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*Paweł Ulman, dr hab. prof. UEK<sup>1</sup>* 

Department of Statistics  
Cracow University of Economics

## **Changes in household income distribution after the introduction of social policy programmes in Poland<sup>2</sup>**

### INTRODUCTION

Many social policy programmes have been introduced in recent years, starting from 2015, which are undoubtedly, or at least perceived so by the public, significant for improving the standard of living for society (general social well-being), and especially for those social groups which used to experience various difficulties in their functioning in the socioeconomic space of modern Poland. Since the programmes are addressed either to a wide range of society or to specific social groups, they substantially no longer fall strictly within the welfare policy but form a part of the social policy, as they are designed to change the current socioeconomic system. The “Family 500+” programme is a good example as its objectives, as we can read on the website of the Polish Ministry of Family, Labour and Social Policy (MRPiPS, 2019a), were to: increase the number of births, limit poverty, and support family. At least two of those objectives (increase the number of births and family support) have distant time horizons and they considerably help organise the socioeconomic order and secure a fair system of relations in society (Danecki, 1984, p. 193).

Although the “Family 500+” programme has been functioning for a relatively short time, the relevant Polish literature already includes papers addressing its impact on Poland’s socioeconomic situation. Information about its significance for the income situation of households can be found in (Hanusik, Łangowska-Szczeńiak, 2018; Gasz, 2018; Brzeziński, Najsztub, 2017; Chrzanowska, Landmasser, 2017)

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<sup>1</sup> Correspondence address: Rakowicka 27, 31-510 Kraków; e-mail: ulmanp@uek.krakow.pl.  
ORCID: 0000-0002-1911-8821.

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and indirectly in (GUS, 2018a). The impact of the programme on the economic activity of people, the state budget and the number of children in families has been addressed by (Franielczyk, 2018; Politaj, 2018; Radzik, 2018; Krawczyk, 2019).

Social policy understood as taking actions can be defined as an instrumental use of power in a state in order to adjust the market mechanisms to secure well-being for all citizens by addressing the socioeconomic inequalities among various social groups and inequalities in terms of power (Szarfenberg, 2007, p. 34).

Social well-being in a general sense is an outcome of two factors: standard of living and the inequalities of its distribution among the citizens<sup>3</sup>. It increases when the standard of living of the members of a particular society or social group improves and/or the inequalities in its distribution decrease. Therefore, the state should pursue both economic and social goals, the former to build wealth, in a broad sense of the term, and the latter to alleviate the excessive inequalities in its distribution among the citizens and to empower the weakest groups.

The purpose of the paper is to analyse the changes in income distribution of Polish households during the introduction and functioning of social policy programmes, and in particular “Family 500+”. The results of the analysis make it possible to monitor the socioeconomic effects of the said programmes in terms of how they shape the income of the population, with the size and diversification of the income determining the level of social well-being – a general objective of social policy. Special attention is paid to those social groups that used to be in a difficult financial situation, as presented in studies by GUS (Polish Central Statistical Office). These include households with many children, people with disabilities or households in the countryside and small towns (GUS, 2017, pp. 25–27). The benchmarking of income distributions is based on data from the 2015 and 2018 Household Budget Survey. When compared to the results presented in the aforementioned papers, this study has the added value that consists in a more in-depth benchmarking analysis of income distribution and distance, from the cross-sectional and time-series perspectives, based on individual data from the Household Budget Survey for two periods – before the introduction of the programmes in question and after they were fully in operation.

## SOCIAL POLICY PROGRAMMES IMPLEMENTED IN POLAND AFTER 2015

Studies regarding the policy addressing social problems attempt to differentiate between social policy and social welfare policy. The subject undertaken in this chapter is difficult and it has been discussed in the literature without explicit

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<sup>3</sup> In a narrower (simplified) sense, the level of social well-being is determined based on the average wages in society and the inequalities in the distribution of those wages. This is synthetically captured by abbreviated welfare function (Kot, 2000, pp. 141–142).



conceptualisation of those terms. This results from the complexity of social issues or processes, their considerable uncertainty and the cultural diversity of the causes underlying those processes, in both space and time. The social policy lexicon confirms this by providing different definitions of that policy<sup>4</sup> (Rysz-Kowalczyk, 2001, pp. 119–120). Those definitions suggest that social policy applies more to the organisation of social life and social relations in order to preserve and shape social progress and social order by preventing social problems and changing the social structure for the benefit of society as a whole. In contrast, social welfare policy is oriented towards issues connected with improving the financial conditions of life (and in particular increasing the income of households) based on *ad hoc* intervention (distribution of welfare benefits), especially in respect of weaker social groups (Rysz-Kowalczyk, 2001, p. 118). There is no doubt that social policy and social welfare policy are intertwined, as expressed by Frączak-Müller (2014, p. 37), who claims that the welfare-related activity of the state is considered as its response to the expectation of social justice and as cooperation to compensate the outcomes of specific situations or fortuitous events in accordance with the principles of equity. Therefore, the state performs a welfare function when it guarantees the satisfaction of the basic needs for all of its citizens, ensures financial security, acts in support of social development through proper services and has institutionalised social rights as an important part of civic rights.

At this point of discussing social policy and welfare policy, I must reiterate that the purpose of this paper is not to address the definition-related issues regarding the terms connected with social policy in a broad sense, but merely to outline the problem of the impact of specific actions of the state on the standard of living and quality of life of society. The definition-related issues of social policy are discussed in more detail by (Skinder, 2009, pp. 33–45).

Below I briefly present the social policy programmes in Poland in 2018. It should be remembered that population income studies also take into account the non-financial goods and services provided to households which increase the total income of the household. Despite that, the overview focuses only on those programmes that result in an actual flow of income to families, people and their households and which apply nationwide<sup>5</sup>.

The first flagship social policy programme of recent years is “Family 500+”, which is a system-based long-term support for Polish families. It was introduced on 1 April 2016. The purpose of the programme is to: increase the number of births in Poland due to their dramatically low level in 2015; limit poverty which substantially affected large families; and support the family as the fundamental and

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<sup>4</sup> The author of the term “Social policy definitions” included in the social policy lexicon decided against providing one definition for the term “social policy”, instead presenting the 7 definitions used in the relevant literature.

<sup>5</sup> All the information about the described social policy programmes comes from the website of the Polish Ministry of Family, Labour and Social Policy (MRPiPS, 2019b).

most important social unit. The programme involves cash transfers of PLN 500 for every child up to the age of 18 in a family, starting from 1 July 2019. Before that date, the benefit was paid for the second and every subsequent child, and in the case of poor families also for the first child.

The “Good Start” programme provides a one-off support of PLN 300 to all pupils starting school. The objective is to invest in the education of Polish children regardless of the income of the pupil’s family.

Another benefit to support families is the supplementary parental benefit, “Mama 4+”. It is intended for those who have raised at least four children and for that purpose they were unable to start a job or had to give up their jobs. To be eligible, they must be additionally experiencing a difficult financial situation – living on the verge of poverty without a right to even minimum benefits. As such, the parental supplementary benefit is a tool to at least partially reward mothers for the work done to raise children if they are unable to earn an adequate salary because of that.

Another programme with material impact on the income of households is a one-off cash transfer for retirement and disability pensioners, “Pension+”. It involves a single payment of PLN 1,100 before tax to every pensioner. As the programme was launched in 2019, its effects are not included in the present analysis.

In addition to the government’s financial social policy programmes, there are also programmes to support specific social groups through the financing of services delivered to the concerned parties either directly or via local governments<sup>6</sup>. They may also influence the income and expenses of households if they are recognised as income resulting from goods and services received for free.

In developed countries, social spending constitutes a considerable share of the GDP. According to data of the OECD (OECD, 2020), Poland spent 21.133% of the GDP for those purposes in 2019, which was about 0.9 percentage points more than in 2015 and almost 1.1 percentage points more than the mean value for OECD countries. Total expenditure on Polish families in Poland in 2015 reached 1.78% of the GDP versus 3.11% in 2017 (MRPiPS, 2020). The brief overview of social policy programmes presented above and the considerable increase in expenditure for that purpose, especially for family support, shows that Poland has considerably increased social support, especially in relation to financially weaker social groups.

## STATISTICAL DATA AND RESEARCH METHOD

The benchmarking of the income across the Polish population is based on data obtained by GUS (Polish Central Statistical Office) through the Household Budget Survey (HBS). The main purpose of the HBS was to provide relevant data for an analysis regarding the standard of living of the population and for an

<sup>6</sup> Examples of such programmes include: “Government Food Support”, “Care 75+”, “Meal at School and at Home”.

analysis of the level and sources of income. The statistical unit is a household, which is classified according to about a dozen criteria, but only two are important from the perspective of this study: socioeconomic group and household biological type. The first criterion includes but is not limited to: employment households, retired pensioners or households supporting themselves from sources other than employment. The second one encompasses households of childless marriages, marriages with dependent children and, for example, single parents (GUS, 2018b).

The most common income category used in benchmarking studies is disposable income per capita. This income is defined as “total current household income from various sources, less personal income tax withholdings (deducted from wages and from certain social security benefits and other benefits), less ownership taxes, taxes paid for self-employment, for instance by representatives of free professions and individual farmers, and less social security and healthcare insurance premiums” (GUS, 2018b, p. 26). Disposable income includes both cash and non-cash income as well as goods and services received for free. It is significant for a study of the impact of social programmes on income, and by extension on the standard of living, that disposable income also includes goods and services acquired for free. After all, social support may be provided largely as non-financial social benefits.

Ultimately, the study examines household income per capita and per equivalent unit, i.e. equivalent income, but the income in both cases is weighted by the number of people in the household. As a result, an individual (household member) rather than a whole household is treated as the statistical unit.

Equivalent units are obtained based on equivalence scales. Their application makes it possible to compare households of various demographic structures according to the cost of maintaining a specific standard of living (well-being) equal for those households. The relevant literature offers broad discussions about the problem of determining those scales (Dudek, 2011; Kot et al., 2004, pp. 171–175). Since there is no single method for estimating equivalence scales, this paper uses a modified OECD scale<sup>7</sup>, which involves assigning weights to particular household members depending on their age (Hagenaars et al., 1994).

There are two ways of examining income distribution: as empirical distribution or using income distribution models. Both methods have their advantages and disadvantages. In the case of empirical distribution, problems may include the calculation of certain characteristics of the distribution and their vulnerability to extreme observations, while in the case of theoretical distributions, we face the problem of selecting an appropriate function to model the actual income distribution and the issue of estimating the parameters of that model.

The present paper adopts an intermediate approach, one which involves using a decile distribution with closing of extreme income classes<sup>8</sup>. The approach makes

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<sup>7</sup> As it is impossible to expressly define the equivalence scales, the literature often uses the OECD scale. This approach makes it possible to compare the results obtained by various researchers.

<sup>8</sup> The issue has been addressed in more detail in (Ulman, 2015, pp. 80–82).

it possible to avoid multiple estimation of income distribution models (for various household groups) and also to significantly limit the impact of any diverging income.

Statistical description of income distribution is based on common descriptive measures – mean value, median, mode, coefficient of variation, relative average deviation, Gini coefficient and asymmetry coefficient<sup>9</sup>.

Differences between income distributions in the years under study are explored using a measure of distance between the distributions which is based on comparison of quantile orders (in the cumulative distribution function). They can be presented with the following formula:

$$O = 1 - \sum_{i=1}^k (G(p_i) + G(p_{i-1}))w_i, \quad (1)$$

where:  $w_i = p_i - p_{i-1}$ ,  $G(p_i)$  is the studied cumulative distribution function value for baseline distribution quantiles. The measure takes values in the range  $[-1,1]$ . A negative  $O$  value means divergence of the studied distribution from the baseline distribution towards the lower values of income, while a positive  $O$  value means that the studied distribution is shifted against the baseline distribution towards the higher values of income (Ulman, 2018, p. 48).

A slightly simpler way to measure the differences in income is to compare its mean values using the income gap index. This involves calculating the difference between mean values of income for two comparable distributions and dividing that difference by the mean value from the baseline distribution.

Abbreviated welfare functions serve as simple measures of social well-being (of population groups). They make it possible to compare well-being without measuring the utility function, taking into account only two income distribution parameters: its mean value and the level of income inequalities. One of the most popular welfare functions of this type is the Sen index, proposed by A. Sen, a 1973 and 1998 Nobel Prize winner (Sen, 1973, p. 33).

The Sen index may be presented with the following formula:

$$I_s = \mu(1 - G) \quad (2)$$

where:  $\mu$  means average income, and  $G$  – Gini coefficient value.

## STUDY RESULTS

The results of the analysis presented below were obtained based on individual and anonymised data from the Household Budget Survey for two year periods: 2015 and 2018. The first of those years directly preceded the introduction of many significant social policy programmes, while the other one was chosen for data

<sup>9</sup> Appropriate formulae can be found in (Ulman, 2015, pp. 87–99).

availability reasons – they were the most recent data sets available as the paper was being prepared and they already included information about increased income from various social programmes implemented after 2015.

First, the results of estimations of the basic characteristics of income distribution per capita and equivalent income were presented in Table 1 for 2015 and 2018. To achieve income comparability, the income from 2015 was converted according to the inflation rate to bring it in line with 2018 prices.

All measures of central tendency (mean value, median, mode) point to a substantially higher income in 2018 than in 2015 for both income per capita and equivalent income. Notably, all the three measures of variability (inequality) of income (coefficient of variation, relative average deviation – RAD, Gini coefficient) show that inequalities were lower in 2018. If the purpose of social programmes involving transfer of money primarily to the financially weaker members of society is to increase their income and limit the diversification, the results presented in Table 1 confirm this effect. Even if we assume that we give the same amount of money to every member of society, this is enough for the inequalities in income distribution to drop. This arises from an axiom of the measures of inequalities, which states that adding the same income to every individual reduces the inequalities in income distribution. In social policy programmes, money is usually provided to those who need it the most, which of course allows such programmes to reduce income inequalities even more. The growing average income and the decreasing inequalities are reflected in the increasing value of the Sen index, which reflects the level of social well-being in a simplified way. Besides, it is noteworthy that equivalent income is much higher than income per capita. This is of course justified because there are fewer equivalent units in a household than there are household members (unless it is a single-member household). Equivalent income is assumed to be a measure of well-being as it carries information about income comparable due to the costs that households should incur to achieve a specific well-being level<sup>10</sup>. The asymmetry of income distribution must also be mentioned – it was right-sided, which was an expected outcome. This result derives from the differentiation between measures of central tendency – the income mean value being higher than the modal value.

This special characteristic of income distribution is illustrated in Figures 1 and 2, where the right distribution tail runs more towards higher values than the left one towards lower values. There is also a visible shift of income distributions towards higher values in 2018 versus in 2015, which is confirmed by the applied measures of distance between the distributions, showing that the 2018 distribution substantially, for such a short period, differs from the income distribution in 2015, both for income per capita and for equivalent income.

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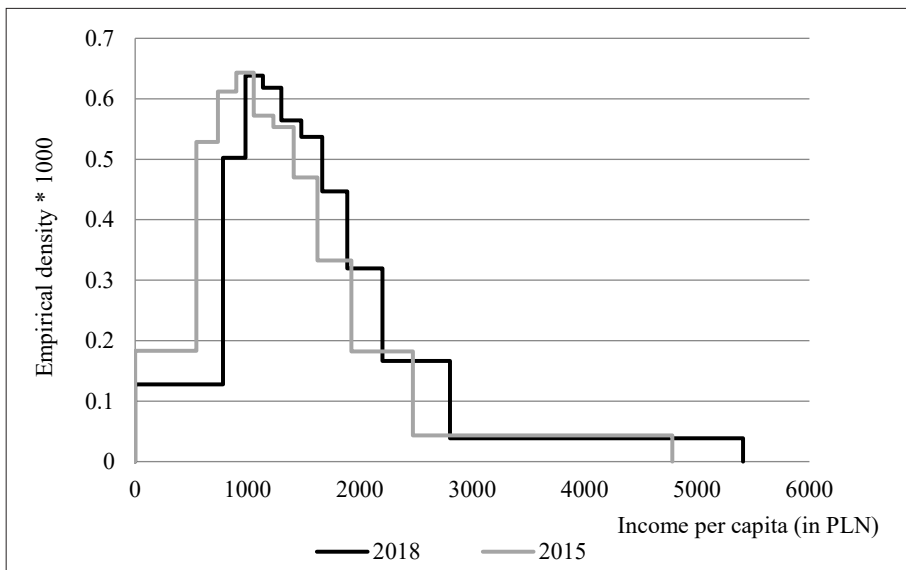
<sup>10</sup> The equivalence scale answers the question of what income should be available to a household with specific characteristics (usually the number of people) to achieve the same level of well-being as the reference household with a specific income and characteristics.

**Table 1. Distribution characteristics for income per capita and for equivalent income (in PLN) in 2015 and 2018 (prices from 2018)**

Distribution characteristic	Income per capita		Equivalent income	
	2015	2018	2015	2018
Mean value	1427.88	1693.46	2199.75	2652.95
Median	1228.91	1477.18	1922.85	2351.17
Mode	946.09	1118.08	1748.14	2055.26
Coefficient of variation	63.31%	58.10%	59.34%	54.90%
RAD	23.81%	21.55%	21.91%	20.14%
Gini coefficient	0.334	0.304	0.310	0.287
Asymmetry	0.533	0.585	0.346	0.410
Sen index	951.40	1178.31	1517.17	1891.29
Index of distance	x	0.2029	x	0.2354
Income gap	x	0.1860	x	0.2060

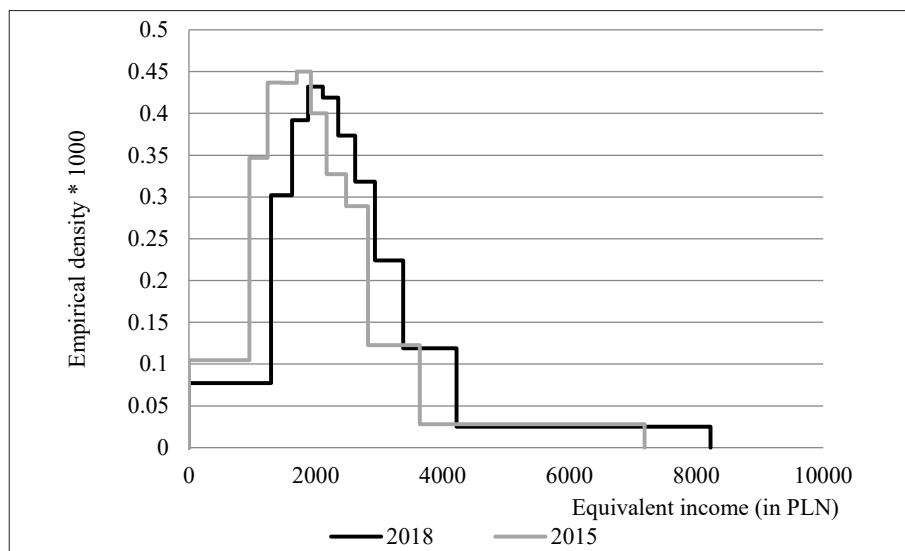
Source: own study based on (GUS, 2018b).

Table 2 presents income distribution characteristics for selected socioeconomic groups of households in the two periods under study. It includes households living off paid employment, retirement pension, disability pension and certain non-employment sources. These types of household should be the primary beneficiaries of the recently introduced social programmes.



**Figure 1. Distribution of income per capita in 2015 and 2018 (prices from 2018)**

Source: own study based on (GUS, 2018b).



**Figure 2. Distribution of equivalent income in 2015 and 2018 (prices from 2018)**

Source: own study based on (GUS, 2018b).

**Table 2. Distribution characteristics of income per capita (in PLN) by socioeconomic group in 2015 (prices from 2018)**

Distribution characteristic	Households living off:					
	paid employment		retirement pension or disability pension		non-employment sources	
	2015	2018	2015	2018	2015	2018
Mean value	1428.61	1702.65	1481.33	1683.35	897.49	1057.94
Median	1208.65	1466.67	1389.67	1590.00	661.84	887.33
Mode	919.48	1141.32	1386.10	1613.06	505.06	911.09
Coefficient of variation	63.37%	57.69%	51.58%	47.02%	77.40%	65.26%
RAD	23.65%	21.28%	19.63%	17.68%	28.26%	22.83%
Gini coefficient	0.331	0.300	0.281	0.255	0.385	0.323
Asymmetry	0.562	0.572	0.125	0.089	0.565	0.213
Sen index	956.31	1192.54	1064.78	1253.76	551.78	716.33
Index of distance	x	0.2242	x	0.1769	x	0.2463
Income gap	x	0.1918	x	0.1364	x	0.1778

Source: own study based on (GUS, 2018b).

Just like before, the average household income in 2018 was in all cases significantly higher, while inequalities were lower than in 2015. This diversification between distributions is confirmed by measures of distance. The higher the value of

the index of distance and the income gap, the more apart the compared distributions. Notably, the index of distance was the highest in the case of distributions for households living off non-employment sources, while the income gap was the highest for employment sources. Yet it seems that the index of distance used in the analysis is a more precise measure for income distribution diversification. This is because, unlike in the case of the income gap, it takes into account more information about the distribution than just the mean value. So the greatest beneficiaries of the income distribution changes in the period under study are households living off non-employment sources, followed by employment households.

Tables 3 and 4 include results analogical to those described above but they focus on households by biological type. They consider households of childless marriages (no dependent children), households of marriages with dependent children and households of single mothers with at least one dependent child. The intended primary beneficiaries of the social programmes changing the income distributions were households with underage children.

**Table 3. Distribution characteristics of income per capita (in PLN)  
by biological type of household in 2015 (prices from 2018)**

Distribution characteristic	Marriage					Mother with children
	without children	with 1 child	with 2 children	with 3 children	with 4 or more children	
Mean value	2000.40	1638.01	1304.76	959.69	684.87	1110.80
Median	1751.17	1442.14	1107.36	824.08	577.20	905.97
Mode	1504.19	1310.32	995.02	836.38	529.88	653.06
Coefficient of variation	55.47%	56.97%	62.41%	59.31%	57.19%	64.85%
RAD	20.40%	21.21%	22.65%	22.10%	21.40%	24.31%
Gini coefficient	0.290	0.301	0.321	0.310	0.299	0.337
Asymmetry	0.447	0.351	0.380	0.217	0.396	0.635
Sen index	1421.28	1145.62	886.32	662.09	479.89	736.79

Source: own calculations based on (GUS, 2018b).

The income of particular social groups clearly grew in all cases. The level of inequalities dropped significantly, which, in total, resulted in a substantial increase of the Sen index value. At the bottom of Table 4 are measures of distance for the studied distributions on a time-series basis. It can be noticed how the values of those measures rise as the number of children in the marriage increases. For marriages with 4 or more children, income distribution from 2018 is no longer the same as in 2015 (to the advantage of the 2018 situation). If the index of distance were 1, the two distributions would have nothing in common (all the



2018 income would be at least equal to the highest income from 2015). Therefore, the greatest beneficiaries of the social programmes in recent years are households with dependent children. This reveals the difficult income situation in which those households were before 2016. If they had had sufficient income at their disposal, then even a child benefit of PLN 500 multiplied by the number of children would not have caused such significant changes in income distribution. In other words, the reference baseline (2015 income) was low.

**Table 4. Distribution characteristics of income per capita (in PLN)  
by biological type of household for 2018**

Distribution characteristic	Marriage					Mother with children
	without children	with 1 child	with 2 children	with 3 children	with 4 or more children	
Mean value	2195.07	1903.01	1596.84	1326.09	1085.82	1367.26
Median	1950.00	1700.00	1408.25	1140.00	984.83	1155.67
Mode	1685.72	1615.26	1109.47	1087.68	1010.50	1152.85
Coefficient of variation	53.14%	55.29%	55.43%	53.54%	54.10%	57.49%
RAD	19.57%	19.96%	20.15%	19.28%	18.69%	20.61%
Gini coefficient	0.279	0.287	0.287	0.275	0.273	0.291
Asymmetry	0.437	0.274	0.551	0.336	0.128	0.273
Sen index	1583.52	1357.42	1138.07	961.28	789.39	969.52
Index of distance	0.1303	0.1934	0.2705	0.4032	0.5318	0.2844
Income gap	0.0973	0.1618	0.2239	0.3818	0.5854	0.2309

Source: own calculations based on (GUS, 2018b).

Tables 5 and 6 include income gap calculation results for the already mentioned household groups by the socioeconomic class and biological type. The calculations were made separately for 2015 and 2018. The comparison is designed to show whether the introduced social programmes change the diversification between social groups, for example.

In the case of household division by the socioeconomic group, we do not observe clear changes in the relations between particular income distributions over time. Employment households had “better” income distribution than households living off non-employment sources. A slight change took place between employment households and households living off a retirement pension or disability pension. In 2015, the former were in a worse situation than the latter, but in 2018 the situation reversed. Still, the income gap differences for those two periods were not substantial.

**Table 5. Income gap for households by selected socioeconomic groups for 2015 and 2018**

Baseline distribution / household	Studied distribution		
	employment	retirement pension or disability pension	non-employment sources
2015			
employment	0.0000	0.0369	-0.3718
retirement pension or disability pension	-0.0356	0.0000	-0.3941
non-employment sources	0.5918	0.6505	0.0000
2018			
employment	0.0000	-0.0113	-0.3787
retirement pension or disability pension	0.0115	0.0000	-0.3715
non-employment sources	0.6094	0.5912	0.0000

Source: own study based on (GUS, 2018b).

**Table 6. Income gap for households by biological type of household for 2015 and 2018**

Baseline distribution / household	Studied distribution					
	marriage without children	marriage with 1 child	marriage with 2 children	marriage with 3 children	marriage with 4 or more children	mother with children
2015						
marriage without children	0.0000	-0.1812	-0.3478	-0.5203	-0.6576	-0.4447
marriage with 1 child	0.2212	0.0000	-0.2034	-0.4141	-0.5819	-0.3219
marriage with 2 children	0.5332	0.2554	0.0000	-0.2645	-0.4751	-0.1487
marriage with 3 children	1.0844	0.7068	0.3596	0.0000	-0.2864	0.1575
marriage with 4 or more children	1.9208	1.3917	0.9051	0.4013	0.0000	0.6219
mother with children	0.8009	0.4746	0.1746	-0.1360	-0.3834	0.0000
2018						
marriage without children	0.0000	-0.1331	-0.2725	-0.3959	-0.5053	-0.3771
marriage with 1 child	0.1535	0.0000	-0.1609	-0.3032	-0.4294	-0.2815
marriage with 2 children	0.3746	0.1917	0.0000	-0.1696	-0.3200	-0.1438
marriage with 3 children	0.6553	0.4351	0.2042	0.0000	-0.1812	0.0310
marriage with 4 or more children	1.0216	0.7526	0.4706	0.2213	0.0000	0.2592
mother with children	0.6055	0.3918	0.1679	-0.0301	-0.2058	0.0000

Source: own study based on (GUS, 2018b).

The situation is different if we divide households by the biological type. Let us take a look at the most drastic difference, i.e. households of marriages with 4 or more dependent children. Their average income in 2015 was almost half that (1.9208) of the average income of marriages without children, and households of single mothers with children had an income higher by over 62%. In 2018, those relations remained unchanged but the scale of income diversification for the mentioned household groups dropped. The average income was “only” 102% higher for childless marriages and about 26% higher for single mothers than the average income of marriages with many children.

The results in the tables show that not only did the income situation of particular groups improve but also the inequalities between the groups decreased. The main beneficiaries of the social programmes were those population groups who were in the most difficult income situation before 2016. This is confirmed by the simple estimation of the money transferred under the “Family 500+” programme in 2018 by quartile income class. The calculations based on the HBS database show that 51.92% of the total funds were transferred to households with the lowest income; 26.24% to households from the second quartile class (income between the first quartile and the median); 12.73% to households from the third quartile class; and, finally, 9.11% to households characterised by the best income situation.

## CONCLUSIONS

The social programmes introduced in recent years were intended to ensure a fairer distribution of the benefits derived from Poland’s economic growth. As the study results regarding poverty show, poverty affected large families and households with the disabled the most. Philosophical and ethical issues aside, the introduction of cash transfers to support families, primarily in raising children, seems a justified activity of the state. After all, such families carry out work that is socially useful and important for shaping the pro-developmental structure of society (which is one of the objectives of social policy). So why should they not be rewarded for that by the state (society) in the spirit of social solidarity and justice.

The analysis results presented in the paper show that not only did the average income of all social groups grow but also income distribution inequalities within and between groups dropped, the greatest beneficiaries of the social programmes in the period under study being marriages with dependent children and households living off non-employment sources. All those changes may be, with a certain caution, attributed to the social programmes introduced in recent years and to the policy of raising the minimum wages (by PLN 350, from PLN 1750 in 2015 to PLN 2100 in 2018, i.e. by 20%). In addition to those two factors, the economic condition in the period under study was good, which led to pay increases in general, decreased the

share of employees receiving minimum wages<sup>11</sup> and increased employment, and this, in turn, resulted in higher income of the population. Nevertheless, it must be noted that such significant income distribution changes in the population groups identified in the paper (primarily marriages with dependent children) cannot be explained away only by an improving economy.

The growth of the average income and the decrease of income inequalities directly improves social well-being, with income growth being more significant in this case than the reduction in inequalities<sup>12</sup>. This shows that from a formal view, the focal point should be to increase the income of the population rather than limit income inequalities which can no longer be considered as high after the introduction of the social programmes.

## BIBLIOGRAPHY

- Brzeziński, M., Najsztub, M. (2017). *Wpływ programu „Rodzina 500+” na dochody gospodarstw domowych, ubóstwo i nierówność*. Retrieved from: [https://www.researchgate.net/publication/320386256\\_Wplyw\\_programu\\_Rodzina\\_500\\_na\\_dochody\\_gospodarstw\\_domowych\\_ubostwo\\_i\\_nierownosc](https://www.researchgate.net/publication/320386256_Wplyw_programu_Rodzina_500_na_dochody_gospodarstw_domowych_ubostwo_i_nierownosc) (2020.03.20).
- Chrzanowska, M., Landmasser, J. M. (2017). Symulacja efektów ex ante programu „Rodzina 500+”. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu. Taksonomia* 28. *Klasyfikacja i analiza danych – teoria i zastosowanie*, 468, 38–46. DOI: 10.15611/pn.2017.468.04.
- Danecki, J. (1984). O postępie społecznym i polityce społecznej. In: W. Anioł (Ed.), *Polityka społeczna. Wybór tekstów teoretycznych* (pp. 182–195). Warszawa: Wydawnictwo IPS UW.
- Dudek, H. (2011). *Skale ekwiwalentności – estymacja na podstawie kompletnych modeli popytu*. Warszawa: Wydawnictwo SGGW.
- Franielczyk, A. (2018). Program Rodzina 500+ w aspekcie wydatków publicznych. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 528, 68–75. DOI: 10.15611/pn.2018.528.06.
- Frątczak-Müller, J. (2014). *Rodzina. Potrzeby. Polityka społeczna*. Warszawa: Dom Wydawniczy Elipsa.
- Gasz, M. (2018). Rola programu Rodzina 500+ w procesie redukcji zagrożenia ubóstwem i wykluczeniem społecznym w Polsce. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 528, 88–101. DOI: 10.15611/pn.2018.528.08.
- GUS (2017). *Jakość życia w Polsce w 2015 r. Wyniki badania spójności społecznej. Studia i analizy statystyczne*. Warszawa: GUS.

<sup>11</sup> At the end of 2018, the number of people employed in the national economy whose gross pay did not exceed the minimum wages dropped by 3.7% versus the analogical period in the year before (GUS, 2019).

<sup>12</sup> Analysis of the flexibility of the Sen index versus appropriate income changes and inequalities shows that with a Gini coefficient below 0.5, a 1% income growth has more impact (well-being growth) than a 1% drop in the said coefficient.

- GUS (2018a). *Różne oblicza ubóstwa w Polsce w 2015 r. i w 2018 r. na podstawie Badania spójności społecznej. Informacja sygnałna*. Warszawa: GUS.
- GUS (2018b). *Badanie budżetów gospodarstw domowych. Zeszyt metodologiczny. Metodologia badań statystycznych*. Warszawa: GUS.
- GUS (2019). *Wybrane zagadnienia rynku pracy (liczba osób z minimalnym wynagrodzeniem, „samozatrudnienie”, umowy zlecenia, umowy o dzieło). Dane dla 2018 r.* Warszawa: GUS.
- Hagenaars, A., de Vos, K., Zaidi, M. A. (1994). *Poverty Statistics in the Late 1980s: Research Based on Micro-data*. Luxembourg: Office for Official Publications of the European Communities.
- Hanusik, K., Łangowska-Szczeńiak, U. (2018). Wpływ programu Rodzina 500+ na poziom życia gospodarstw domowych wychowujących dzieci i jego samoocenę w Polsce w 2016 roku. *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania Uniwersytetu Szczecińskiego*, 51(3), 123–137. DOI: 10.18276/sip.2018.51/3-11.
- Kot, S. M. (2000). *Ekonometryczne modele dobrobytu*. Warszawa–Kraków: Wydawnictwo Naukowe PWN.
- Kot, S. M., Malawski, A., Węgrzecki, A. (Eds.). (2004). *Dobrobyt społeczny, nierówność i sprawiedliwość społeczna*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.
- Krawczyk, M. (2019). Świadczenie 500+ jako element polityki prorodzinnej i demograficznej państwa. *Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach*, 120, 57–62. DOI: 10.34739/zn.2019.47.07.
- Politaj, R. (2018). Sytuacja kobiet na rynku pracy w dobie obowiązywania programu Rodzina 500+. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 529, 248–257. DOI: 10.15611/pn.2018.529.22.
- Radzik, P. (2018). Wpływ rządowego programu „Rodzina 500+” na współczynnik aktywności zawodowej kobiet. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, 353, 59–72.
- Rysz-Kowalczyk, B. (Ed.). (2001). *Leksykon Polityki Społecznej*. Warszawa: Oficyna Wydawnicza ASPRA-JR.
- MRPiPS (2019a). Retrieved from: <https://www.gov.pl/web/rodzina/rodzina-500-plus> (2019.10.15).
- MRPiPS (2019b). Retrieved from: <https://www.gov.pl/web/rodzina/programy-i-projekty> (2019.10.16).
- MRPiPS (2020). Retrieved from: <https://www.gov.pl/web/rodzina/rodzina-500-plus> (2020.03.20).
- OECD (2020). Retrieved from: <https://data.oecd.org/socialexp/social-spending.htm#indicator-chart> (2020.03.20).
- Sen, A. (1973). *On Economic Inequality*. Oxford: Clarendon Press.
- Skinder, M. (2009). *Polityka społeczna. Wybrane aspekty*. Bydgoszcz: Wydawnictwo Edukacyjne WERS.
- Szarfenberg, R. (2007). Definicje, zakres i konteksty polityki społecznej. In: G. Flirt-Fesnak, M. Szyłko-Skoczny (Eds.), *Polityka społeczna. Podręcznik akademicki* (pp. 21–36). Warszawa: Wydawnictwo Naukowe PWN.

Ulman, P. (Ed.). (2015). *Statystyka pracy. Wybrane zagadnienia*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.

Ulman, P. (Ed.). (2018). *Wybrane zagadnienia statystyki pracy. Materiały do ćwiczeń*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.

### *Summary*

The aim of the paper is to analyse changes in the distribution of income of Polish households during the implementation and functioning of social policy programmes in Poland. Attention is paid to social groups that experienced a difficult economic situation, in particular marriages with dependent children. The added value of the research lies in the in-depth comparative analysis of the distribution of income and its distance in cross-section and time, based on individual data from the Household Budget Survey for two periods – before the implementation of the programmes and during their full operation.

In order to compare the income distributions, statistical analysis methods were applied to the empirical income distributions. In addition to the commonly known and basic numerical characteristics of the distributions, a distribution distance measure and an income gap ratio were used. All calculations were based on individual data from the Household Budget Survey carried out in 2015 and 2018.

As a result of the calculations, it was shown that in the analysed period there were significant changes in the distribution of income among the Polish population in terms of average income and income inequality. The former increased substantially, while the latter decreased, including between social groups. The results show that the social policy programmes implemented in Poland after 2015 contributed significantly to raising the level of income of most members of society and reducing economic inequalities.

*Keywords:* social policy, income, economic inequalities.

## **Zmiany w rozkładzie dochodów gospodarstw domowych po wprowadzeniu programów polityki społecznej w Polsce**

### *Streszczenie*

Celem artykułu jest analiza zmian w rozkładzie dochodów polskich gospodarstw domowych w czasie wprowadzania i funkcjonowania programów polityki społecznej w Polsce. Uwaga poświęcona została tym grupom społecznym, które doświadczały trudnej sytuacji ekonomicznej, w szczególności małżeństwom z dziećmi na utrzymaniu. Wartością dodaną badań – w stosunku do prezentowanych dotychczas w literaturze przedmiotu – jest dogłębna analiza porównawcza rozkładu dochodów i ich oddalenia (odległości) w ujęciu przekrojowym, jak i czasowym, oparta o indywidualne dane z Badania Budżetów Gospodarstw Domowych z dwóch okresów – przed wprowadzeniem w życie omawianych programów i w trakcie ich pełnego funkcjonowania.

W celu porównania rozkładów dochodów wykorzystano metody statystycznej analizy empirycznych rozkładów dochodów. Oprócz powszechnie znanych podstawowych charakterystyk liczbowych rozkładów zastosowano miernik odległości rozkładów oraz miernik luki dochodowej. Wszystkie obliczenia przeprowadzono na podstawie indywidualnych danych z Badania Budżetów Gospodarstw Domowych zrealizowanych w latach 2015 i 2018.

W wyniku przeprowadzonych obliczeń pokazano, że w badanym okresie nastąpiły zasadnicze zmiany rozkładów dochodów ludności polskiej zarówno w zakresie przeciętnych dochodów, jak również nierówności dochodowych. Pierwsze istotnie wzrosły, natomiast drugie spadły. Spadły również nierówności między porównywanymi grupami społecznymi. Wyniki te dają podstawę do stwierdzenia, że programy polityki społecznej wprowadzone w życie w Polsce po 2015 r. zasadniczo przyczyniły się do podniesienia poziomu dochodów większości członków społeczeństwa i ograniczenia nierówności ekonomicznych.

*Słowa kluczowe:* polityka społeczna, dochody, nierówności ekonomiczne.

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Krzysztof Bartosik, dr hab.<sup>1</sup> 

Institute of Economics  
Polish Academy of Sciences

## **The “Family 500+” programme and female labour force participation in Poland. Demographic and economic determinants**

### INTRODUCTION

As with other countries, Poland is experiencing a low fertility rate, population ageing and, as a result, depopulation. In 2016, the government introduced a child cash benefit “Family 500+”. The programme aimed to increase the income of households, cut child upbringing costs and encourage fertility<sup>2</sup>. However, the cash transfers may decrease female economic activity, strengthen the labour supply shortage resulting from the adverse demographic changes, and it may impede the achievement of the programme’s aims, such as an increase in the income of households.

This paper investigates the impact of the child benefit “Family 500+” on female labour supply in Poland, taking into account the changes in the age structure of the female population and business cycle. Several Polish authors (Myck, 2016; Premik, 2017; Magda et al., 2018) have examined the impact of the “Family 500+” on labour supply in Poland. The early studies, however, have provided mixed results (see related literature) and risen methodology-related controversies. For instance, the Polish Ministry of Family, Labour and Social Policy (MRPiPS, 2018) questioned the results of the analysis by Magda *et al.* (2018), claiming that more factors than the cash transfers under the “Family 500+” programme determine female labour supply.

This paper uses a method that differs from the earlier Polish studies. To understand what forces drive labour supply, the effects of the demographic changes, the business cycle and the cash transfers on Labour Force Participation Rate (LFPR)

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<sup>1</sup> Correspondence address: e-mail: kbartosik@inepan.waw.pl. ORCID: 0000-0002-1488-7031.

<sup>2</sup> More details about the aims of the programme and the related dilemmas can be found in Gromada (2018).



were examined. The effect of the change in the age-structure of the population and the change in the economic activity of age-range subgroups activity on labour supply was studied using a counterfactual analysis. To identify the causes of female economic inactivity, a decomposition of the growth rate of economically inactive women into the inactivity types adopted by the Polish Labour Force Survey (LFS) was conducted. To capture the effect of the business cycle, the analysis investigated the stability of the relationship between the business cycle and labour supply using Ordinary Least Square (OLS) recursive regression.

The analysis focuses on the period from 2016q2, when the “Family 500+” programme was introduced, to 2018q4. Nonetheless, to better understand changes in female labour supply and its determinants, the study goes back to 2006. The analysis is based on quarterly data from LFS and GUS (Polish Central Statistical Office; CSO). The missing data on the labour market for 2012q2 are interpolated. The data on the number of women with tertiary education comes from the Eurostat database, the data on the number of births are taken from CSO *Statistical Bulletins*.

The paper is organised as follows: Section 2 presents related literature; Section 3 describes the evolution of the Polish family policy, particularly child benefits, and the effect of the child benefit “Family 500+” on the income of households and incentives to labour market activity; Section 4 analyses the time-evolution of female LFPR and explains how it was influenced by demographic processes and changes in the economic activity of age-range subgroups; Section 5 analyses the reasons for female inactivity adopted by the LFS; Section 6 examines cyclicity of female LFPR; Section 7 concludes the paper.

## RELATED LITERATURE

This paper refers to three groups of studies. The first group (e.g. Aaronson et al., 2006) addresses welfare benefits as one of labour supply determinants, along with demographic and business cycle-related factors. The second group analyses the impact of cash benefits provided within the family policy on female labour supply. The results of these studies are mixed. For instance, the report by Bastagli *et al.* (2016) summarising relevant studies for developing countries suggests that cash transfers have no significant effect on adult labour supply. In contrast, the study by Jaumotte (2013), analysing the impact of family policies in 17 Organisation for Economic Cooperation and Development (OECD) countries between 1985 and 1999, indicates a negative impact of child benefits on female labour supply.

Previous Polish analyses of the impact of the “Family 500+” child benefit on female labour supply also provided mixed evidence. According to Premik (2017), the transfers encouraged mothers with school-age children to be more economically active, contributed to a slow drop in the activity of mothers of the

youngest children and increased the economic activity of their fathers. In contrast, Magda *et al.* (2018) and Myck (2016) claim that the “Family 500+” child benefit decreases female labour supply, especially among less-educated women and in small towns.

A third group of papers investigates the impact of economic fluctuations on labour supply. Analyses show (e.g. Darby *et al.*, 1998; Van Zandweghe, 2012; Ozerkek, 2013) that female labour supply is more sensitive to economic fluctuations than male labour supply. Importantly, many researchers suggest that out-of-work income weakens the sensitivity of labour supply to economic fluctuations. For instance, Bredtmann, Otten and Rulff (2018) show that the “added worker effect” is weaker in countries where unemployment benefits are generous and the eligibility period is long. Lee and Parsanis (2014) found that the “discouraged worker effect” dominates in developed countries with access to non-wage incomes, while the “added worker effect” prevails in developing countries characterised by low social security and welfare support<sup>3</sup>.

#### FAMILY POLICY AND CASH BENEFITS

Over the past decade, Polish governments increased financial support for families with children and extended the paid parental leave. The evolution of Polish family policy was driven by population ageing and a low fertility rate<sup>4</sup>. This section briefly presents the evolution of child benefits in Poland in previous years, and the effect of the “Family 500+” child benefit on households’ income and incentives to labour market activity.

#### *EVOLUTION OF CHILD BENEFITS*

In 2006, a single payment of PLN 1000 was introduced, which was provided following childbirth (starting from 2013, eligibility depended on an income threshold). In 2014, the Large Family Card programme was adopted, granting various discounts (e.g. for train journeys) to families with at least three children. In 2015, tax credits beneficial for large families were introduced. In 2016, a parental benefit of PLN 1000 was enacted, to be paid for one year following childbirth to those (e.g. unemployed, students, farmers) who do not receive maternity benefits.

<sup>3</sup> The “added worker effect” occurs when, for example, the woman starts a job to compensate for the earning losses because her partner has become unemployed, while the “discourage worker effect” occurs when the deterioration of labour market discourages people from active job searching and they drop out of the labour force.

<sup>4</sup> More details about Polish family policy can be found in Sobociński (2016).

In 2016, the “złoty for a złoty” rule was introduced to the family benefit. According to the rule, parents who exceed the income threshold do not lose the benefit but receive a proportionally lower benefit.

In 2016, the government introduced a means-tested child cash benefit, “Family 500+”. The programme provided a PLN 500 benefit per month for every second and subsequent child until the age of 18. The first child was eligible for the benefit if the income per family member did not exceed PLN 800 (PLN 1200 in the case of a disabled child). In July 2019, the income threshold for the first child was withdrawn, and, as a result, all children up to the age of 18 became eligible for the benefit. Importantly for economic activity, the income under the “Family 500+” programme is not taxed and it does not affect eligibility for other social welfare benefits.

In 2016, the “Pro-Life” programme was introduced to provide a one-off benefit payment of PLN 4,000 for families where a disabled child was born. In 2018, the “Good Start” programme was implemented – at the beginning of the school year, every schoolchild receives a single payment of PLN 300.

#### *THE ROLE OF “FAMILY 500+” CHILD BENEFIT LEVEL AND DESIGN*

Economic theory suggests that cash transfers may affect labour supply in different ways. In a ‘textbook’ microeconomic model of labour supply, cash transfers may discourage labour market participation through the income effect; they cut the cost of leisure-time and increase demand for leisure-time. On the other hand, models taking into account child upbringing costs and treating payments for childcare services as a “tax” (e.g. Connelly, 1992), imply that cash benefits may increase female labour supply because they cut that “tax” and encourage the use of childcare services. In turn, empirical studies (e.g. Bastagli et al., 2016), suggest that the cash benefit level and design are important. For instance, relatively high cash transfers may decrease labour market participation, while short-term transfers may be neutral.

“Family 500+” is a large and costly programme (see Table 1). In 2016 and 2017, the programme covered 2.52 million families, and in 2018 2.38 million. The cost of the programme is estimated at PLN 17.1 billion in 2016, 23.2 billion in 2017 and 22.2 billion in 2018. As a result of the programme, welfare costs between 2015 and 2017 increased from about 1% to 2.4% of the GDP. Withdrawal of the income threshold increased the range and costs of the programme. In 2020, the costs of the “Family 500+” programme are expected to reach PLN 41.2 billion<sup>5</sup>.

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<sup>5</sup> *Polish State Budget Act 2020 Statement of grounds*. Warsaw, September 2019, chapter V, p. 44.

**Table 1. The “Family 500+” child benefit costs and coverage**

Year	2014	2015	2016 <sup>a</sup>	2017	2018
Share of social welfare in % GDP	1.1	1.0	2.1	2.4	.
Expenditures on “Family 500+” (in billion PLN)	.	.	17.1	23.2	22.2
The average number of families covered by “Family 500+” (in millions)	.	.	2.52	2.52	2.38
including ones with one child (in millions)			0.63	0.67	0.54
Number of children covered by the programme (in millions)	.	.	3.81	3.80	3.59

Note: (a) The programme covered the period from April to December.

Source: own study based on (GUS, *Concise Statistical Yearbook of Poland* – issues from the years 2015–2019 (Table 27); GUS, 2019, *Concise Statistical Yearbook of Poland 2019*, p. 156).

The effect of the income threshold for the first child on economic activity may be either neutral or negative. It may be neutral as the benefits are paid to the poorest and large families, who usually live in the countryside, work on farms, and additional income may not affect their economic activity. Large families and farming families are the main beneficiaries of the “Family 500+” programme. The average net household income per capita between 2015 and 2016 increased by 4.2%, and for households with 5 and more members by 9.4%. The average growth rate was 4.6% in the households of employees, and 13.7% in the households of farmers (see Table 2). This was accompanied by a decrease in income inequalities and poverty. According to GUS (2019a, p. 4; 2019b, p. 1), the Gini coefficient dropped from 0.332 to 0.298, and the indicator of absolute poverty from 6.5% 2015 to 4.3% in 2017<sup>6</sup>.

On the other hand, means-tested and relatively high transfers may motivate people to economic inactivity. The income threshold encourages lower-income parents to adjust their income to receive a benefit for the first child: either by not starting a job in order not to lose the benefit or by quitting their jobs to become eligible<sup>7</sup>. The benefits received under the programme were relatively high compared to the level of wage, and their significance grew with the number of children. Table 3 shows that a cash transfer for one child (PLN 500) represented about 33% of the minimum net wage and more than 15% of the average net wage in 2018<sup>8</sup>. Importantly, as reported by GUS (2018, p. 159), the majority of working

<sup>6</sup> More details about the impact of the “Family 500+” programme on income, poverty and inequalities can be found in Brzeziński and Najstüb (2017) and Chrzanowska and Landmesser (2018).

<sup>7</sup> Minister E. Rafalska admitted that the income adjustment occurred and contributed to an increase in the number of families eligible for the benefit when compared to the initial estimations (MRPiPS, 2017).

<sup>8</sup> As a comparison, Spain introduced transfers of EUR 100 per month for every child below the age of three. The amount represented 13% of the pay of a woman with primary education and 7.5% and 5.2% respectively of a woman with secondary and tertiary education (Sánchez-Mangas, Sánchez-Marco, 2008).

people in Poland are paid below or equal to the average wage – about 62% of men and 71% of women. According to GUS (2019a, pp. 9–10), the share of transfers made under the "Family 500+" programme in the average monthly disposable income per capita was 13.5% for households with children and 20% for families with at least three children.

**Table 2. The growth rate of average net disposable income (in %, 2014–2016)**

Year	By					
	Number of household members*			Socioeconomic group**		
	Total	5	6+	Total	Employees	Farmers
2014	3.5	4.2	3.7	3.5	3.9	-0.8
2015	2.8	6.0	4.8	3.1	4.3	0.7
2016	4.2	9.4	9.4	4.4	4.6	13.7

Note: \* average net annual disposable income per capita; \*\* average annual net disposable income per equivalent unit.

Source: own study based on data from GUS (2017), *Dochody i warunki życia ludności Polski [Income and living conditions of the Population of Poland]* (report from EU-SILC survey of 2015 and 2016), p. 137 and 140.

The cash transfers appear to be more important for female economic activity, because females are usually paid less compared with males, and are more involved in household duties. If they quit their jobs, the household's income drop is relatively small, and it can be more easily replaced with a transfer. On the other hand, relatively high are the benefits of resigning for instance from institutional childcare.

**Table 3. The ratio of the "Family 500+" transfer to minimum net wage and average net wage (in %, 2016–2018)**

Year	Minimum net wage			Average net wage		
	2016	2017	2018	2016	2017	2018
Number of children						
1 child	36.9	34.3	32.7	17.4	16.4	15.3
2 children	73.8	68.5	65.4	34.8	32.9	30.7
3 children	110.6	102.8	98.0	52.2	49.3	46.0

Source: own study based on data from *Communications of the President of GUS on average pay in the national economy* and *Regulations of the Council of Ministers on minimum pay*.

The extension of paid parental leave may have been an additional factor stimulating economic inactivity. In 2009, the maternity leave was extended from 18 to 20 weeks, and the possibility of taking extra 6-week maternity leave was

provided (with a 100% wage compensation). In 2013, a parental leave of 26 weeks was introduced, to be taken after the maternity leave (with a 60% wage compensation, 80% if the decisions to take the maternity leave and the parental leave are made concurrently). A 1-week paternity leave was introduced in 2010, and in 2011 it was extended to 2 weeks (with a 100% wage compensation). In 2016, the extra 6-week maternity leave was combined with the parental leave, and it was extended to 32 weeks.

#### FEMALE LABOUR SUPPLY, CHANGES IN AGE STRUCTURE AND ECONOMIC ACTIVITY

This paper employs the Labour Force Participation Rate (LFPR) as a measure of the labour supply. The LFPR indicates the percentage of the population at a working-age who are economically active (working or being unemployed). The aggregate LFPR is influenced by the economic activity of age-range subgroups and the age structure of the population. For instance, the LFPR may be decreased if some people become economically inactive due to rising cash transfers or an increase in unemployment. On the other hand, the shifting of population composition towards people who are highly economically active may increase the LFPR. These relationships are described in the following equation:

$$LFPR_t = \sum_i s_t^i LFPR_t^i \quad (1)$$

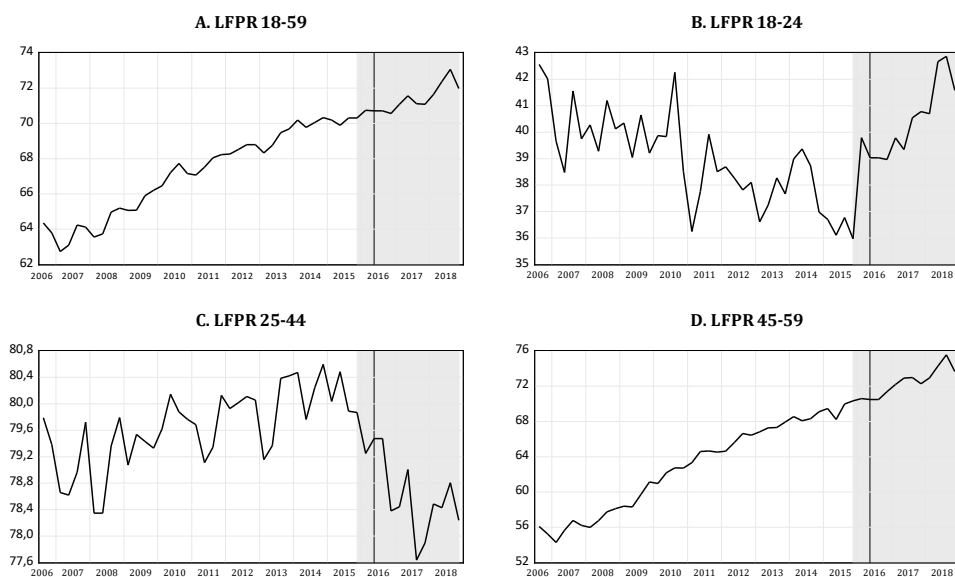
where  $LFPR$  is the aggregate Labour Force Participation Rate,  $LFPR^i$  refers to the Labour Force Participation Rate of the age group,  $s^i$  is the share of the group in the population,  $i$  is a group subscript,  $t$  is a time subscript.

This section presents the time-evolution of the female labour supply and relates this evolution to age-changes in the female population and changes in the economic activity of female age-range subgroups.

#### LABOUR FORCE PARTICIPATION RATE AND AGE STRUCTURE

The labour supply of working-age women (18–59 years old) increased between 2006 and 2018. This resulted from an increase in the share of women aged 25–44 with high labour force attachment, as well as increase LFPRs in the groups of women under the age of 25 and over the age of 45. In contrast, the LFPR drop in the group aged 25–44 decreased the aggregate female labour supply. Importantly, this drop started at the end of 2015 and coincided with the change of government and the promise of implementation of the “Family 500+” programme.

Figure 1 shows the time-evolution of the LFPRs in the four age-range subgroups: 18–59; 18–24; 25–44; 45–59. The division was made because age-range groups might differ with respect to cash transfers. The figure shows that the LFPR of women aged 18–59 increased from 63% to 73% between 2006q2 and 2018q4. During that time, the LFPR of women aged 45+, and, starting from 2015, also of women aged 18–24, increased. For women aged 25–44, the growth trend changed to a decreasing trend in 2015; since then this age group has been adversely affecting the aggregate LFPR.



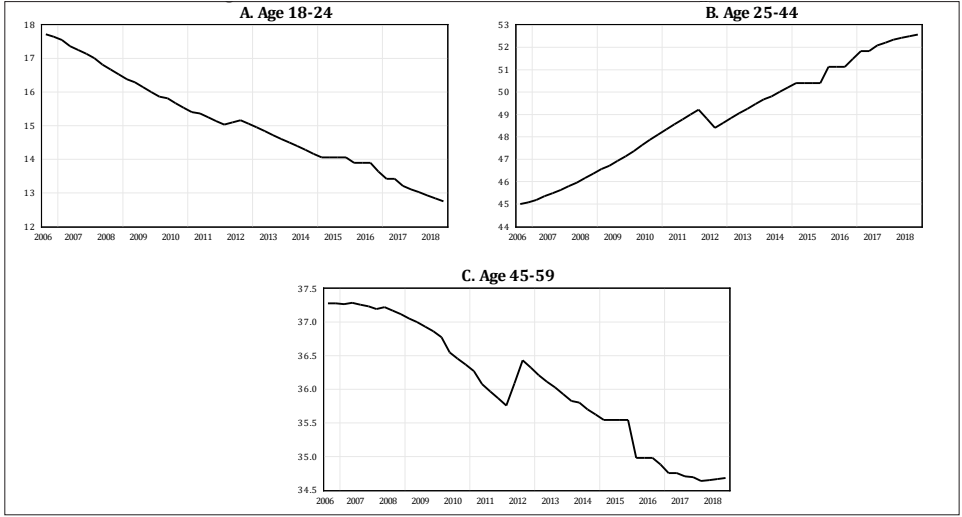
**Figure 1. Female LFPR for selected age groups (in %, 2006q3–2018q4)**

Note: the grey area covers the period of the new government in power; the vertical line indicates when the “Family 500+” was introduced.

Source: own study based on data from the LFS.

Figure 2 presents changes in the age structure of women aged 18–59 as divided into three groups: 18–24; 25–44; 45–59. This shows that changes in the demo-graphic structure positively affected labour force participation. The share of highly economically active women aged 25–44 increased, and the share of women aged 18–24 and 45–59, characterised by lower labour force participation, decreased<sup>9</sup>.

<sup>9</sup> Table 1A in the Appendix presents the association between the age of women and their LFPR.



**Figure 2.** Share of selected age groups in the 18–59 population (in %, 2006q3–2018q4)

Source: own study based on data from the LFS.

### COUNTERFACTUAL ANALYSIS

A counterfactual analysis was used to explore the impact of changes in the age structure of the population and in the economic activity of female age-range subgroups on the LFPR of women aged 18–59 and 25–44. The analysis confirms that, starting from 2015, the LFPR of women aged 25–44 continued to drop because their economic activity decreased; if it were not for that drop, the labour supply of women aged 18–59 would have been higher.

Equation (1) is the starting point for the analysis. Assuming a constant age structure ( $s^i$ ) or labour force participation ( $LFPR^i$ ), as in the baseline period ( $t_0$ ), one may estimate counterfactual LFPRs:

$$LFPR_t^{t0} = \sum_i s_{t0}^i LFPR_t^i \quad (2)$$

and

$$LFPR_t^{t0} = \sum_i s_t^i LFPR_{t0}^i \quad (3)$$

The difference between the actual and counterfactual LFPR shows how far the changes in the age structure of the population or LFPRs of age-range subgroups influence labour supply. For example, the demographic change increases labour supply if the LFPR estimated with equation (2) is below the

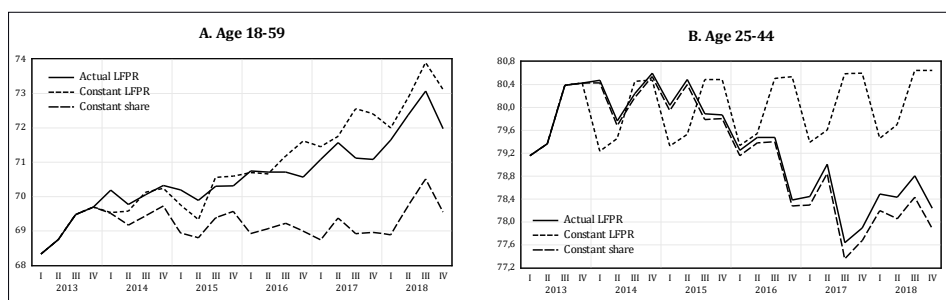


actual LFPR. In contrast, change in the economic activity of age-range subgroups decreases labour supply if the LFPR calculated with equation (3) is above the actual LFPR.

Equations (2) and (3) are used to examine the impact of the changes in the group aged 25–44 on the LFPR of women aged 18–59 in the 2014–2018 period. The share of the 25–44 group or the LFPR was kept the same as in the subsequent quarters of 2013. Figure 3 presents the results in the left panel. Firstly, they confirm the positive impact of the growing share of the 25–44 group in the population on the aggregate labour supply. Since the counterfactual LFPR line based on fixed share is below the actual LFPR line, the actual LFPR of women aged 18–59 in 2018 would have been lower by 2.6 percentage points on average if the share of the 25–44 group had not increased.

Secondly, changes in economic activity of women aged 25–44 had a negative, though inconsiderable, impact on the aggregate labour supply of women. Since the counterfactual LFPR line based on fixed economic activity has remained above the actual LFPR line since 2015, in 2018, the LFPR in the group aged 18–59 would have been 0.7 percentage points higher on average if the economic activity of the group 25–44 had not decreased.

The counterfactual method was also used to explore the impact of demographic changes and changes in subgroups’ economic activity on the LFPR for women aged 25–44. It was assumed that the age structure or the LFPR for the age groups 25–29, 30–34, 35–39, 40–44 is the same as in subsequent quarters of 2013. The results are presented in the right panel in Figure 3. They confirm that the main cause underlying the LFPR drop for women aged 25–44 observed by the end of 2015 was a drop in economic activity. The actual LFPR line is well below the counterfactual line based on the fixed economic activity. In 2018, the actual LFPR in the 25–44 group was on average 1.6 percentage points lower than the counterfactual LFPR. At the same time, the demographic change slightly increased LFPR in the 25–44 group. In 2018, the actual LFPR was on average 0.3 percentage points higher than the counterfactual LFPR holding the shares fixed.



**Figure 3. Female LFPR, actual and counterfactual (in %, 2014–2018)**

Source: own study based on data from the LFS.

### REASONS FOR ECONOMIC INACTIVITY

The above analyses show that the economic activity of women aged 25–44 decreased after 2015. This poses the question: what are the factors behind this decline? According to the LFS, it may be related to such factors as discouragement caused by the inefficiency of job seeking, education and training, family and household responsibilities, retirement, illness and disability. This section explores which of the above causes led to the inactivity of women aged 25–44 over the period of 2016–2018. The analysis suggests that the main causes were “family and household responsibilities” (hereinafter “family responsibilities”<sup>10</sup>).

Table 4 presents the structure of the causes underlying the economic inactivity of women from 2016 to 2018 by age group: 15–64, 18–24, 25–34, 35–44, 45–54 and 55–64. The results show that the weight of particular factors depends on age. Women below the age of 25 were most frequently inactive due to education and training. The most important cause for the 25–44 group is family responsibilities – about 80% of women were inactive for this reason. Women aged 45+ leave the labour market mainly for health reasons or because they retire. The significance of “discouragement” caused by the inefficiency of job-seeking’ (hereinafter “discouragement”) was relatively low but it increased with age.

**Table 4. Reasons for women’s inactivity by age (in %, 2016–2018)**

Age	Discouragement	Education and training	Family and household responsibilities	Retirement	Illness and disability	Total
15–64	3.9	26.6	33.0	23.2	13.3	100
18–24	0.6	88.3	9.4	0.0	1.8	100
25–34	2.6	5.4	83.0	0.0	8.9	100
35–44	5.2	0.5	77.7	0.0	16.6	100
45–54	12.4	0.0	52.0	1.2	34.4	100
55–64	4.5	0.0	14.6	63.6	17.4	100

Note: quarterly average.

Source: own study based on LFS data.

To determine the role of particular causes, a decomposition of the growth rate of economically inactive women over 2016–2018 is conducted. The following formula is employed:

$$\Delta ie_t = \sum_1^n \Delta ie_t^i s_{t-1}^i \quad (4)$$

<sup>10</sup> The “family and household responsibilities” category includes taking care of children and of others who need it, or other personal or family reasons.

where  $\Delta ie$  refers to the growth rate of economically inactive women,  $s$  is the share of the age-range subgroup of inactive women,  $i$  is the subscript of the inactive group by cause,  $t$  is the time subscript.

**Table 5. Decomposition of the growth rate of economically inactive women by reasons for inactivity (2016–2018)**

Age	Growth rate (in %)					
	Total	Discouragement	Education and training	Family and household responsibilities	Retirement	Illness and disability
15–64	-3.2	-21.6	-6.3	2.8	-0.3	-6.0
including:						
15–24	-1.8	-0.8	-6.2	0.0	0.0	0.1
25–34	0.3	-2.1	-0.1	1.6	0.0	-0.4
35–44	0.2	-4.3	0.0	1.5	0.0	0.2
45–54	-0.5	-5.7	0.0	0.2	0.0	-1.6
55–64	-1.4	-8.8	0.0	-0.5	-0.3	-4.3

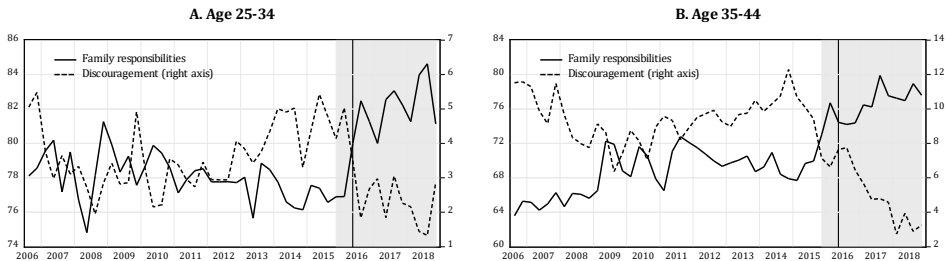
Note: quarterly average growth rate.

Source: own study based on LFS data.

Table 5 presents the results of the decomposition. This decomposition shows that the number of economically inactive women dropped in the 2016–2018 period, except for the 25–44 age group. The population of inactive women aged 15–64 decreased on average by 3.2% quarterly. On the other hand, the growth rate for women aged 25–34 and 35–44 was 0.3% and 0.2% respectively. The main underlying cause was “family responsibilities”. The average quarterly growth rate caused by family responsibilities in the 25–34 and 35–44 groups was 1.6% and 1.5% respectively. At the same time, the drop in the number of “discouraged” women was quite substantial (-2.1% and -4.3%). Those opposite trends suggest that shifting of the inactive composition may have caused the growth of the number of women inactive due to family responsibilities.

Figure 4 shows the time-evolution of the share of economically inactive women aged 25–34 and 35–44 changed between 2006q3 and 2018q4 due to family responsibilities and discouragement. The figure shows that the trends reversed in 2015. Until 2015, the share of women economically inactive by reason of family responsibilities continued to decrease, but in 2015 it started to grow. For discouragement, the trend changed from increasing to decreasing in 2015. For example, between 2012q3 and 2015q3, the share of women in the 25–34 group of the economically inactive by reason of family responsibilities fell by 1.2 percentage points, while between 2015q3 and 2018q4 it grew by 4.4 percentage points. For discouragement, it was 1.8 and -1.3 percentage points respectively.

Note that during the global financial crisis in the years 2008–2009, the share of women inactive by reason of family responsibilities also significantly increased. This suggests that the number of inactive women may have been related to economic fluctuations and changes in the institutional framework, such as the introduction of child cash transfers.



**Figure 4. Share of women economically inactive due to family responsibilities and discouragement in the groups aged 25–34 and 35–44 (in %, 2006q3–2018q4)**

Note: the share is calculated as the number of the inactive by cause divided by the number of inactive in the respective age group; the grey area covers the period of the new government in power, the vertical line indicates the point of time at which “Family 500+” was introduced.

Source: own study based on data from the LFS.

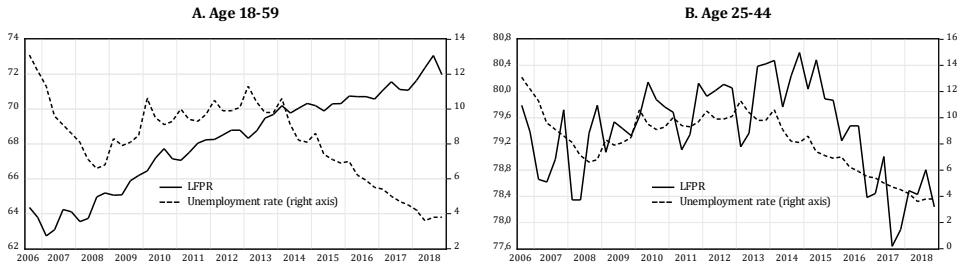
## CYCLICALITY OF FEMALE LABOUR FORCE PARTICIPATION

The business cycle shapes labour supply through the “discouraged worker effect” and the “added worker effect”. They may occur simultaneously and work in opposite directions. For instance, during an economic downturn, the “added worker effect” increases the labour supply; in contrast, the “discouraged worker effect” decreases the labour supply. The net effect depends on which of the effects prevails. This section investigates the impact of the economic fluctuations on the LFPR of women aged 25–44. The main findings suggest that after 2015, the LFPR drop for women aged 25–44 was not associated with the phase of the business cycle.

The analysis begins with a presentation of the time-evolution of the unemployment rate (an indicator of the business cycle<sup>11</sup>) and the LFPR of women aged 18–59 and 25–44 in 2006–2018. Figure 5 shows that over the period of 2013–2018 the economic situation was good, the unemployment rate fell from 10% in 2013 to 4% in 2018. Figure 5 also suggests that there was a mixed relationship between the unemployment rate and the LFPR for women aged 18–59. The LFPR

<sup>11</sup> The relationship between unemployment rate and LFPR plays a key role in understanding the

grew during both the increase and the decrease in the unemployment rate. In contrast, the Figure suggests a comovement of the LFPR of women aged 25–44 and the unemployment rate. However, it should be noted that the declining trend of the unemployment rate started around 2013, while the LFPR of women aged 25–44 started to decrease in 2015.



**Figure 5. Female LFPR and unemployment rate (in %, 2006q3–2018q4)**

Source: GUS and author’s calculations based on data from the LFS.

To investigate the relationship between economic fluctuations and the LFPR of women aged 25–44, this section also performs the OLS recursive regression (1 quarter = 1 step) to estimate two groups of models. In both groups, dependent variables are the LFPR, the share of women inactive by reason of family responsibilities (*fr*) and discouragement (*dc*) in inactive women aged 25–44. In the first group (equations 5a–c), the unemployment rate (*u*) was used as an explanatory variable, whereas in the second group (equations 6a–c), control variables (*v*) were also employed. The recursive regression procedure covers the period of 2006q3–2018q4, the period before and after implementation of child benefit “Family 500+”.

$$lfpr_t = \beta_0 + \beta_1 u_t + \varepsilon \quad (5a)$$

$$fr_t = \beta_0 + \beta_1 u_t + \varepsilon \quad (5b)$$

$$dc_t = \beta_0 + \beta_1 u_t + \varepsilon \quad (5c)$$

$$lfpr_t = \beta_0 + \beta_1 u_t + \beta_2 v_t + \varepsilon \quad (6a)$$

$$fr_t = \beta_0 + \beta_1 u_t + \beta_2 v_t + \varepsilon \quad (6b)$$

$$dc_t = \beta_0 + \beta_1 u_t + \beta_2 v_t + \varepsilon \quad (6c)$$

impact of business cycle on labour supply, see e.g. Van Zandweghe (2012), Hornstein (2013), Erceg and Levin (2013), Fuchs and Weber (2017).

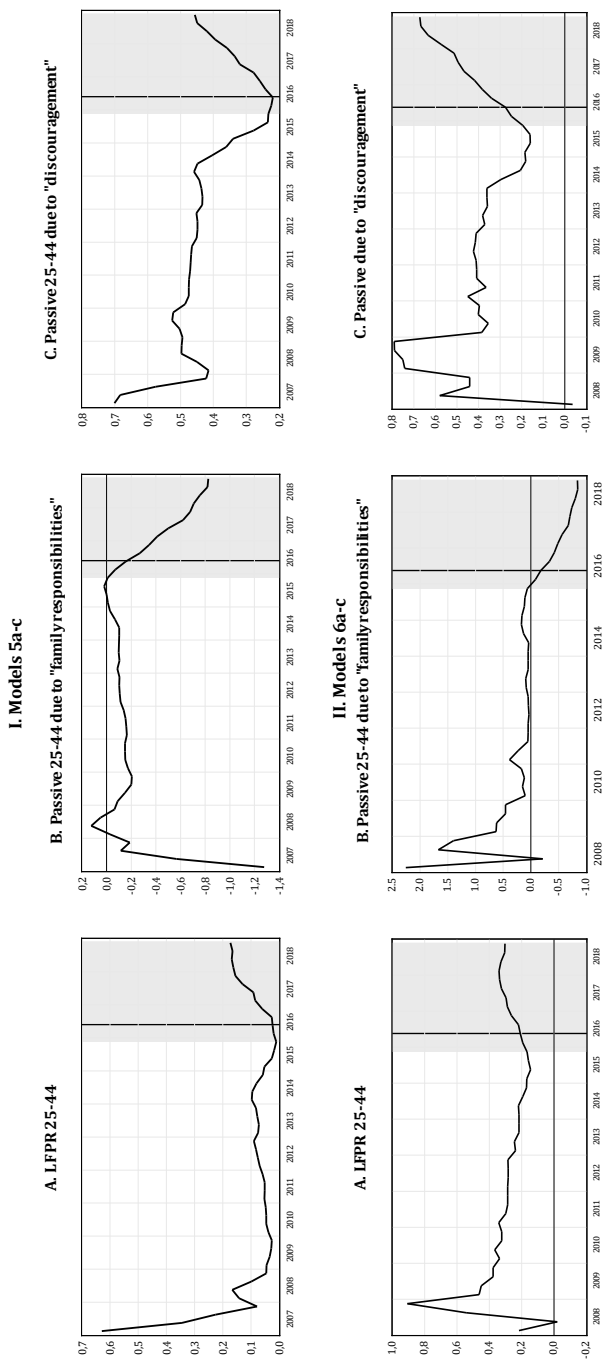


Figure 6. OLS recursive regressions

Note: the grey area covers the period of the new government in power; the vertical line indicates when “Family 500+” was introduced.  
Source: own study based on data from GUS and LFS.

As the control variables the following were used: the number of children born (in thousands<sup>12</sup>), because childbirth usually leads to economic inactivity; the share of women with tertiary education in the 25–44 age group, because people with tertiary education are characterised by higher labour force participation; the share of women aged 25–34 in the 25–44 group, to account for the impact of changes in the age structure on labour force participation; the share of women under part-time contracts in the 25–44 group, because flexible forms of employment may encourage labour market activity.

Figure 6 presents the estimated parameters (Table 2A in the Appendix contains “static” coefficients). The results show the time-variability of elasticity of dependent variables with respect to the unemployment rate. They imply that at the turn of 2015 the relationships between the dependent variables and the unemployment rate were changed. For instance, the responsiveness of the LFPR increased, while the responsiveness of the share inactive by reason of “family responsibilities” decreased. Importantly, this was not associated with changes in the unemployment rate, because the unemployment rate continued to drop between 2013 and 2018. The breakdown coincided with the change of the Polish government, the confirmation of the promise to implement the “Family 500+” programme and its actual implementation.

## CONCLUSIONS

This paper investigated the impact of the child cash benefit “Family 500+” on female labour supply in Poland. The analysis suggests that “Family 500+” had a negative effect on female Labour Force Participation Rate. The LFPR in the working-age group (18–59) would have been higher if it had not been for the drop in the LFPR in the 25–44 group. The drop in the 25–44 group coincided with the introduction of “Family 500+”, and it was associated with the growing number of women who became economically inactive by reason of family responsibilities. Also, the introduction of the cash transfers changed the relationship between the LFPR, the share of women who were discouraged, inactive by reason of family responsibilities and the business cycle, even though the economic situation had not changed. This implies that the changes in the labour supply were determined by an institutional rather than a business cycle related factor. Nevertheless, it should be mentioned that the “Family 500+” programme had also positive consequences, such as a decrease in inequalities and poverty, which the Public Opinion Research Centre (CBOS, 2017) claims to be the reason for a broad social support for the programme.

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<sup>12</sup> Quarterly data were obtained by aggregation of the monthly data from the GUS *Statistical Bulletins*.

## BIBLIOGRAPHY

- Aaronson, S., Cajner, T., Fallick, B., Galbis-Reig, F., Smith, C.L., Wascher, W. (2014). Labor Force Participation, Recent Developments and Future Prospects. *Brookings Papers on Economic Activity*, Fall, 197–275.
- Aaronson, S., Fallick, B., Figura, A., Pingle, J., Wascher, W. (2006). The Recent Decline in the Labor Force Participation Rate and Its Implications for Potential Labor Supply. *Brookings Papers on Economic Activity*, 1, 69–154. DOI: 10.1353/eca.2006.0012.
- Bastagli, F., Hagen-Zanker, J., Harman, L., Barca, V., Sturge, G., Schmidt, T., Pellerano, L. (2016). *Cash transfers: what does the evidence say? A rigorous review of programme impact and of the role of design and implementation features*. ODI Report. London, Overseas Development Institute BISP ‘Homepage’. Webpage. BISP. Retrieved from: <http://bisp.gov.pk> (2020.02.13).
- Bredtmann, J., Otten, S., Rulff, C. (2018). Husband’s Unemployment and Wife’s Labor Supply: The Added Worker Effect across Europe. *Industrial and Labor Relations Review*, 71(5), 1201–1231. DOI: 10.1177/0019793917739617.
- Brzeziński, M., Najsztub, M. (2017). *Wpływ programu „Rodzina 500 +” na dochody gospodarstw domowych, ubóstwo i nierówność*. Retrieved from: [http://coin.wne.uw.edu.pl/mbrzezinski/research/rodzina500plusPolitykaSpoleczna\\_nowa\\_wersja.pdf](http://coin.wne.uw.edu.pl/mbrzezinski/research/rodzina500plusPolitykaSpoleczna_nowa_wersja.pdf) (2020.02.13)
- CBOS (2017). Ocena programu „Rodzina 500 plus” po blisko roku od jego wprowadzenia. *Komunikat z badań*, 36.
- Chrzanowska, M., Landmesser, J. (2018). Simulation of Ex Ante Effects of “Family 500+” Program. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 468, 38–46. DOI: 10.15611/pn.2017.468.04.
- Connelly, R. (1992). The Effect of Child Care Costs on Married Women’s Labor Force Participation. *The Review of Economics and Statistics*, 74(1), 83–90. DOI: 10.2307/2109545.
- Darby, J., Hart, R. A., Vecchi, M. (1998). *Labour Force Participation and the Business Cycle: A Comparative Analysis of Europe, Japan and the United States*. Retrieved from: <https://ideas.repec.org/p/gla/glaewp/9802.html> (2020.02.13).
- Erceg, C. J., Levin, A. T. (2013). Labor Force Participation and Monetary Policy in the Wake of the Great Recession. *IMF Working Paper*, 245.
- Fuchs, J., Weber, E. (2017). Long-term unemployment and labour force participation: a decomposition of unemployment to test for the discouragement and added worker hypotheses. *Applied Economics*, 49(60), 5971–5982. DOI: 10.1080/00036846.2017.1368991.
- Gromada, A. (2018). Czemu służy program Rodzina 500 plus? Analiza celów polityki publicznej i polityki partyjnej. *Ruch Prawniczy, Ekonomiczny i Socjologiczny*, 80(3), 231–244. DOI: 10.14746/rpeis.2018.80.3.18.
- GUS (2017). *Dochody i warunki życia ludności Polski (raport z badania EU-SILC 2015 i 2016)*. GUS: Warszawa.
- GUS (2018). *Budżety gospodarstw domowych w 2017 r.* GUS: Warszawa.
- GUS (2019a). *Sytuacja gospodarstw domowych w 2018 r. w świetle wyników badania budżetów gospodarstw domowych*. Retrieved from: <https://stat.gov.pl/obszary-tematyczne/warunki-zycia/dochody-wydatki-i-warunki-zycia-ludnosci/sytuacja-gospodarstw-domowych-w-2019-r-w-swietle-badania-budzetow-gospodarstw-domowych,3,19.html> (2019.05.30).



- GUS (2019b). *Zasięg ubóstwa ekonomicznego w Polsce w 2018 r.* Retrieved from: <https://stat.gov.pl/obszary-tematyczne/warunki-zycia/ubostwo-pomoc-spoeczna/zasieg-ubostwa-ekonomicznego-w-polsce-w-2019-roku,14,7.html> (2019.06.28).
- GUS (2007–2009). *Biuletyn statystyczny GUS*. GUS: Warszawa.
- GUS (2015–2019). *Mały rocznik statystyczny Polski*. GUS: Warszawa.
- Hornstein, A. (2013). Why Labor Force Participation (Usually) Increases when Unemployment Declines. *Economic Quarterly*, 99(1), 1–23. Retrieved from: <https://pdfs.semanticscholar.org/0005/4d5d4c27592e9f07e8c455dbaabc7b1d5471.pdf> (2020.02.13)
- Jaumotte, F. (2013). Female Labour Force Participation: Past Trends and Main Determinants in OECD Countries. *SSRN Electronic Journal*, 376. DOI:10.2139/ssrn.2344556.
- Komunikaty Prezesa Głównego Urzędu Statystycznego w sprawie przeciętnego wynagrodzenia w gospodarce narodowej – 2016–2018.*
- Lee G. H. Y., Parasnis, J. (2014). Discouraged Workers in Developed Countries and Added Workers in Developing Countries? Unemployment Rate and Labour Force Participation. *Monash University, Department of Economics, Discussion Paper*, 15.
- Magda, I., Kielczewska, A., Brandt, N. (2018). The "Family 500+" Child Allowance and Female Labour Supply in Poland. *IBS Working Paper*, 1.
- MRPiPS (2017). Minister Elżbieta Rafalska o szacunkach dotyczących „Rodzina 500 +”, 5.07.2017. Retrieved from: <https://archiwum.mpips.gov.pl/aktualnosci-wszystkie/rodzina-500-plus/art,8969,minister-elzbieta-rafalska-o-szacunkach-dot-rodzina-500.html> (2020.02.13)
- MRPiPS (2018). MRPiPS odpowiada: „500 plus” nie jest bezpośrednią przyczyną dezaktywizacji zawodowej kobiet. *Gazeta Prawna*, 20.03.2018. Retrieved from: <https://serwisy.gazetaprawna.pl/praca-i-kariera/artykuly/1112265,500-plus-nie-jest-bezposrednia-przyczyna-dezaktywizacji-zawodowej-kobiet.html> (2020.02.13).
- Myck, M. (2016). Estimating Labour Supply Response to the Introduction of the "Family 500+" Programme. *CenEA Working Paper Series*, 1/16.
- Ozerkek, Y. (2013). Unemployment and labor force participation: A panel cointegration analysis for European countries. *Applied Econometrics and International Development*, 13(1), 67–76.
- Premik, F. (2017). Child support instruments and labor supply: evidence from a large scale child benefit program. *NBP Working Paper*, May 11, 1–28.
- Rozporządzenia Rady Ministrów w sprawie wysokości minimalnego wynagrodzenia za pracę – 2016–2018.*
- Sánchez-Mangas, R., Sánchez-Marcos, V. (2008). Balancing family and work: The effect of cash benefits for working mothers. *Labour Economics*, 15(6), 1127–1142. DOI: 10.1016/j.labeco.2007.10.002.
- Sobociński, M. (2016). Polska polityka rodzinna w latach 1989–2015. Próba podsumowania. *INFOS*, 8(212), 1–4.
- Ustawa budżetowa na rok 2020. Uzasadnienie.* (2019). Warszawa, wrzesień.
- Van Zandweghe, W. (2012). Interpreting the recent decline in labor force participation. *Federal Reserve Bank of Kansas City*, first quarter, 5–34.

## APPENDIX

**Table 1A. Female LFPR and age-based structure of the female group  
(in %, 2012q2–2018q4)\***

Age	18–59	18–24	25–34	35–44	45–59
LFPR	70.4	38.9	77.0	81.9	70.2
Share in the 18–59 group	100	14.0	25.5	25.2	35.4

Note: \* average values for the period from 2012q3 to 2018q4.

Source: own study based on data from the LFS.

**Table 2A. Results from OLS regression for models 5a–5c and 6a–6c (2006q3–2018q4)**

Variable	LFPR		Share of women inactive by reason of			
			family and household responsibilities		discouragement	
<i>const</i>	0.780*** (0.004)	0.491*** (0.059)	0.823*** (0.013)	1.137*** (0.177)	0.017*** (0.006)	-0.045 (0.089)
<i>u</i>	0.173*** (0.049)	0.303*** (0.066)	-0.826*** (0.140)	-0.841*** (0.202)	0.456*** (0.067)	0.673*** (0.126)
<i>edu</i>		0.235*** (0.050)		-0.255* (0.143)		0.156* (0.081)
<i>pt</i>		0.263** (0.127)		-1.5*** (0.362)		0.727*** (0.224)
<i>cb</i>		-0.00001 (0.000)		0.00036 (0.000)		-0.00034* (0.000)
<i>sh</i>		0.316*** (0.079)		-0.153 (0.237)		-0.123 (0.094)
N	50	50	50	50	50	50
R <sup>2</sup>	0.298	0.560	0.534	0.661	0.533	0.677

Note: standard error in brackets; \*\*\*\*/\*\*/\*/- *p*-value /0.01/0.05/0.10/ respectively.

Source: own study based on data from GUS and LFS.

Models (5a–5c and 6a–6c) were estimated using the OLS, with the Newey-West method used due to the random component autocorrelation. Where *u* is the unemployment rate, *edu* is the share of women with tertiary education in the population of women aged 25–44, *pt* is the share of women working part-time in the 25–44 population, *cb* is the number of children born, *sh* is the share of women aged 25–34 in the 25–44 group.

### *Summary*

The paper investigates the effect of child cash benefit "Family 500+" on the female labour supply in Poland, taking into account demographic and cyclical determinants. The study is based on the Labour Force Survey (LFS) and Polish Central Statistical Office quarterly data. The analyses cover the period of 2016–2018. The Labour Force Participation Rate (LFPR) is the measure of labour supply. The analysis uses a counterfactual method to determine the impact of demographic and behavioural changes on female labour supply. To identify the causes of the economic inactivity of women (adopted by LFS), decomposition of the growth rate of economically inactive women is applied. The effect of the business cycle on female labour supply is analysed using OLS recursive regression.

The study found that the LFPR of women aged 25–44 decreased after 2015. This was related to the cash transfers under the "Family 500+" programme and the increasing number of economically inactive women by reason of "family and household responsibilities". At the same time, changes in the demographic structure contributed positively to the LFPR of women aged 25–44, while the business cycle did not have a significant impact on it. OLS recursive regression showed that in the 25–44 age group, the introduction of "Family 500+" coincided with changes in the relationships between the LFPR, the percentage of the "discouraged", economically inactive women by reason of "family responsibilities" and the unemployment rate.

*Keywords:* child cash benefits, female labour supply, "Family 500+".

## **Program „Rodzina 500+” a aktywność zawodowa kobiet w Polsce. Uwarunkowania demograficzne i koniunkturalne**

### *Streszczenie*

Celem niniejszej pracy jest ocena znaczenia programu „Rodzina 500+” dla podaży pracy kobiet w Polsce, uwzględniając uwarunkowania demograficzne i koniunkturalne. W badaniu wykorzystano dane BAEL i GUS. Miarą podaży pracy jest współczynnik aktywności zawodowej. Analiza skupia się na latach 2016–2018. W badaniu zastosowano metodę kontrfaktyczną, aby określić znaczenie zmian w strukturze wiekowej i w aktywności zawodowej poszczególnych grup wiekowych dla podaży pracy kobiet. Przyczyny dezaktywizacji zawodowej kobiet zidentyfikowano dekomponując stopę wzrostu zawodowo biernych kobiet według rodzajów bierności wyróżnianych w BAEL. Znaczenie zmian w koniunkturze gospodarczej dla podaży pracy kobiet w latach 2006–2018 przeanalizowano za pomocą regresji rekursywnej.

Wyniki analizy wskazują, że program „Rodzina 500+” przyczynił się do spadku współczynnika aktywności zawodowej kobiet w wieku 25–44 lata. Spadek ten był skorelowany w czasie z transferami pieniężnymi na rzecz rodzin i dzieci w ramach programu „Rodzina 500+” oraz ze zwiększeniem liczby kobiet biernych zawodowo ze względu na „obowiązki rodzinne i związane z prowadzeniem domu”. W tym samym czasie zmiany w strukturze demograficznej sprzyjały większej aktywności zawodowej kobiet w wieku 25–44 lata, natomiast zmiany koniunkturalne nie wywierały na nią istotnego wpływu. Z regresji rekursywnej wynika, że w grupie kobiet w wieku 25–44 lata wprowadzenie programu „Rodzina 500+” zmieniło relacje między współczynnikiem aktywności zawodowej, odsetkiem kobiet „zniechęconych” i biernych ze względu na „obowiązki rodzinne” a stopą bezrobocia, choć nie zmienił się trend bezrobocia.

*Słowa kluczowe:* świadczenia pieniężne, podaż pracy kobiet, „Rodzina 500+”.

JEL: I38, I13, E24.

Krzysztof Krajewski, mgr<sup>1</sup> 

University of Warsaw, PhD student

Tomasz Zalega, dr hab., prof. UW<sup>2</sup> 

University of Warsaw

## The “Family 500+” programme versus the economic activity of women in Poland

### INTRODUCTION

Social policy is a huge system of communicating vessels. Every decision, every action in one area strongly, but often indirectly, affects another area. Examples of such mutual correlations include the manipulation of retirement age, which then influences social benefits and health care, or changes in housing policy, which then reduces pathologies within a given area while deteriorating the environmental conditions there. One such programme whose effects are still being studied is “Family 500+”. Both at the stage of discussion and in the first months of its operation, there have been numerous arguments for and against this benefit. “Family 500+” should not be treated solely as a money transfer in terms of the hopes and controversies surrounding it, but also as an important instrument of state policy. It should be borne in mind that its statutory goal is to increase the fertility rate in Poland and to encourage people to establish families. However, it quickly became apparent that this benefit also had a strong impact on the poverty of families with children and on the economic activity of women.

This paper is only a contribution to a broader discussion on the consequences of “Family 500+” in the general labour market, with particular emphasis on the economic activity of women. The principal goal of the paper is to depict the relationship between “Family 500+” and the economic activities of women in Poland. This paper takes the following structure: The first part synthetically

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<sup>1</sup> Correspondence address: e-mail: krzysztof.krajewski94@gmail.com. ORCID: 0000-0001-6515-0649.

<sup>2</sup> Correspondence address: e-mail: tomasz.zalega@wp.pl. ORCID: 0000-0002-7488-1184.

focuses on the essence of "Family 500+" and the macroeconomic consequences of its implementation. The second part, based on available statistical data, analyses the economic activity of women in Poland, with particular emphasis on young women aged 25–34 years. The final section, based on the logit model used by the authors, attempts to depict the impact of "Family 500+" on the economic activities of women.

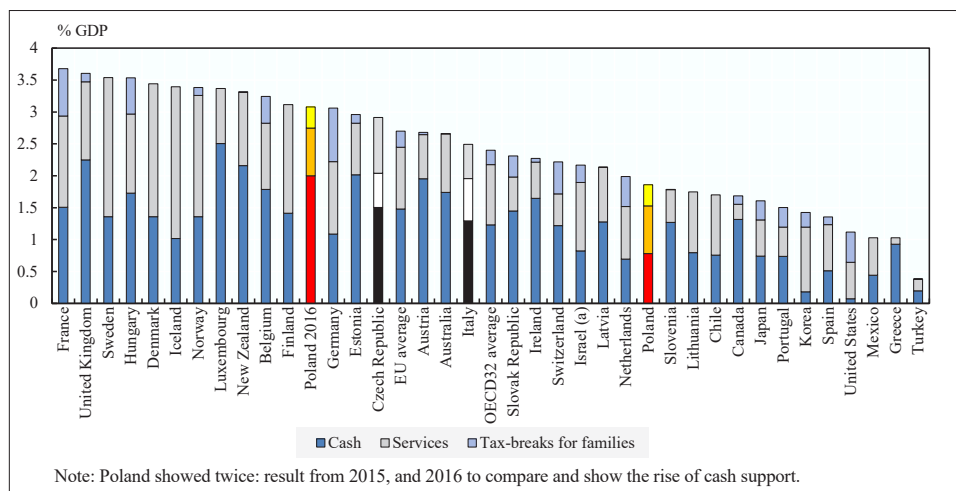
### THE ESSENCE AND GOAL OF "FAMILY 500+"

The topic of women, their economic activity and their willingness to start a family is at the heart of family policy. Polish women are delaying their decision to start a family and raise children. This may be because they seek professional accomplishment and to ensure adequate living and financial conditions for themselves and their families in the long run. One of the consequences of such a decision is a dramatic decline in the fertility rate in Poland in recent years. In 2017 this rate was only 1.35, or 0.75 lower than the level of generational replacement defined at 2.1 (Central Intelligence Agency, 2018). Statistical data show that 402.0 thousand children were born in Poland in 2017, 19.7 thousand more compared to 2016 (GUS, 2018a, p. 26), with preliminary data indicating that the number of births in 2018 was 388 thousand, 13 thousand lower than in the previous year. It can therefore be concluded that the increased fertility rate in 2017 was a combination of many factors, including the deferred procreation decisions of women born in the peak of the 1980s. Many women took their previously delayed decision to have a second (third) child, as they felt the need for greater job security due to an improved labour market situation. It should be clearly emphasised that the observed increase in births in Poland in 2017 is mainly attributable to the enlargement of families that already had a child. However, the overall number of women annually who decide to have a child is still falling.

One of the answers to this demographic disaster is the "Family 500+" programme, implemented in Poland on 1 April 2016. It was designed as a social investment in that its assumed prospective and current effects on the economy go far beyond the role of a typical social programme. On its normative side, the programme refers to the provisions of Articles 18 and 20 of the Constitution of the Republic of Poland, which define the essence and role of the State's protection of and care for the family, including the implementation of a social market economy. In accordance with the definition in the Polish Constitution, a social market economy, on the one hand, is based on the freedom to conduct business and on legally secured private property. In its assumptions, "Family 500+" aims to reduce the financial burden on families raising children, thereby increasing the fertility rate and leading to population growth in Poland. The programme

involves monthly payments of PLN 500 in parental benefits for the second and subsequent children. The benefit may also be awarded for the first child, depending on the income criterion (income per family member not higher than PLN 800 per capita or PLN 1,200 for a family raising a disabled child). “Family 500+” is thus a social investment on a much larger scale than the previously implemented family social policy, which chiefly involved payments of benefits as family allowances supplemented with extra allowances and one-off childbirth grants. The normative basis of the programme is provided by the Act of 11 February 2016 on State Aid for Child Support (Journal of Laws (Dz.U.) of 2017, item 1851). The beneficiaries of “Family 500+” are primarily Polish citizens. The programme also covers foreigners where the provisions on the coordination of social security systems apply to them if this follows from international bilateral agreements, where a person has a residence permit with the annotation “access to the labour market” but with the exclusion of third-country nationals: with a work permit for less than 12 months, who came to Poland to study and who can work on the basis of a visa. Foreigners are entitled to benefits provided that they reside in the territory of Poland for the period of receiving benefits. The only exceptions are situations where bilateral international agreements or provisions on the coordination of social security systems state otherwise. From April 2016 to January 2017, the beneficiaries of the programme were already 2.56 million families, including 3.82 million children, and the programme itself consumed over PLN 19 billion of state budget expenditure. The benefit is provided for 55% of children in Poland: 699 thousand families with one child under 18 years of age, 1.5 million families with two children, 288 thousand with three children, 53 thousand with four, almost 13 thousand with five, 5.6 thousand with six, and 278 with seven (Kisicka, 2017). The “Family 500+” budget constituted 0.93% of GDP in 2016 (Mroziński, 2017) and 0.95% of GDP in 2017. For comparison, the budget of the Ministry of National Defence in the same period amounted to approximately 2% of the GDP. In turn, in 2018 the programme cost PLN 22.1 billion, or every sixteenth zloty received by the state budget. Families tend to spend the “Family 500+” benefits on food and clothing (42.6%), expenses related to schools and kindergartens (34.2%) and extra-curricular activities for children (32%). Much of the money is spent on general consumption and only 16.2% of the beneficiaries decide to save any money (Białowolski, Dudek, 2016).

It is worth mentioning here that by 2016 financial support for families in Poland could be called modest. According to OECD data, in 2015, Poland spent about 1.8% of GDP on public support for families, slightly below the OECD average (Magda, 2018). “Family 500+” almost doubled this amount, and placed Poland among the countries that spend the largest amounts on helping families (Figure 1).



**Figure 1. Public expenditure on family benefits by type of expenditure, in percentage of GDP, 2015 and latest available**

Source: own study based on OECD Family Database 2015.

However, it should be remembered that the virtually unconditional support under “Family 500+” was not accompanied by additional measures, such as support for the family services sector or tax breaks for young people deciding to have and raise a child.

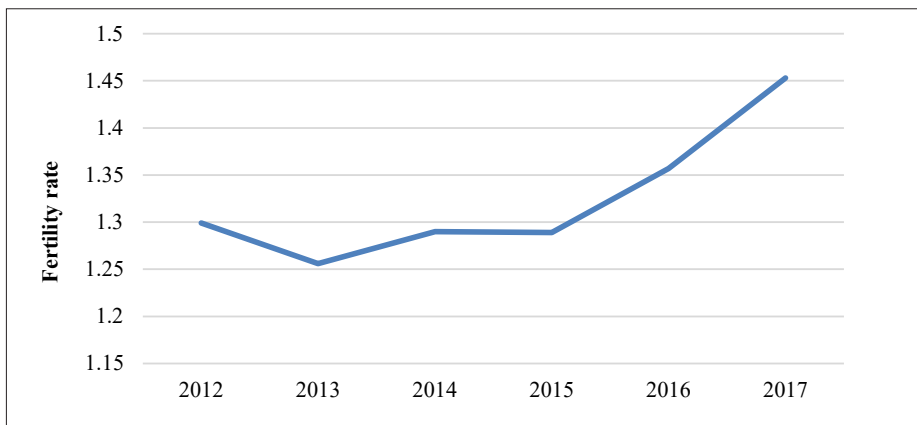
The above characteristics of “Family 500+” present a rather positive picture of the effects of this social benefit. The increase in public support for families, with sensible management of this support by the beneficiaries, leads to the conclusion that the programme works well. This also appears to be confirmed by the data on poverty, in particular child poverty. In 2015–2017, extreme poverty of families with children decreased by 54% and relative poverty by 30%. This means that, in comparison to 2015, there were 455 thousand fewer relatively poor children and 390 thousand fewer extremely poor children in Poland in 2017 (GUS, 2018c). This is a steep decline and a step forward in the implementation of two international plans to combat poverty: 2030 UN Agenda and Europe 2020 Strategy proposed by the EU (Szarfenberg, 2018).

While appreciating the potential effect of poverty reduction, it should however be considered whether this is a long-term strategy. If the extreme poverty line in 2017 was PLN 521.76 per person in the case of a working household with two children, a transfer of PLN 1,000 would automatically put such a family above this line (assuming that there is at least one person working full-time for the minimum wage). Certainly, it may be a great chance for such families to leave a difficult financial situation, and many people will surely use it well. Nonetheless, from the point of view of public policy, the question of sustainability of these solutions



should be asked. If 8.7% of children aged 0–14 in Poland live in households with no working adult (OECD, 2018), then a transfer of PLN 500 per month would certainly help to cover current expenses but without necessarily changing the structural position of such a family. It should also be borne in mind that it was not solely the PLN 500 benefit that contributed to the decline in extreme poverty. This change was a continuation of a long-term trend of increasing incomes of the population and occurred while the situation in the labour market improved. Thus the availability of more opportunities of finding a job (very low unemployment) and rising wages might also have reduced poverty.

In Poland, as in many other countries in Europe, we are facing a fertility crisis characterised by a lack of full generational replacement and population ageing. It is not difficult to accurately diagnose the projected potential consequences for the economy and social life. In observing similar demographic changes which began much earlier in other countries, many social and economic processes adversely affecting the national economy were noticed. Therefore, “Family 500+”, in addition to combating poverty, was also designed as a response to the progressive ageing of the Polish population and a stimulus toward starting a family and increased fertility. How is this goal being achieved? According to GUS (Central Statistical Office) data, the fertility rate as the number of born children per female of childbearing age, i.e. 15–49 years, increased by about 13% in 2015–2017, which translated into over 30,000 more live births than in the base year (Figure 2).



**Figure 2. Fertility rate in Poland in 2012–2017**

Source: own study based on (BAEL, 2018).

A fertility rate at 1.45 still ranks Poland in one of the lowest positions in Europe and does not ensure generational replacement. Nevertheless, this is a decisive step forward, especially considering the trend in 2012 and 2015 (Rudzik-Sierdzińska,



2018). It is currently difficult to assess whether this effect will be maintained in the longer term or will only be temporary. However, the history of European countries and research in this area indicate that the greatest success in increasing fertility rates was achieved by programmes allowing parents to combine work and child raising rather than direct cash transfers (Luci-Greulich, Thévenon, 2013). Women are better educated and want to develop and build their professional career; therefore, measures aimed at supporting their decision to start a family should be targeted at the support for the caring responsibilities, otherwise their effects may have negative consequences in the labour market.

### DATA DESCRIPTION

The data used to analyse and verify the hypotheses and solve the research problem came from two studies: Labour Force Survey (LFS) conducted by Central Statistical Office (CSO) in Poland since 1992 and Human Capital Balance (HCB), a study organised by the Polish Agency for Enterprise Development (PARP).

The purpose of the LFS study was to provide information on the structure and size of the population of economically active, economically inactive, unemployed and employed people as well as to learn about the pace and directions of change in the economic activity of the population. The observation unit in the study are members of households aged 15 and above residing in randomly selected locations. The same group also constitutes the general population. For over twenty years, the main and overarching LFS question has been: “Did you perform any work that yielded income in the given week, or did you help free of charge in a family business?” Participation in the survey is voluntary and the survey itself is carried out at quarterly intervals. The quarterly sample in the survey (as of 2018) is 55,380 apartments and is divided into 13 weekly samples (reference period). The sample draw for LFS is carried out according to the principles of a two-stage draw divided into statistical regions and flats. The LFS results are widely used by institutions such as the National Bank of Poland, the United Nations, the World Bank, as well as many universities and scientific institutions (GUSa, 2018). HCB is a study aimed at monitoring competences on the labour market in Poland and directing institutions and public funds to implement tasks aimed at closing competence gaps at the national and regional levels. It is implemented by PARP in cooperation with experts from the Jagiellonian University. In addition to the main goal, it also implements a series of specific objectives, which can include:

- matching competences to the needs of employers;
- adjusting upper secondary school profiles to the needs of the labour market;
- determining the adjustment of profiles of inactive and unemployed people to the conditions of the labour market.

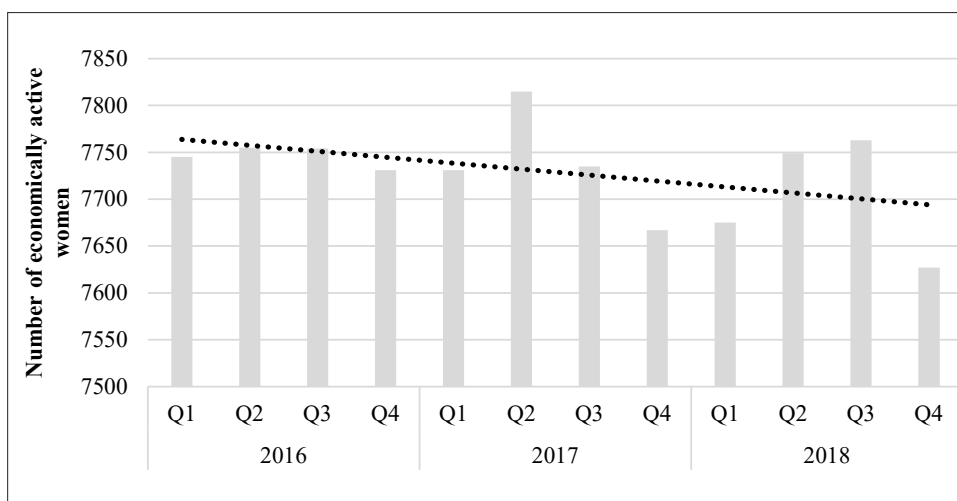
Particularly due to the implementation of the latter goal, the data from the study are extremely important and are an essential element of this work. The use of data is possible due to the cyclicity of the study, the use of a uniform methodology in subsequent editions, representativeness at the national and regional levels, as well as, and above all, the availability of a micro database for the needs of individual user analyses (which distinguishes this study from LFS and allows the use of the material to construct an econometric model). The questions posed in HCB focus primarily on competences, but they also touch on the subject of professional activity and also in recent editions raise the topic of the “Family 500+” programme, which makes them an excellent source that will translate the macro conclusions drawn from the CSO data 10.1057/ces.2012.3 into micro data from the study (PARP, 2017).

#### “FAMILY 500+” AND WOMEN’S ECONOMIC ACTIVITY IN POLAND — ANALYSIS OF AVAILABLE DATA

The available data show that among 13.7 million economically passive people, the number and share of persons declaring that they do not participate in the labour market due to family and housekeeping responsibilities have been growing since 2010 (Rudzik-Sierdzińska, 2017, p. 8). It is worth emphasising that such statements appear in an improving situation in the labour market, hence it is rather not the difficulty in finding a job that “pushes” such people out of the labour market. It is therefore possible that either those already economically passive have begun to declare “family responsibilities” as a new reason for their economic inactivity, or that there has been a movement in two directions: some women with household responsibilities have left the labour market and other women have taken their place. Women constitute a predominant group of those economically passive. According to estimates provided by CenEA analysts using the SIMPL microsimulation model based on data on household size, composition and earnings, almost a quarter of a million people will give up work in the long term, with other conditions remaining the same. These will be: 230,000 women and 7,000 men living mainly in small towns (45.7%) and rural areas (46.4%), without higher education (85%), including 25,000 single parents (Myck, 2016). This means that those leaving their jobs will be chiefly women (as confirmed by the data available up to the third quarter of 2018), people with basic or secondary education, earning relatively little and living in smaller towns and rural areas. The research by Magda *et al.* (2018) shows that about 2.4 percentage points of the fall in the number of economically active mothers observed until mid-2017 was attributable to the “Family 500+” benefit. The above-mentioned study suggests that “Family 500+” increased the outflow of women not only from employment resources but also from unemployment resources into economic passivity. This means that some non-working mothers have given up an active job search.

The indication of poorly educated young women in small towns or rural areas as most susceptible to economic deactivation is in line with the report by Bargu and Morgandi (2018). They demonstrated that this programme strongly discourages people from taking up employment, especially adults in families in the lowest income distribution quintile. This impact is particularly pronounced in the case of single mothers and other adults in a family in which one parent already works and earns too low a wage. After taking into account the cost of private care for young children, the number of families that would be financially disadvantaged if another adult or a single parent took up work increases. Greater access to affordable and good quality care for young children would reduce the negative impact of this benefit on labour supply.

In order to depict the real impact of “Family 500+” on the economic activity of women in Poland, the numbers of working women should be analysed based on available statistical data (Figure 3).



**Figure 3. Quarterly numbers of economically active women in 2016–2018**

Source: own study based on (BAEL, 2018).

In 2015–2018, the number of economically active women decreased by 70 thousand. This is clearly illustrated by the trend line, which features a negative slope and an angular coefficient below zero (this shows a general decrease in the analysed value). The absolute value, which is the number of economically active women, is however not the best measure for analysis. The value may be influenced by many factors, including demographic and emigration trends. A much better measure is the economic activity rate, which informs about the ratio of economically active people (i.e. employed and unemployed) at a given age to the total population at this age.

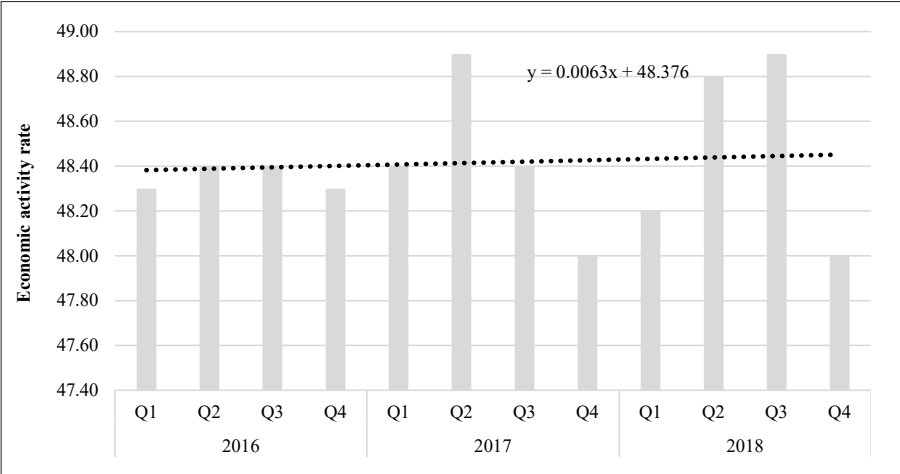


Figure 4. Quarterly economic activity rates of women in 2016–2018 (%)

Source: own study based on (BAEL, 2018).

The economic activity rate among women reveals that the preliminary interpretation of the data presented in the previous figure may be misleading. Obviously, similar trends (general decrease/increase) of activity rate are maintained in comparable periods, yet at the same time the total rate is on the rise, which is once again confirmed by the trend line. To clearly corroborate the above interpretation, a figure showing annual data was used in order to better present the data.

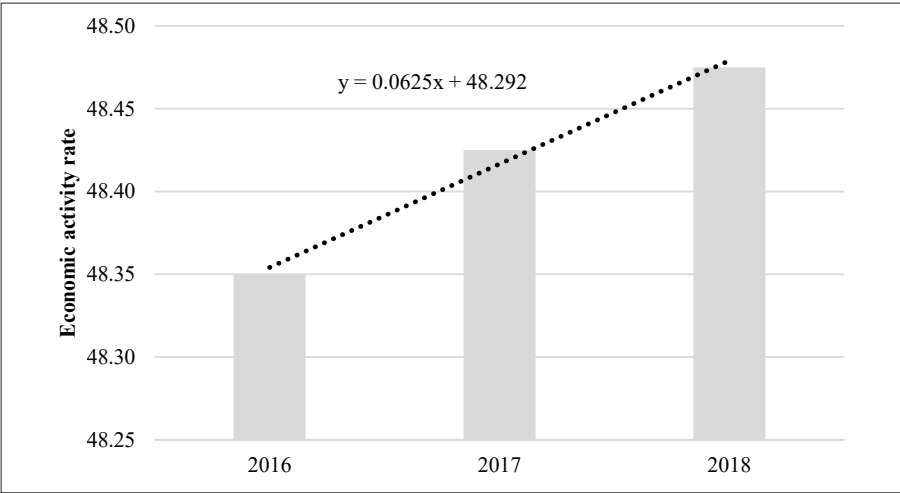


Figure 5. Annual economic activity rates of women in 2016–2018 (%)

Source: own study based on (BAEL, 2018).

A steady, slight increase in the average economic activity rate of women can be noted. It can therefore be concluded that “Family 500+” is unlikely to have a negative impact on the total economic activity rate of women. Another recommendation that can follow from the analysis concerns the analytical and interpretative advantage of the economic activity rate over the absolute number of economically active women.

The consequences of “Family 500+” for economic activity of women are particularly noticeable in the 25–34 age group, i.e. the group entering the labour market and making key decisions about their life regarding their professional career and starting a family. In Poland, women at this age most often decide to have children, which is directly correlated with the operation of the discussed “Family 500+” programme. To confirm the conjectures about the importance of this female age group for the research problem, Figure 6 is used to illustrate the quarterly economic activity rates of women in different age groups in 2016–2018.

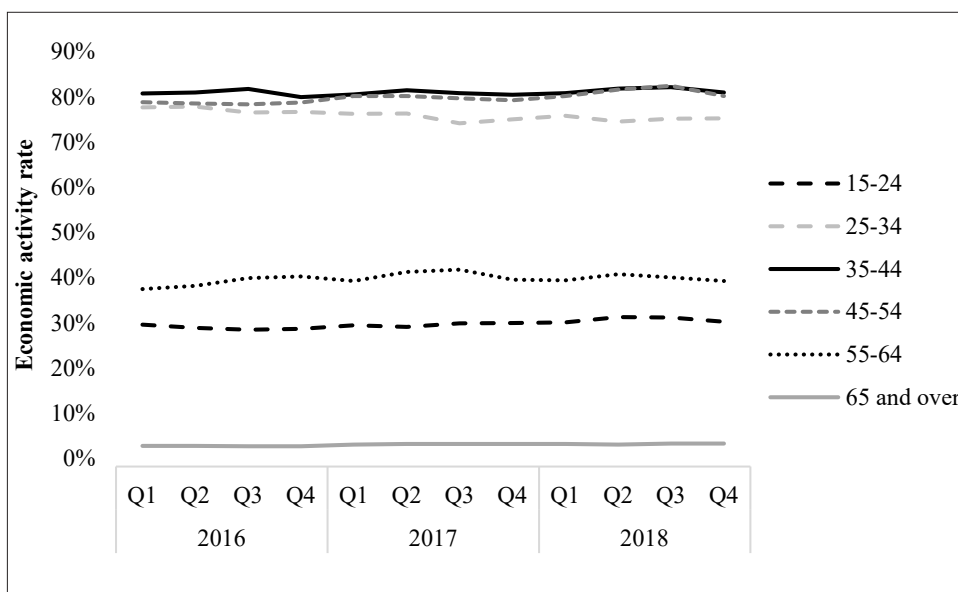
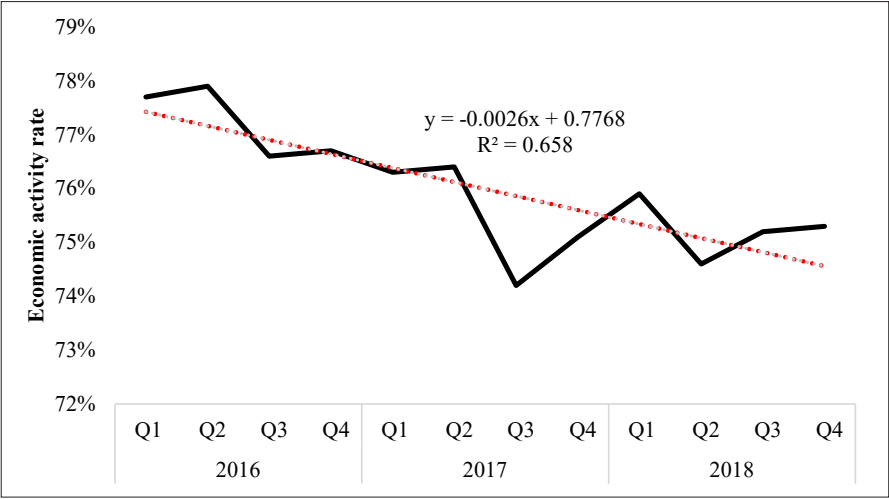


Figure 6. Quarterly economic activity rates of women in 2016–2018 divided by age (%)

Source: own study based on (BAEL, 2018).

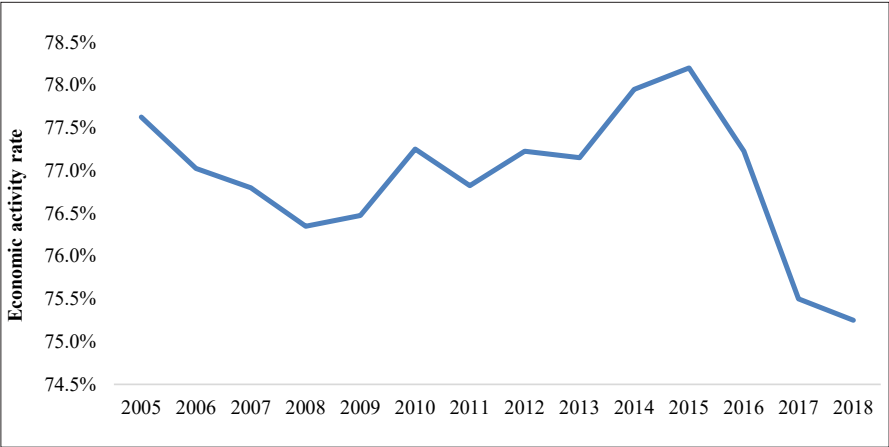
In the 25–34 age group, there is a clear (negative) change in the economic activity rate among women. In the remaining age groups, this rate was practically unchanged or slightly increased. The quarterly economic activity rates of women in the 25–34 age group are more precisely illustrated in Figure 7.



**Figure 7. Quarterly economic activity rates of women aged 25–34 years for 2016–2018 (%)**  
Source: own study based on (BAEL, 2018).

The drop in the economic activity rate among women aged 25–34 from 77.9% at the beginning of the second quarter of 2016 to 75.3% at the end of 2018 is confirmed by a negative slope and angular coefficient of the trend line. The translation of these values into absolute values confirms that over 210 thousand women aged 25–34 left the labour market.

The analysis also included economic activity rates of women aged 25–34 in the long term.



**Figure 8. Economic activity rates of women aged 25–34 years for 2005–2018 (%)**  
Source: own study based on (BAEL, 2018).

The economic activity rate in 2018 was the lowest since 2005. By the end of 2015, its growth could be observed up to the record high of 78.2%. In turn, the 2016–2018 period saw a dynamic decline in the economic activity rate among women aged 25–34. The decrease in the number of professionally active women in the group of people just starting their professional career may have many reasons. They may include monetary incentives in the form of benefits for children – with deficiencies in the number of crèches, kindergartens or access to care for preschool children as accompanying factors.

The spatial distribution (by voivodship) is important to determine the impact of “Family 500+” on the economic activity rate among women.

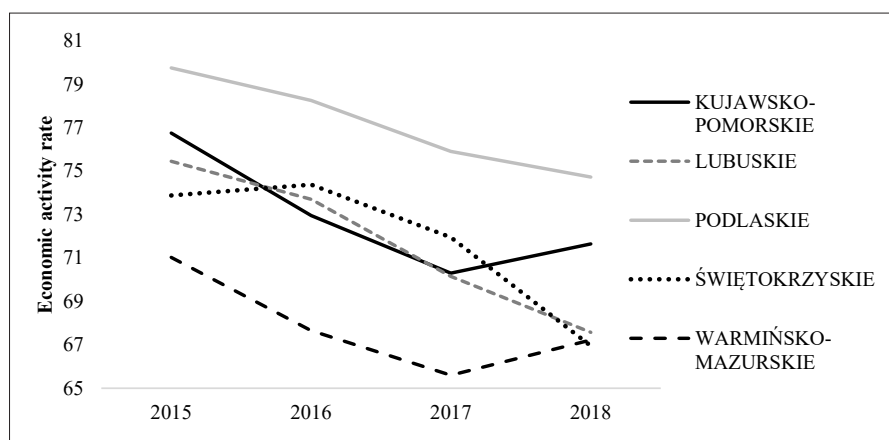


Figure 9. Economic activity rates of women in the 25–34 age group in selected voivodships in 2015–2018 (%)

Source: own study based on (BAEL, 2018).

Among the poorest voivodships (Podlaskie, Świętokrzyskie, Kujawsko-Pomorskie, Warmińsko-Mazurskie, Lubuskie), the economic activity rate among women aged 25–34 dropped most in Lubuskie (by almost 8%), Świętokrzyskie (7%) and Podlaskie (4%). These voivodships, where there is a visible decrease in the economic activity rate among women, are simultaneously those regions of Poland (with the exception of the Lubuskie Voivodship) where the unemployment rate is the highest, at over 8%. An increase in the number of non-working women aged 25–34 in voivodships where the economic situation is slightly more difficult than in others may indicate some influence of aid programmes on employment decisions. Having two or three children, a woman may voluntarily give up her job in order to raise the children. A simple calculation shows that a household with three children will receive PLN 1,000 or, if the income criterion is met, even PLN 1,500. In turn, the gross minimum wage in 2018 was set at PLN 2,100 (PLN 1,530 net). A simple calculation demonstrates that a household with four children will

receive a benefit in excess of the minimum wage. Undoubtedly, for some women, especially those in the poorest voivodships, this is a sufficient reason to give up their job and devote themselves to bringing up children.

Using Holt's linear model<sup>3</sup>, the economic activity rate of women in Poland in the 25–34 age group can be forecast. This method involves smoothing a time series. Two constants,  $\alpha$  and  $\beta$ , are responsible for the smoothing of the level of the variable and its trend, respectively.

The estimating equation for random variations is as follows:

$$F_t = \alpha \cdot y_t + (1 - \alpha) \cdot (F_{t-1} + S_{t-1}) \quad \text{for } \alpha \in (0, 1) \quad (1)$$

The estimating equation for the trend is as follows:

$$S_t = \beta \cdot (F_t + F_{t-1}) + (1 - \beta) \cdot S_{t-1} \quad \text{for } \beta \in (0, 1) \quad (2)$$

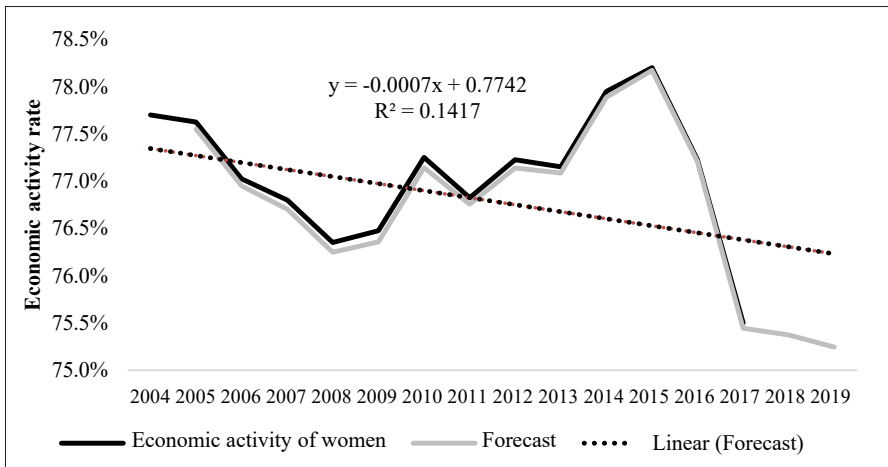
where:

$t$  – subsequent period of time ( $t = 2, \dots, n - 1$ ),

$F_t$  – smoothed value of the analysed time series in period  $t$ ,

$S_t$  – smoothed trend value in period  $t$ ,

$\alpha, \beta$  – model parameters with values in the range  $[0-1]$ .



**Figure 10. Forecast of the economic activity rate of women aged 25–34 years in 2018–2019 according to Holt's linear model**

Source: own study based on (BAEL, 2018).

<sup>3</sup> This model is used to smooth time series in which there are small random variations and a development trend but there is no seasonality. Smoothing covers the level and increment of the variable. Nonetheless, the time span should not be extended because this increases uncertainty.



The forecast from Holt's linear model seems to be a close fit to the real data. The forecast is smoothed, ideally adjusted to the primary data and reflects the observed trend. The forecast predicts a decrease in the activity rate of women aged 25–34 by 0.1 percentage points in the next period. The quality of the forecast is evidenced by the very low error values:  $ME = -0.074$  and  $RMSE = 0.079$ . The first refers to the mean error of prediction and informs whether the forecast is overestimated or underestimated. The higher the result above zero, the poorer the forecast. In this forecast, the  $ME$  error slightly deviated from zero, which means that the forecast was very good in this respect. In turn, the  $RMSE$  error is probably the best and most popular method of assessing the quality of forecast. It answers the question of by how many units on average the solution values  $\hat{y}_t$  positively or negatively deviate from  $y_t$ . For this forecast, the error was only 0.079. This proves that the forecast results deviated from the real results of the economic activity rate of women by only 0.079 percentage points (Skoczypiec, 2012).

#### "FAMILY 500+" AND WOMEN'S ECONOMIC ACTIVITY IN POLAND — RESEARCH HYPOTHESES AND METHODOLOGY

In order to depict the correlation between "Family 500+" and the economic activity of women aged 25–34 years, a logistic regression model based on data from the BKL study was used where the dependent variable was the economic activity of women and independent variables the receipt of the "Family 500+" benefit. In order to show the relationship between the "Family 500+" benefits and the economic activity of women aged 25–34 in Poland, two research hypotheses were formulated:

$H_1$ : "Family 500+" has a negative impact on the economic activity of women aged 25–34.

$H_2$ : Women living in voivodships with the lowest wage modes in Poland more often decide to be economically passive due to receiving the "Family 500+" benefit than those living in voivodships with higher wage modes.

The data used to verify the hypotheses and solve the research problem came from two studies: Labour Force Survey (LFS) by Central Statistical Office in Poland and Human Capital Balance (HCB), a survey organised by the Polish Agency for Enterprise Development (PARP).

In order to analyse the variable of economic activity based on data from the HCB study, the logistic regression model<sup>4</sup> was used, based on the logistic

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<sup>4</sup> It is a mathematical model used to describe the influence of independent variables on the dependent variable with the following values: 1 – occurrence of the analysed phenomenon, 0 – lack thereof. Independent variables in the model can be both qualitative and quantitative. The condition

function that allows description of the influence of several variables  $x_1, x_2, \dots, x_k$  on dichotomous variable  $Y$ . This function is described by the formula (Hosmer, Lemeshow, 2000):

$$f(z) = \frac{e^z}{1 + e^z} = \frac{1}{1 + e^{-z}}. \quad (3)$$

The logistic function takes values in the range  $<0; 1>$ , where 0 and 1 are the marginal values achieved between  $+\infty$  and  $-\infty$ .

This function is particularly useful when analysing categorical data for two reasons. First, it takes values in the range  $<0; 1>$ , and can therefore describe the probability values of the occurrence or non-occurrence of any phenomenon (the probability takes values in the range of 0–1). Second, the dichotomous dependent variable takes only two values (usually coded as 0 and 1); the first value usually means no occurrence (e.g. no susceptibility to influence) and the second one means that a phenomenon occurred (e.g. susceptibility to social influence).

The logistic regression equation, like the linear regression equation (Ferguson, Takane, 1999), allows the calculation of the expected value of dependent variable. Since the logistic regression model applies to bicategorical dependent variables (i.e. taking only two values: 0 and 1), the expected value of dependent variable  $Y'$  has been replaced by the conditional probability that the dependent variable  $Y$  will take the value of 1 for independent variables  $x_1, x_2, \dots, x_k$ . The properties of the logistic function suggest that both of these values (expected values of variable  $Y'$  and the conditional probability of taking the value of 1) are equal. Hence, the logistic regression model can be expressed by the formula (Kleinbaum, Klein, 2002):

$$P(Y' = 1 | x_1, x_2, \dots, x_k) = \frac{e^{\alpha + \sum_{i=1}^k \beta_i x_i}}{1 + e^{\alpha + \sum_{i=1}^k \beta_i x_i}} \quad (4)$$

where:

$P(Y=1|x_1, x_2, \dots, x_k)$  – the probability of the dependent variable taking the value of 1 at given values of explanatory variables,

$\beta_i$  – logistic regression coefficient of the  $i$ -th independent variable,

$x_i$  –  $i$ -th independent (quantitative or qualitative) variable.

for the use of logistic regression – in addition to the binary value of explained variable – is the sample size, which must be greater than  $10 \cdot (k + 1)$ , where  $k$  is the number of independent variables.

The estimation results in logits, i.e. logarithms of the odds ratio, is expressed by the formula:

$$\frac{x_i' \beta = F^{-1}(p_i) = \ln p_i}{1 - p_i} \quad (5)$$

Thereby, it will be possible to calculate the quotients that will allow understanding of the effects on the explained variable. The  $\beta$  parameters were estimated using the maximum likelihood method. The likelihood function is described by the formula (Gruszczyński, 2012):

$$\ln L = \sum_{i=1}^n [Y_i Z_i - \ln (1 + \exp Z_i)] \quad (6)$$

where:

$$Z_i = b_0 + b_1 x_{1i} + b_2 x_{2i} + \dots + b_k x_{ki} \quad (7)$$

The set of data obtained from the HCB study contained over 850 variables and 4,056 records corresponding to respondents filling in the questionnaire. Given the size of the database, the variables were selected before modelling – their initial number was inadequate to establish econometric inference. The variables were meticulously filtered so as to ultimately allow for designing the most accurate, yet transparent and “sensible”, model. The selection process was carried out in two stages:

- 1) Stage 1: based on a literature review, an initial selection of explanatory variables was made, taking into account their high substantive value and the purpose of the study.
- 2) Stage 2: from the variables selected in the first stage, the final variables were chosen on the basis of statistical criteria.

After the first stage of the analysis, 52 variables were selected from 855 variables. These variables represented appropriate “groups” of variables well. They were substantively justified and coincided with the observations of other authors examining the impact of “Family 500+” on the economic activity of women. Statistically insignificant variables and those that negatively affected the model quality were eliminated from the selected group (stepwise regression). As a result of the procedure applied, the model contained five explanatory variables. In order to check the assumption of no correlation among explanatory variables, a correlation matrix was drawn up and it was assumed that strongly correlated variables (an absolute value of correlation higher than 0.5 (strong correlation)) (Cohen, 1988) would be removed from the model. None of the variables were removed at that stage.

**Table 1. Correlation matrix**

Specification		Constant	(1)	(2)	(3)	(4)	(5)
Step 1	Constant	1.000	-0.192	-0.638	-0.197	-0.239	-0.720
	Completed education (1)	-0.192	1.000	-0.114	-0.134	0.258	0.050
	Willingness to take responsibility for the performance of tasks (2)	-0.638	-0.114	1.000	-0.173	0.014	0.149
	Operation of machines, tools and technical devices (3)	-0.197	-0.134	-0.173	1.000	-0.050	0.090
	“Family 500+” – for how many children (4)	-0.239	0.258	0.014	-0.050	1.000	-0.077
	Age (5)	-0.720	0.050	0.149	0.090	-0.077	1.000

Source: own study.

Finally, the model included 6 variables, 1 dependent variable and 5 explanatory variables. The coding of variables is presented in Table 2.

**Table 2. Recoding of variables – logit model**

LFS_rekod	dependent, binary variable describing economic activity
m15	explanatory, quantitative variable describing for how many children the respondent receives the “Family 500+” benefit
k12	explanatory, qualitative, ordered variable taking values from 1 to 5, describing respondents’ willingness to take responsibility for work tasks
k05	explanatory, qualitative, ordered variable taking values from 1 to 5, describing the degree to which respondents know how to operate machines, tools and technical devices
age	explanatory, quantitative variable specifying the respondent’s age
educ	explanatory, qualitative, ordered variable taking values from 0 to 15, describing the respondent’s education (LFS approach)

Source: own study.

The last action prior to the analysis of data was the reduction of the number of records in the database. In order for the data to be relevant to the issue in question, it was decided to confine the study only to women aged 15 or older. As a result of this procedure, 2,263 individual responses were left in the final file.

## RESULTS OF THE MODELLING AND DISCUSSION

### ASSESSMENT OF THE MODEL QUALITY

The model designed by means of logistic regression proved to be significant. This means that at the significance level of 0.05, we reject the null hypothesis about the total insignificance of explanatory variables to adopt the alternative hypothesis,

which means that at least one of the variables had a significant impact on the explained variable. Nagelkerke's parameter  $R^2$  of the model is 0.277, denoting that the explanatory variables in the model explain 27.7% as belonging to one of two groups (active and inactive) (Kmieć, 2015). The value of the Hosmer-Lemeshow test is 0.442 and is statistically insignificant, which proves that the model was a good fit to the data. This means that the distribution of probabilities predicted on the basis of the estimated model does not differ significantly from the observed values.

**Table 3. Classification table<sup>a</sup>**

Step 1	Observed		Predicted		
			LFS recoded variable		Percentage of correct classifications
			economically passive	economically active	
	LFS recoded variable				
		economically passive	68	79	46.3
		economically active	35	258	88.1
	Total percentage				74.1

Note: <sup>a</sup> The division point is 0.500.

Source: own study.

The model, with the division point at  $p_i > 0.5$ , correctly classified 74.1% of the observations, including 46.3% of the 0 values – economically inactive (specificity) and 88.1% of the 1 values – economically active (sensitivity). With division point  $p_i > 0.60$ , the general correctness of the classification drops to 72.5%, the classification of the 1 values falls to 78.5%, and the percentage of correct classifications of the 0 values increases to 60.5%. It should be remembered that a model without any predictive power correctly predicts at least 50% of the observations. This proves that the designed model is of satisfactory quality and can be the basis for further conclusions.

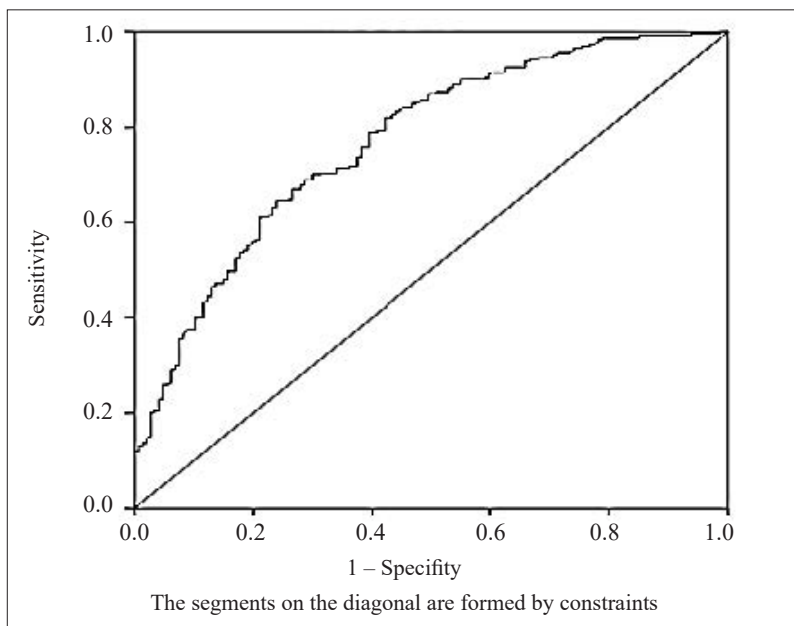
**Table 4. Classification table<sup>b</sup>**

Step 1	Observed		Predicted		
			LFS recoded variable		Percentage of correct classifications
			economically passive	economically active	
	LFS recoded variable				
		economically passive	89	58	60.5
		economically active	63	230	78.5
	Total percentage				72.5

Note: <sup>b</sup> The division point is 0.600.

Source: own study.

Similar conclusions follow from the *ROC* (Receiver Operating Characteristic) curve presented below, which is a tool used to assess the correctness of the classifier, providing a combined description of its sensitivity and specificity. It illustrates the relationship between the sensitivity and specificity of a given model. For each possible cut-off point, we calculate the sensitivity and specificity, and then mark the results in a graph. Traditionally, they are marked in a coordinate system, with specificity on the abscissa axis and sensitivity on the ordinate axis (Figure 11). The obtained points are then linked. The more different values of the indicator, the smoother the curve. If equal costs of incorrect classifications are assumed, the optimal cut-off point is the point of the *ROC* curve that is closest to point (0.1). The point with such coordinates is a point with sensitivity equal to 1 (all objects in the selected class were detected) and specificity equal to 1 (no object was erroneously regarded as an object in the distinguished class). If for a certain cut-off point the classes are completely separated and the model indications are good, then the *ROC* curve passes through this point.



**Figure 11. ROC curve**

Source: own study.

The area under the ROC curve is designated as AUC (area under curve) and treated as a measure of the quality and validity of a given model. The measured value was 0.77. The high value of this indicator clearly confirms the earlier statement about the high quality of the model.

# EVALUATION AND INTERPRETATION OF EXPLANATORY VARIABLES CONTAINED IN THE MODEL

All variables contained in the model were statistically significant (with significance set at 0.05).

**Table 5. Evaluation of variables in the logit model**

Variables in the model							
Specification		$\beta$	Standard error	Wald	df	Significance	Exp( $\beta$ )
Step 1a	Completed education	0.138	0.035	15.689	1	0.000	1.148
	Willingness to take responsibility for the performance of tasks	0.529	0.158	11.141	1	0.001	1.697
	Operation of machines, tools and technical devices	0.291	0.112	6.827	1	0.005	1.338
	“Family 500+” – for how many children	-0.405	0.145	7.834	1	0.005	0.667
	Age	0.077	0.016	21.909	1	0.000	1.080

Source: own study.

Based on the obtained results, using the maximum likelihood method, it can be concluded that:

- along with an increase in education, the likelihood that a woman will be economically active increases by 14.8%, *ceteris paribus*;
- women who are more willing to take responsibility for the performance of tasks have a 69.7% better chance of being economically active, *ceteris paribus*;
- women who better operate machines and technical devices have a 33.8% better chance of being economically active than women who do not have such skills, *ceteris paribus*;
- with age, the likelihood of women’s economic activity increases by 8%, *ceteris paribus*;
- the receipt of “Family 500+” benefits reduces the likelihood of the economic activity of women by 33.3%, *ceteris paribus*.

The analysis of the research problem and hypotheses was the pivot and key element of the study. An attempt was made to answer the question of what relationships existed between “Family 500+”, in operation since 2016, and the economic activity of women in Poland. The analysis shows that in 2016–2018, the economic activity rate of women in Poland increased, and although this increase was minimal, it cannot be clearly stated that the introduction of the social benefit of PLN 500 per child caused a sudden outflow of women from the labour market.

Nonetheless, it should be noted that in the analysed period more than 210 thousand women aged 25–34 left the labour market. The economic activity rate of women in this age group fell by over 2% in 2016–2018. This is a very alarming signal and evidence that “Family 500+” has an impact on the labour market. Only to a certain extent does this confirm the first research hypothesis that “Family 500+” negatively affects the economic activity of women aged 25–34. As the authors of this paper, we wish to point out that we have failed to prove this hypothesis in a reliable way on the basis of the available statistical data and materials. Nonetheless, according to our own observations and the latest CSO surveys, the “Family 500+” benefit is conducive to economic passivity of young women. The fact that over 30% of families receiving 500+ benefits remain economically passive may mean that around 350–400 thousand adults, including women aged 25–34 and bringing up one child, are unemployed and are not looking for a job (<https://gospodarka.dziennik.pl/praca/artykuly/568094,szokujace-dane-gus-niezbedna-reforma-500-plus.html>). It can thus be supposed that if “Family 500+” had initially covered all children and had not foreseen an income threshold, the programme would have been neutral for the labour market. The second research hypothesis can, on the other hand, be considered as confirmed. The economic activity rate among women in the poorest voivodships decreased in 2016–2018. The strongest effect could be observed in the Świętokrzyskie, Podlaskie and Lubuskie Voivodships. The case of the Lubuskie Voivodship is particularly interesting as it cannot be classified as one of the poorest in Poland. The economic activity rate of women remained high there and only after the implementation of “Family 500+” in 2016 did it drop significantly.

Summing up the conclusions of the verification of research hypotheses, it can be concluded that “Family 500+” affects the economic activity of women in Poland, in particular younger ones, aged 25–34, who have low educational attainments and live in poorer voivodships. The analysis of micro data from the HCB study has clearly confirmed that “Family 500+” negatively affects the likelihood of being economically active, which holds true not only for women of a certain age or of a certain background but for all those surveyed.

A quantitative approach to the analysis of source material proved to be an effective method to verify the research problem. The analysis of macro data from the Central Statistical Office (CSO) allowed a holistic view on the impact of “Family 500+” on the economic activity of women in Poland.

Undoubtedly, the disadvantages of the study include the use, in some cases, of raw data on the number of economically passive women in Poland. This method of data presentation is strongly exposed to the impact of many other factors, for instance demographic or migration issues. Therefore, the conclusions can only serve to aid more complex analyses of the broadly understood labour market.

Another limitation of the study is certainly the lack of access to micro data from the LFS study – the authors used only data that was aggravated by CSO.



The use of a full set of data concerning the responses of all those surveyed by the Central Statistical Office would allow a more detailed analysis and would not be confined to examining various groups of women separately (age, voivodship, cause of passivity) but rather would allow the design of a comprehensive model in which the relationship between successive factors could be examined, as was done in the logit model based on HCB data.

Without a doubt, a further path that should be followed by researchers studying the impact of “Family 500+” on economic activity of women is a microeconomic analysis of data from the regular panel research. Supplementing quantitative research with a qualitative study, such as in-depth individual interviews or interviews with focus groups, would make it possible to better understand and deepen the knowledge about the issue in question.

## CONCLUSIONS

The “Family 500+” benefit programme, implemented in 2016, differs from many other public policies in that it has deeply penetrated the awareness of Poles. This probably results from the amount of the benefit, the transparency of this instrument, media coverage and people feeling that this public policy affects them directly (Gromada, 2017, p. 2). Undoubtedly, “Family 500+” has various disadvantages. One of them is the perceived negative impact on economic activity of parents of young children, mainly women. In combination with the parental benefit available since 2016, paid out for a year after childbirth even to mothers who have not previously worked, the additional benefit weakens the willingness to work.

The results of the analysis allow the conclusion that the continuation of “Family 500+” should be subject to a thorough public debate, where all the arguments for and against would be considered. Obviously, this programme has a positive impact on poverty reduction in Poland. Its effect might also be visible in the context of an increased fertility rate. However, it cannot be denied that it also has an influence on the labour market, in particular on the economic activity of women. In particular, the economic passivity of young women who could work is worrying. The analysis makes it possible to conclude that “Family 500+” negatively affects the economic activity of young women aged 25–34 who have low educational attainments and most often live in the poorest voivodships. Therefore, it can be stated that the success in increasing the economic activity of women and fertility rates would be achieved through a state policy that facilitates combining work with having children. If the goal is intense economic activity and a high fertility rate at the same time, taking into account changes in the economic model of today’s family, the state should actually support parents in their caring responsibilities by implementing policies fostering women’s economic activity

(flexible part-time employment, flexible working hours, etc.), developing a network of nurseries and kindergartens, while introducing provisions that allow mothers and fathers to equally share childcare (longer paid holidays for both parents).

## BIBLIOGRAPHY

- Bargu, A., Morgandi, M. (2018). Can mothers afford to work in Poland? Labor supply incentives of social benefits and childcare costs. *Policy Research Working Paper No. 8295*. Washington, DC: World Bank.
- Białowolski, P., Dudek, S. (2016). *Sytuacja na rynku consumer finance, III kwartał [Situation in the consumer finance market, 3rd quarter]*. Warszawa: Konfederacja Przedsiębiorstw Finansowych w Polsce.
- Central Intelligence Agency (2018). *The world factbook*. Retrieved from: <https://www.cia.gov/library/publications/resources/the-world-factbook/> (2018.05.08).
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York: New York University. Retrieved from: <http://www.utstat.toronto.edu/~brunner/oldclass/378f16/readings/CohenPower.pdf> (2018.05.08).
- Ferguson, G. A., Takane, Y. (1999). *Analiza statystyczna w psychologii i pedagogice [Statistical analysis in psychology and pedagogy]*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Gromada, A. (2017). Rodzina 500+ jako polityka publiczna [Family 500+ as a public policy]. *Seria Analizy Instytutu Studiów Zaawansowanych*. Warszawa: Instytut Studiów Zaawansowanych.
- Gruszczyński, M. (2012). *Mikroekonometria [Microeconometric]*. Warszawa: Wolters Kluwer.
- GUS (2018a). *Rocznik Demograficzny 2018 [Demographic yearbook 2018]* (2018a). Warszawa: GUS.
- GUS (2018b). *BAEL [Study of economic activity of population]*. Warszawa: GUS.
- GUS (2018c). *Zeszyt metodologiczny. Badanie Aktywności Ekonomicznej Ludności [Methodological notebook. Study of economic activity of population]*. Warszawa: GUS.
- Hosmer, D. W., Lemeshow, S. (2000). *Applied logistic regression*. New York: Wiley & Sons.
- <https://gospodarka.dziennik.pl/praca/artykuly/568094,szukajace-dane-gus-niezbudna-reforma-500-plus.html> (02.03.2020).
- Kisicka, A. (2017). Program „Rodzina 500 plus” w liczbach [The “Family 500 plus” programme in figures]. Retrieved from: <https://www.bankier.pl/wiadomosc/Program-Rodzina-500-plus-w-liczbach-3659577.html> (2018.03.27).
- Kleinbaum, D. G., Klein, M. (2002). *Logistic regression – a self-learning text*. New York: Springer.
- Kmieć, D. (2015). Zastosowanie modelu logitowego do analizy czynników wpływających na bezrobocie wśród ludności wiejskiej. *Ekonomika i Organizacja Gospodarki Żywnościowej*, 110, 33–42.

- Luici-Greulich, A., Thévenon, O. (2013). The impact of family policies on fertility trends in developed countries. *European Journal of Population*, 29(4), 387–416. DOI: 10.1007/s10680-013-9295-4.
- Magda, I. (2018). *The "Family 500+" child allowance and female labour supply in Poland*. Warszawa: Wydawnictwo IBS.
- Mroziński, D. (2017). Program „Rodzina 500 plus” – analiza [The “Family 500 plus” programme – An analysis]. Retrieved from: <http://prostaekonomia.pl/program-rodzina-500-plus-analiza/> (2018.03.27).
- Myck, M. (2016). *Estimating labour supply response to the introduction of the Family 500+ programme*. Szczecin: CenEA.
- OECD (2018). Social Expenditure Database, the OECD Family Database, the European System of Integrated Social Protection Statistics (ESSPROS), the Comparative Family Policy Database, and the GGP Contextual Database. Retrieved from: <https://www.oecd.org/social/expenditure.htm> (2018.08.15).
- PARP [Polish Agency for Enterprise Development] (2017). *O Projekcie BKL [About the project BHC]*. Warszawa: PARP.
- Rudzik-Sierdzińska, A. (2017). Czy program „Rodzina 500+” wywołał efekt na rynku pracy? [Has the “Family 500+” programme had an effect on the labour market?]. Warszawa: Instytut Obywatelski.
- Skoczypiec, S. (2012). *Metody prognozowania. Jakość prognoz [Forecasting methods. Quality of forecasts]*. Retrieved from: [http://m6.pk.edu.pl/materialy/mp/MP\\_02\\_bledy\\_prognozy.pdf](http://m6.pk.edu.pl/materialy/mp/MP_02_bledy_prognozy.pdf) (2018.03.02).
- Szarfenberg, R. (2018). *Przewidywane skutki społeczne 500+: ubóstwo i rynek pracy [Expected social consequences of 500+: Poverty and the labour market]*. Warszawa: Zgromadzenie Ogólne Polskiego Komitetu Europejskiej Sieci Przeciwdziałania Ubóstwu, EAPN Polska.
- Ustawa z dnia 11 lutego 2016 r. o pomocy Państwa w wychowaniu dzieci, Dz. U. z 2017 r., poz. 1851.

### Summary

The “Family 500+” programme was introduced by the Act on State Aid for Child Support. It differs from many other public programmes in that it has deeply penetrated the general awareness of Poles, which may result from the amount of the benefit, its simplicity, media coverage and the feeling that this policy directly affects people’s lives. There are comments about the impact of the programme on the condition of the labour market. It is believed that to some extent it discourages some women from taking up work, thereby potentially causing their economic activity to decline and unemployment to increase over the longer time frame. Undoubtedly, “Family 500+” is already a very large challenge for the state budget. It is highly probable that the huge funding needed to cover benefits will grow each year, constituting an important government transfer.

The goal of the paper is to depict the relationship between “Family 500+” and the economic activity of women in Poland. This study is a research exercise. Quantitative methods were used, including: logistic regression modelling and Holt forecasting. The analysis suggests the conclusion that “Family 500+” has contributed to the reduction of extreme poverty in households with children but also has affected the economic activity of women in Poland, in particular younger ones, aged

25–34 years, who have low educational attainments and live in poorer voivodships. The analysis of micro data from the Human Capital Balance study has clearly confirmed that “Family 500+” negatively affects the likelihood of being economically active, which holds true not only for women at a certain age or of a certain background, but for all those surveyed.

*Keywords:* labour market, economic activity rate, parental benefits.

### **Program „Rodzina 500+” a aktywność zawodowa kobiet w Polsce**


#### *Streszczenie*

Program „Rodzina 500+” został wprowadzony ustawą o pomocy państwa w wychowywaniu dzieci. Różni się on od wielu innych programów publicznych tym, że głęboko przeniknął do powszechnej świadomości Polaków, co może wynikać z wysokości świadczenia, jego prostoty, nagłośnienia medialnego i poczucia, że polityka ta bezpośrednio wpływa na los ludzi. Pojawiają się komentarze dotyczące wpływu wprowadzonego programu na kondycję rynku pracy. Przypuszcza się, że w pewnym stopniu zniechęca on część kobiet do podejmowania pracy, co w konsekwencji może spowodować spadek ich ekonomicznej aktywności oraz wzrost bezrobocia w dłuższym horyzoncie czasowym. Niewątpliwie program „Rodzina 500+” już teraz jest bardzo dużym wyzwaniem dla budżetu państwa. Z dużym prawdopodobieństwem można wnioskować, że olbrzymie kwoty przeznaczane na pokrycie świadczeń będą rosły z każdym rokiem, stanowiąc ważny transfer rządowy.

Celem artykułu jest uchwycenie zależności między programem „Rodzina 500+” a aktywnością zawodową kobiet w Polsce. Artykuł ma charakter badawczy. Skorzystano z metod ilościowych: między innymi modelowania przy pomocy regresji logistycznej oraz prognozowania metodą Holta. Z przeprowadzonej analizy można wnioskować, że program „Rodzina 500+” przyczynił się do zmniejszenia ubóstwa skrajnego w gospodarstwach domowych z dziećmi, ale także wpłynął na aktywność zawodową kobiet w Polsce, w szczególności tych młodszych, z grupy wiekowej 25–34 lata, legitymujących się niskim wykształceniem i zamieszkujących biedniejsze województwa. Analiza mikrodanych pochodzących z badania Bilans Kapitału Ludzkiego dobitnie potwierdziła, że program „Rodzina 500+” negatywnie wpływa na prawdopodobieństwo bycia aktywną zawodowo, nie tylko wśród kobiet w określonym wieku czy pochodzeniu, ale wszystkich uczestniczących w badaniu.

*Słowa kluczowe:* rynek pracy, współczynnik aktywności zawodowej, świadczenia wychowawcze.

JEL: H40, H53, J13.

*Jerzy Żyżyński, prof. dr hab.*<sup>1</sup> 

Department of National Economy  
University of Warsaw

## **Salaries and the logic of national income distribution in a market economy – described using a simple model**

### INTRODUCTION

A market economy is a system designed, at least in theory, to satisfy the needs of the community that has built it and which achieves this through economic processes carried out by thousands or millions of economic entities, including households. In the most general sense, its functioning involves people working to produce goods and services and earning income by selling what they have produced to other members of the community, with the money earned spent on the goods and services produced by others to contribute to their income.

The essence of that process can be captured in three words: produce, earn and spend. This leads to the continuous creation and transfer of income in cash flow processes – but it all needs to start with the production of specific goods (and services) because it is the sale of actual goods and services in the market that is the original source of income that is generated and transferred and, subsequently, distributed to create other income within such processes. The wealth of every community is the result of gathering something that has already been created and which forms property recognised as a resource, as well as something that it produces, i.e. tangible goods and services. This adds to the community, each in its own way, and that added value must be somehow distributed between the members of that community. Distribution is not only the key to the actual prosperity of direct producers: how the result of their work is distributed determines the satisfaction of their needs but also the functioning of the economy, its development, the condition

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<sup>1</sup> Correspondence address: University of Warsaw, Faculty of Management, Szturemowa 3, 02-678 Warszawa; e-mail: jerzyzyzynski@gmail.com. ORCID: 0000-0002-7882-7898.

of the state as a set of institutions organising society and, last but not least, the positioning of the country in the international community of economies.

The purpose of this paper is to show the logic of the basic interdependencies in the income creation process based on a simple model – a classic metaphor which the author believes presents the logic of national income distribution better than the traditionally used macroeconomic equations or more complex econometric models. The paper also depicts the position of Poland compared to other countries in terms of the effects of such distribution.

### MONEY AS AN INCOME DISTRIBUTION TOOL

The basic tool used in this process of distributing produced goods and services is money, a special economic instrument: we receive it as income and, as we make purchases, we pass the income to others to generate further income; as a result, money changes hands and circulates in society in a unique network of mutual interrelated income and expenses. One can say that money is just a tool used to achieve specific economic effects; due to the properties it has been given, money becomes in fact “a right to purchase goods and services” – this synthetic definition captures all the functions of money available in the literature but, more importantly, it rids money of the illusion that it should have its own internal value, as believed by supporters of the notion of returning to the gold standard or even metallic money, as used centuries ago. The tool circulates as currency in circulation; in return for having given something to society ( consumer goods, investment goods or services), we receive monetary units as rights to purchase a part of what society has produced and we keep passing on those rights in return for the goods and services we purchase, with those rights stored in banks – the basic institutions in the financial intermediation system – and passed on within that system as tools to create capital but also to realise postponed consumption.

Efficient functioning of that system requires good rules of distributing national income and shaping wages, as well as other mechanisms to provide the entities that form the economy with an adequate quantity of rights to purchase goods and services – a quantity that permits “clearing the market,” i.e. generating enough purchasing power to absorb what has been produced.

However, capitalist economy has a certain special, one could say inherent, property of being a system of overproduction – it is a primary, intrinsic feature of capitalism. As will be demonstrated later, overproduction has a primary function in the production and distribution cycle because the cost of remunerating direct manufacturers is only a portion of the total value of the produced goods, as a result of which they may purchase only a part of what they have made. Consequently, in order for overproduction to ultimately find buyers, mechanisms that energise

the economy and integrate it with the state emerge, a natural process, within the inevitable logic of growth.

The functioning of an economy within specific structures is not just an outcome of objective laws, and we doubt whether such laws even remain constant in the same way as the laws of nature<sup>2</sup>. This is first and foremost the actions of people, and one must bear in mind that the actions of people – entrepreneurs, economic policy makers and opinion-makers – are influenced by the ideology born in the 1970s, colloquially referred to as neoliberalism, brought by the “New Economy”, derived from a concept that arose as an antithesis to the Keynesian “demand-side economics” as the “supply side economics”, just like every idea created to benefit specific interests. It is an economic idea that postulates focusing on those who generate supply and as such it proposes actions to create favourable conditions for entrepreneurs and employers. And since they are interested primarily in profit maximisation, it was believed that conditions and stimuli must be created to reduce all costs, including labour costs and of course taxes; after all, the lower the costs the higher the profits, and this was supposed to motivate them and thus foster their growth.

This is logical and reasonable, but only seemingly as it fails to account for the important characteristic of the economy, which is the internal conflict between the goals and interests at the micro scale and what we need and what is essential at the general macro level. It is primarily the conflict between the interests of a profit-oriented entrepreneur and the interests of their employees. But this is not just the issue of the interests of employees; after all, it is not true that the interests of entrepreneurs, capitalists, businesses and companies always serves the public and society or that profit maximisation is always a force driving the “invisible hand” to make it work for the common good – this is not the case especially where an entrepreneur buys out its competitors and monopolises the market; if this happens, the invisible hand kills the essence of the market, i.e. free competition.

This conflict gains significance especially when entrepreneurs as a community pursue they profit maximisation goals by minimising labour costs, whereas the economy needs demand, and demand is generated by the income of the employees. This leads to the paradoxical conclusion that the more money employees make at the expense of single entrepreneurs by reducing their profits the better for the whole community of entrepreneurs and for the economy as a whole. As a result, what is unfavourable for a single entrepreneur can be beneficial for entrepreneurs as a community. It is a fact that global demand has a special meaning during a crisis – J. K. Galbraith made the following comment in his last book, written

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<sup>2</sup> Besides, it has been observed that in economics some laws are variable because the environment in which economic entities function keeps evolving and as a result certain rules and laws become relative; this leads some to doubt whether economics is even a science.



in 2004 when he was 96, two years before his death: “The one wholly reliable remedy for recession is a solid flow of consumer demand” (Galbraith, 2005, p. 78). This additionally generated flow of consumer demand is expected to reduce the surplus of goods above the current purchasing capacity (the condition of the labour market, the level of wages) and the desire to shop (propensity to save) that develops during a crisis, and thus clear the market. But it may become “reliable” only if wages, i.e. labour costs, rise – with a loss on some of the surplus that represents entrepreneurs’ profit. In this context, surplus is simply a tangible profit of the entrepreneur taking the form of the goods manufactured by employees.

Thus the final result depends on the distribution at the level of enterprises and on the mechanisms for distributing this surplus as they ultimately determine the dynamic and growth prospects of the economy. The distribution must lead to a dynamic balance between the flows of cash and the flows of manufactured goods and services. Moreover, money and other tools of the financial market must be matched to one another and to the condition of the economy. So, let us explore those mechanisms to an extent permitted by a simple classic model.

### THE GREAT BAKERY METAPHOR

The essence of the basic structural system-rooted property of economy (arising from the nature of capitalism) is permanent production surplus in relation to the profit generated by direct manufacturers of market goods, which can be presented by the example of the simplest model of economy, a metaphor similar to the illustration models used as early as in the classic economics development era: we will compare economy to a Great Bakery<sup>3</sup>. We will show how this metaphor simplifies the depiction of complex economic processes and we will use it as an impulse, a pretext to explore various macroeconomic interdependencies and correlations in Poland and other countries.

Let us assume that economy is a Great Bakery owned by Baker, a capitalist making 1000 loaves of bread costing 1 monetary unit each – let us say a dollar. The bread produced by the Bakery is a kind of synthetic aggregate equivalent of the complex set of goods and services produced in the actual economy, and the figure of the Baker can be interpreted as a “collective figure”, i.e. a community of entrepreneurs. As such, our model, just like every model, reflects the reality; disaggregation of those terms would on the one hand bring the model closer to reality, on the other hand it would complicate it rapidly as it would require taking

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<sup>3</sup> Some time after writing this paper and submitting it for publication the author noticed that the same metaphor was also used by Prof. Kazimierz Łaski (2015, p. 37). Perhaps read a long time ago, it still resides in the subconscious. Even when Prof. Łaski was still alive, I noticed we had similar thoughts on economy.




into account a rocketing number of interdependencies and correlations. So in order to avoid problems arising from excessive complications, we are using this extremely simplified model.

Our Baker has 500 employees; let us assume that the production process takes place within a process line from the sowing of grains and manufacturing of flour to baking and selling of bakery products, along with the manufacturing of machines and tools within simple reproduction – a closed and self-sufficient stable system. The value of the manufactured goods is the GDP of our small metaphorical country, and of course the GDP = 1000 dollars – we calculate everything on a monthly basis. The cost of wages is naturally a part of that amount, let us say that they receive wages of 1 dollar each, and the total wages equal the production costs:  $Y = 500$  dollars; the wages represent a half of the (monthly) GDP of our model country.

Thus employees receive an income amount for which they buy (on average, as we allow a certain diversity of income) 1 loaf of bread required to feed the family – as A. Smith said (2003, p. 95), “the product of labour is a natural reward for it – a payment for labour” with the money received as wages making it possible to buy that product. Once the costs of labour are subtracted, we have a production surplus of 500 loaves, which is the Baker’s profit:  $P = 500$  – one can say that the Bakery owner shares what his employees have produced with them fifty-fifty.

The system is stable, static but it can evolve. So let us assume that the Baker has decided to reduce the costs and as a result aggregate wages dropped to 300 dollars and now constitute 30% of the GDP. This could have happened with the employment level remaining unchanged but with the unit pay reduced instead. Consequently, five hundred people will buy a total of only 300 loaves for their reduced wages, which will cause the quality of their lives to deteriorate. Another option is that efficiency could have been improved, for example 300 people make the same number of loaves due to better organisation. What would happen in this case is something that everyone interprets as a positive phenomenon – work efficiency has increased. And so wages could remain the same, labour cost savings have been achieved but still 200 people were made unemployed. As can be easily noticed, such changes in the process of producing basic consumer goods (bread in this case) drive changes across the whole system: it is important what happens to those people, where they can find employment – perhaps new jobs need to be created in services, maybe in the public sector (after all, the state is a kind of service sector too) or in other branches of the economy. In the Bakery itself those changes, whatever the reason for them and mechanisms, come down to labour cost reduction. As a result, the Bakery owner’s profit increased, which means that a surplus of 700 loaves of bread was produced as his tangible profit, which forced changes in the environment of the Bakery. This is illustrated in Figure 1.

*Effect of labour cost reduction*

<b>Wages</b> $Y = 500 \rightarrow 300$		<b>SURPLUS</b> <b>Profit of the capitalist</b> $P = 500 \rightarrow 700$
<b>GDP produced = 1000</b>		

**Figure 1. Basic division structure in capitalism**

Source: own study.

Our simple model illustrates the first and trivial conclusion that in capitalism employees are unable to purchase everything they have produced because labour costs constitute only a part of the generated GDP value; the purchasing power of society (other than capitalists), i.e. aggregate wages, must be lower than the value of the product that society produced. This is a structural property, meaning it is an outcome of the fundamental structure of national income distribution.

Thus a certain permanent producer surplus and a concurrent deficient demand on the part of employees (direct manufacturers) is a structural feature of the capitalist economy – as already discovered in classic economics. In the first approach we have a consumer market where it is “easy to produce and hard to sell”. The situation means that additional market clearing mechanisms must emerge.

### WHAT PART OF GDP DO EMPLOYEES RECEIVE?

Does this “fifty–fifty” or “one third–two thirds” distribution to the disadvantage of employees presented in our model have anything to do with the reality? Is it not an exaggeration that so little is left for the employees? Let us explore how it occurs worldwide at a macro level to see what part of GDP employees in various countries received in the 1997–2018 period.

The ratio of macroeconomic employment-related costs to GDP depends on a number of factors differing country by country, which is why certain data may be poorly comparable. For instance, attention may be drawn to Ireland as its ratio dropped drastically in 2015 as a result of changes in the calculation methodology and the consequent overstatement of GDP value, which resulted in the value of the denominator increasing more than that of the numerator<sup>4</sup>, thus causing a questionable drop in the value of the ratio.

<sup>4</sup> This information (telephone consultation) was received from Polish Central Statistical Office.

Table 1. Share of employment-related costs in GDP in selected countries and years

No.	1997		PL 100	2007		PL 100	2012		PL 100	2017		PL 100	2018		PL 100
1	Switzerland	62.4	141	Switzerland	62.2	177	Switzerland	61.5	170	Switzerland	59.3	154	Switzerland	58.5	149
2	USA	60.3	136	USA	56.8	161	USA	55.4	153	USA	53.5	139	USA (2017)	53.4	136
3	Sweden	58.5	132	UK	54.5	155	Denmark	55.3	153	France	52.2	135	Germany	52.9	135
4	Japan	56.7	128	Sweden	54.4	155	Ukraine	54.0	150	Denmark	51.8	134	Denmark	52.4	134
5	UK	54.4	123	Denmark	54.0	153	UK	53.9	149	Germany	50.9	132	France	52.4	134
6	Denmark	53.1	120	France	51.6	147	Sweden	53.7	149	Canada	50.5	131	Canada	50.5	129
7	Canada	53	120	Japan	51.6	147	France	53.4	148	Luxembourg	50.2	130	Japan	50.4	129
8	Germany	52.7	119	Slovenia	51.1	145	Belgium	52.4	145	Japan	50.0	130	Luxembourg	50.2	128
9	France	51.9	117	Canada	51.0	145	Slovenia	52.4	145	Belgium	49.4	128	Slovenia	49.9	127
10	Belgium	50.6	114	Belgium	50.5	143	Canada	52.3	145	Slovenia	49.3	128	Belgium	49.6	127
11	Austria	50.5	114	Netherlands	49.5	141	Japan	52.0	144	UK	49.1	127	UK	49.4	126
12	Czech Republic	50.4	114	Ukraine	49.4	140	Finland	51.8	143	Belarus	48.4	125	Estonia	48.5	124
13	Netherlands	50	113	Latvia	49	139	Netherlands	51.6	143	Estonia	48.2	125	Belarus	48.0	122
14	Australia	49.9	113	Portugal	49	139	Germany	51.6	143	Netherlands	47.9	124	Austria	47.7	122
15	Finland	49.5	112	Germany	48.8	139	Russia	50.4	140	South Africa	47.7	124	Netherlands	47.7	122
16	South Korea	47.7	108	Austria	48.2	137	Austria	50.2	139	Austria	47.5	123	South Africa	47.6	121
17	Norway	47.1	107	Australia	47.9	136	Belarus	50.2	139	Norway	47.5	123	Sweden	47.5	121
18	Spain	46.4	105	Belarus	47.8	136	Australia	48.1	133	Russia	47.4	123	Russia	47.4	121
19	New Zealand	44.5	101	Estonia	47.7	136	Portugal	48.0	133	Australia	47.3	123	Latvia	47.3	121
20	Poland	44.2	100	Finland	47.5	135	Estonia	47.1	130	Sweden	47.1	122	Australia	47.1	120
21	Portugal	43.6	99	Hungary	46.8	133	Luxembourg	46.1	128	Finland	46.9	122	Spain	47.1	120

22	Ireland	43.3	98	Spain	46.5	132	South Africa	45.9	127	Spain	46.9	122	Finland	46.8	119
23	Italy	41.3	93	Luxembourg	45.7	130	Spain	45.8	127	Latvia	46.6	121	Norway	46.6	119
24	Greece	34	77	South Korea	45.6	130	South Korea	45.8	127	South Korea	44.8	116	Portugal	44.9	115
25				South Africa	45.5	129	New Zealand	45.5	126	Portugal	44.3	115	South Korea	44.8	114
26				Cyprus	45	128	Cyprus	45.4	126	Lithuania	43.8	113	Lithuania	44.8	114
27				New Zealand	44.7	127	Hungary	45.1	125	Cyprus	43.6	113	Ukraine	43.8	112
28				Russia	44.1	125	Norway	44.8	124	Ukraine	43.6	113	Hungary	43.7	111
29				Lithuania	43	122	Malta	44.6	124	Bulgaria	43.2	112	Cyprus	43.2	110
30				Malta	43	122	Czech Republic	43.1	119	Hungary	43.0	111	Bulgaria	43.1	110
31				Ireland	42.8	122	Italy	42.7	118	New Zealand	42.9	111	Czech Republic	43.0	110
32				Norway	42.8	122	Ireland	42.1	117	Czech Republic	41.4	107	New Zealand	42.9	109
33				Czech Republic	42.7	121	Latvia	40.7	113	Malta	41.1	106	Slovakia	41.1	105
34				Romania	42.7	121	Lithuania	38.9	108	Slovakia	40.5	105	Malta	40.4	103
35				Italy	41.1	117	Bulgaria	37.1	103	Italy	39.7	103	Italy	40.2	103
36				Greece	36.4	103	Slovakia	37.0	102	Poland	38.6	100	Romania	39.9	102
37				Slovakia	36.4	103	Romania	36.6	101	Romania	36.0	93	Poland	39.2	100
38				Poland	35.2	100	Poland	36.1	100	Greece	33.6	87	Greece	33.4	85
39				Bulgaria	34.5	98	Greece	33.0	91	Ireland	29.4	76	Ireland	28.8	73

*Note: Data for 1997 were much poorer in terms of the number of countries than data for subsequent years.*

Source: own study based on data from Polish Central Statistical Office, Polish Statistical Yearbooks (1998–2019), chapter “International Comparisons” (ratios for certain countries and certain years pertain to a year other than stated in the table heading).

Still, we have a measure that shows significant differences between countries and the trends in changes as to what part of GDP is received by society as pay for their work. As we can see, in 1997 the 44.2% ratio for Poland was comparable to ratios for a number of developed countries in Western Europe, where the values in the leading countries (assuming that the value for Poland was 100) were only some 10–20 percent higher. Even though it depends on a number of factors, not just on the distribution at the level of enterprises, but also on the size of unemployment and on the forms of employment<sup>5</sup>, the structural changes taking place in Poland over the 10 year period caused a significant change and Poland dropped in the expanded ranking to the penultimate position, with a ratio of 35.2%. This was a drop by almost 10 percentage points, and in the leading countries it was half as high – so, in Poland only a little over 1/3 of GDP<sup>6</sup> was given back to people versus a half more in these other countries. In 2017, Poland rose in the ranking a little, by two positions, with the ratio increasing (by 2.5 percentage points) but that being still much higher (by one third) in the leading countries. As can be seen, Switzerland is a special exception that has no equals. It is a place where the largest part of GDP is given back to people, even up to 60%. The United States usually comes second, with a ratio of over 50% (in 1997 the ratio exceeded 60% but it gradually dropped to reach 53.5%)<sup>7</sup>. Its high value means that the part of society

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<sup>5</sup> Unemployment in Poland in 1997 and 2007 differed only slightly, it increased from about 11.5% to 12.7% but in the meantime it reached 19.9% in 2003; in contrast, in 2012 and 2017, it was 12.8% and 7.3% respectively, which was a substantial drop. But the value of the ratio also depends on the form of employment. In Poland, contracts other than employment contracts became ever more common, especially self-employment, where the employee is no longer an employee but a “business” signing a B2B contract with the company that is an employer. According to the information from GUS (Polish Central Statistical Office), almost 3 million people in Poland were self-employed at the end of 2006, which was almost 19% of all the employed, and the ratio remains at a level close to 20%. This means that 1 in 5 people who are actually employees are not registered as employed (although they employ themselves), which has not only material fiscal consequences (they pay a 19% CIT and low social security) but also reduces the share of employment-related costs. Its drop for Poland, by almost 10 percentage points, was the greatest negative change in this group of countries (data from Polish Central Statistical Office).

<sup>6</sup> Curiously enough, if we take into account the consumption of households, it constituted about 60% of GDP. In the period from 1995, it was the highest (in relation to GDP) in 2002 (65.6%), in the 2006–2013 period, it was about 60%, and it dropped in subsequent years and stabilised at 57.7% in the 2015–2016 period, only to drop gradually to 57.3% in 2018, despite the family support programme financed from the budget (data from Polish Central Statistical Office).

<sup>7</sup> This is not far from the value of that ratio in the years before World War II. In his fundamental paper, M. Kalecki shows that the share of wages in the gross income of the private sector in the United States between 1929 and 1941 was 51 to 57.1%, and it was the highest in 1932 and 1933 (57.0% and 57.1% respectively); the value 54% dominated in that period (Cf. M. Kalecki, *Teoria dynamiki gospodarczej*, PWN, Warsaw 1986; published in the first original version as *Theory of Economic Dynamics: An Essay on Cyclical and Long-Run Changes in Capitalist Economy*, Allen and Inwin, London 1954, p. 47).

which we consider as the employed class is more fully included in the market mechanisms – either directly, as employees of the market sector, or indirectly, when they are compensated through the fiscal redistribution system.

Notably, such a process of value reduction was observed for that ratio in a number of countries. In Poland, it was only partially a consequence of the evolutionary changes arising in the distribution of wages as a result of the transition policy. Table 2 presents the basic parameters for describing the distribution of wages based on the tables from the Statistical Yearbooks of Polish Central Statistical Office presenting the percentage share of the employed in the pay ranges on a biennial basis.

**Table 2. Parameters of the distribution of wages in Poland**

Year	Minimum wages		below average	mean	median		mode		9th decile		
	PLN	% of the mean value	%	PLN	PLN	% of the mean value	PLN	% of the mean value	PLN	% of the mean value	% of the mode
1999	700	41.2	59.4	1697	1487	87.6	1155	68.1	2967	174.8	256.9
2001	760	34.3	65.5	2217	1829	82.5	1441	65.0	3684	166.2	255.7
2002	760	34.1	64.7	2230	1827	81.9	1397	62.7	3761	168.7	269.1
2004	824	34.8	65.5	2369	1911	80.7	1466	61.9	3969	167.6	270.8
2006	899	33.9	65.7	2654	2130	80.2	1592	60.0	4521	170.3	283.9
2008	1126	34.8	65.4	3232	2642	81.7	2086	64.5	5394	166.9	258.6
2010	1317	37.2	64.7	3544	2906	82.0	2008	56.7	5890	166.2	293.3
2012	1500	38.5	66.2	3896	3113	79.9	2170	55.7	6595	169.3	303.8
2014	1680	40.9	65.9	4108	3295	80.2	1927	46.9	6969	169.7	361.6
2016	1850	42.6	66.3	4347	3524	81.1	2056	47.3	7234	166.4	351.9
2018	2100	42.0	66.0	5004	4093	81.8	2378	47.5	8256	165.0	347.2
<b>Increase</b>	<b>3.00</b>	<b>1.02</b>	<b>1.11</b>	<b>2.95</b>	<b>2.75</b>	<b>0.93</b>	<b>2.06</b>	<b>0.70</b>	<b>2.78</b>	<b>0.94</b>	<b>1.35</b>

Source: own study based on data from Polish Central Statistical Office, Polish Statistical Yearbooks (1998–2019), tables of distribution ranges “The employed by gross remuneration,” item Total.

The last row presents increase rates for particular values. The visible general tendency is that the distance between the ninth decile and the mode is increasing – it was two and a half times higher at the turn of the century, and over the next years the difference continued to grow to become almost three and a half times higher in the 2014–2016 period and in 2018 respectively, whereas the distance to the mean value basically stabilised – the 9th decile was higher than the mean value by 66 to 70 percent. The difference between the last decile and the mean value

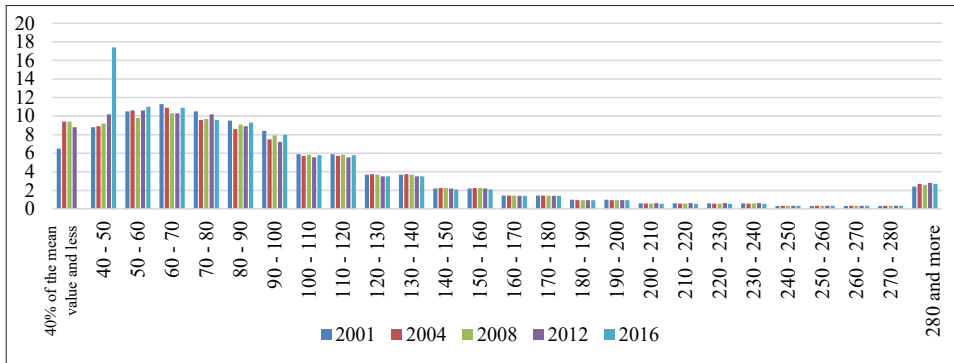
to the advantage of the former is rather small, just sixty-something percent, so if we wanted to single out those whom we consider the richest, we would have to study the last centile rather than the decile. However, the statistical data provided by GUS are not detailed enough to determine its value. Still, it should be noted that in the last open range of 280+ percent above the mean value, 2.4% people were employed in 2001, and in the next years slightly more; in the 2012–2014 period the share of that group stabilised at 2.8% and then dropped to 2.6% in 2018. During that time, the nominal GDP increased 3.14 times so the wages growth rate was much slower for the mean value, even slower for the median and, obviously, much slower (more than twice as slow) for the mode. It should be noted that the minimum wages growth still failed to keep up with the GDP growth, as the wages increased by a factor of three. The fourth column in the table shows that after 2000 about 66% of people had wages below the mean value, with a slight growth tendency (regression coefficient for the whole sequence of data  $\beta_l = 0.37$ , after 2000  $\beta_l = 0.11$ ).

The values of the above measures result from the gradual changes in the distribution of wages and the growing inequalities. It turns out that the highest percentage share in 2018 consisted of employees making 40–50% of the average wages (PLN 1739 to PLN 2173) – at 16.2%, while two years earlier the value was 17.4% of the employed; the number of employees from the next range (50–60% of the average wages) was much lower, at 10.9 % and 11% of the employed in 2018 and in 2016 respectively. Such a distribution resulted from the fact that a major part of the employed “concentrated” within the range of 40–50% of the mean value, with concurrent drastic drop in the number of people making less than 40% of the average wages, which was the effect of an increase in minimum wages (the wages entered a range above 40% of the mean value); a substantial number of people were paid below half of the mean value, and the mode of wages gradually departed (downwards) from the mean value, which indicated growing inequalities, poverty stabilised, the earnings of the majority were characterised by clear stagnation, and this tendency was confirmed by the fact that the median also followed a relative decreasing trend and consequently 65.5% and over 66% in 2001 and in 2018 respectively received wages below the mean value, which is characteristic of highly right-skewed asymmetrical distribution accompanied by steady but consistent growth in symmetry. This is illustrated in Figure 2.

The relations between the mean values and measures of location reflect a gradual increase of inequalities in the area of wages. Significantly, this contradicts the changes in the Gini coefficient because, according to Eurostat data<sup>8</sup>, its value for Poland continued to gradually decrease from 31.4 to 29.8 over 2009–2016 and to 28.5 in 2019.

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<sup>8</sup> [http://appsso.eurostat.ec.europa.eu/nui/show.do?lang=en&dataset=ilc\\_di12](http://appsso.eurostat.ec.europa.eu/nui/show.do?lang=en&dataset=ilc_di12) (10.06.2020).



**Figure 2. Distribution of wages in the economy in the 2001–2016 period**

Source: own study based on data from Polish Central Statistical Office, Polish Statistical Yearbooks (2002–2017), tables “The employed by gross remuneration” – the data specify the percentage of all the people employed in the economy.

Consequently, macroeconomic data confirm that the 50% or 30% share of labour costs in GDP adopted in our model is not detached from reality. A certain level of wage costs shapes the value of the original surplus remaining with the enterprise: the employees spend their wages to buy 500 or 300 loaves, while 500 or 700 loaves respectively remain with the Bakery as product surplus. But the Baker makes an actual profit if that surplus is sold, therefore it must be deposited somewhere, which means there must be mechanisms in place to distribute it in society, whether within or outside of the specific economy, and this leads to certain consequences.

There are *three directions* for changing the surplus to money, i.e. to monetary profit:

- first, shopping done by those employed in sectors that produce means of production, in investment sectors,
- second, shopping done by those employed in the public sector,
- third, sales in foreign markets.

Thus, the surplus is divided into three parts – in Figure 1, the division is marked with a dotted line. As has already been mentioned, the surplus first takes the form of tangible goods (which is why we termed it the “primary surplus”), that is the products that the manufacturer has to sell, in this case loaves of bread. Things would differ in the case of services. The labour cost is of course always a part of the general value (price), and if our metaphorical economy delivered certain services instead of bread, such as hairdressing services, the wages of the direct service providers could also constitute 50% of the income earned by doing the customer’s hair, but the owner of the Great Hair Salon, which would replace the Great Bakery, would receive directly the monetary surplus representing his profit. There is no surplus product in the case of services, while the Baker owning



the Great Bakery is in a difficult corner, as he must transform the product surplus into money by selling it. As we shall see, these *three directions* lead to significant economic consequences, because they imply the emergence of a specific economic structure.

### SURPLUS AS A DRIVER OF GROWTH

Tangible surplus can be passed in the first instance (the order is of course a matter of agreement) to those who will contribute to economic growth by providing new production tools to improve performance and product quality – they will implement investments. In this way the surplus will drive extended reproduction, i.e. development. So, the model needs to be expanded to include two elements: manufacturers of investment goods and a system for transferring funding to them, which is a system for financing investments and purchases of investment goods. Characteristically, in the socialist planned economy those branches of economy that produced investment goods were referred to as the 1st Division of economy; this shows that production of investment goods was a priority, while manufacture of consumer goods was pushed to the background and represented branches assigned to the 2nd Division – they were considered a cost, or even as a burden for economic development, which disrupted the logic connected with the primary goal of economic processes, that is the satisfaction of various consumption needs of society.

The need to take into account the financing system means that first cash, termed as savings (*S*), needs to be generated and then transferred to the economy, which means those savings must be activated or, in other words, invested, lent, transformed to investments (*I*) through a financial intermediation system. As a result, the part of the community that is employed in the investment sector, i.e. the sector producing not the means of consumption “baked” in the Great Bakery but the means of production, will be able to purchase a part of the surplus consisting of the 500 (or 700) loaves.

Investing is an objective need of every economy that is intended to grow. Therefore a question arises: who is to generate the funds for the growth, where should cash flow *S*, which is expected to be converted to *I*, be supposed to come from? In the nationalised socialist economy this was the role of the state. The state paid basically only net income to employees of state-owned companies, i.e. income without taxes<sup>9</sup> and practically without savings<sup>10</sup>, with cash flows managed

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<sup>9</sup> Strictly speaking, without direct taxation, income tax did not exist but there were various turnover taxes, i.e. indirect income taxes, because it was not possible to survive completely without taxes after all.

<sup>10</sup> Of course, people accumulate savings, there were even campaigns encouraging them to do so, but the wages of many were enough only to cover the basic costs of living so they could not afford to

through a central plan at the macro level. In contrast, our Great Bakery model logically shows that it would have to be the capitalist himself to first provide the purchasing power for employees of the businesses functioning in the environment of the Great Bakery, and so our model needs to be expanded to include producers of investment resources, and secondly (which is going to be discussed in the next chapter) to supply funds to the state by paying taxes. This cash flow is indispensable for the surplus of the manufactured product remaining with the capitalist to be purchased.

Therefore, the model needs to become dynamic because this money has to be generated in the previous period: let us assume that the Baker sold all the production in the month before, giving him an income of 1000 dollars from which he paid wages to his employees, thanks to which they bought 500 (or 300) loaves of bread, while for the Baker to sell the remaining loaves funds need to be transferred from his savings (and, by extension, as the taxes he pays). In this way, many models analysing the processes of functioning and growth of a capitalist economy assume that savings are generated from the profits of the capitalist – this is the logic of those models<sup>11</sup>. For Keynes, savings are simply the difference between income and consumption expenses, the issue of whether we treat the purchase of a house or a car as consumption or investment expenses being a matter of convention. It all depends on “where we draw the line between the consumer and the entrepreneur” (Keynes, 1985, p. 88); similar ideas were expressed by K. Łaski (2015).

Today we know, of course, that in a real economy the relationship between investments and savings is neither simple nor direct; Keynes demonstrated that those notions, as macroeconomic flows, are determined primarily by the propensity to save and the propensity to invest, which depend on a number of factors; at any rate, it is not true that savings determine investments but rather on the contrary – investments are primary in nature, their level defines the level of income, with a certain propensity to save. However, it is a complex process, contingent also (or perhaps primarily) on what entities generate the funds that are contributed to the financial system. At first glance, our Great Bakery model suggests that the capitalist should provide the funds to finance development from his own resources, while the banking (financial) system will act as an agent if the revenue earned in the previous period has been deposited therewith or is reinvested. Of course, its employees could also gather savings but the macroeconomic consequences depend on how the income earned at the level of the enterprise is distributed. With an income of 500 (or 300) dollars, their savings

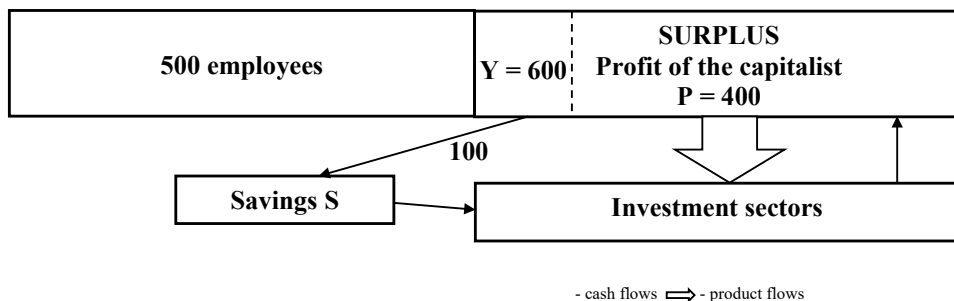
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put money aside and build their wealth through savings; besides, there was no trust in Polish currency, and no other financial assets (other than black market dollar) were available; savings as such did not serve the functions they have in a market economy because the role of banks was limited, especially since money did not have the same functions it has in a market economy.

<sup>11</sup> For instance the model by Kalecki (cf. Kalecki, 1986, p. 63 et seq.).

would directly weaken the economy, which could affect the propensity to save. As M. Levinson (1992, p. 69) notes, “a smart employer is willing to pay more than the equilibrium wages suggest (...), he believes that paying his workers above the market equilibrium wages is fully justified”. For instance, Henry Ford decided in 1914 to pay his workers a then unprecedented daily rate of 5 dollars (Levinson, 1992, p. 67). In this way Ford’s worker could buy not only a Ford but also save money. The Baker in our model could pay his employees not 500 but 600 dollars and then, having satisfied his needs, he would have saved 100 and contributed to the financial system, as illustrated in Figure 3. Such distribution would have a specific macroeconomic effect on the distribution structure of national income, i.e. on the manufactured product and the related income stream: savings would also be generated by households.

*Labour costs above the equilibrium level – generating savings*



**Figure 3. Savings as a financial surplus of employees**

Source: own study.

Therefore, if, as suggested by Levinson, a major part of the funds is passed on to employees, then at least for some of them the income may exceed their consumption needs and so a propensity to save will emerge in households while at the same time demand will be satisfied in accordance with their consumption needs. The increase in the propensity to save is non-linear in relation to income growth; the increase in the risk-taking propensity, i.e. readiness to make risky investments, is non-linear, too. Hence the significance of income diversification – because this builds a group of richer people in society who are willing to risk some of their money for investment purposes without this affecting their financial situation. They make it possible to create the funds used to finance various risky undertakings, some of which are successful and drive economic development.

Still, it must be borne in mind that too large an inequality is highly harmful to the system because it results in too large a portion of the general income pool being held by a privileged group, which increases the macroeconomic savings rate

but also results in a purchasing power deficit for the rest. Such income allocation impedes development due to insufficient global demand and, consequently, leads to economic stagnation. In such a case, any mechanisms transferring a part of the purchasing power to households instantly stimulate costs and, by extension, the economy and economic growth<sup>12</sup>.

From the point of view of households, saving has a special individual value – it allows households to build wealth in the form of resources set aside. But it also has a macroeconomic value: it will co-create the M2 monetary aggregate as something that I have termed the “capital leg of the economy”<sup>13</sup> – because this resource of deposited savings is used to finance loans (multiplied by the money multiplier by commercial banks), other investments disclosed in the assets of balance sheets of banks and acquisitions in stock markets, whether secondary (stock exchange) or primary – stock issues placed by banks and stockbroking firms. It is thanks to the financial system that the passively accumulated money is activated to form the ultimate income of the employees of the companies producing investment goods.

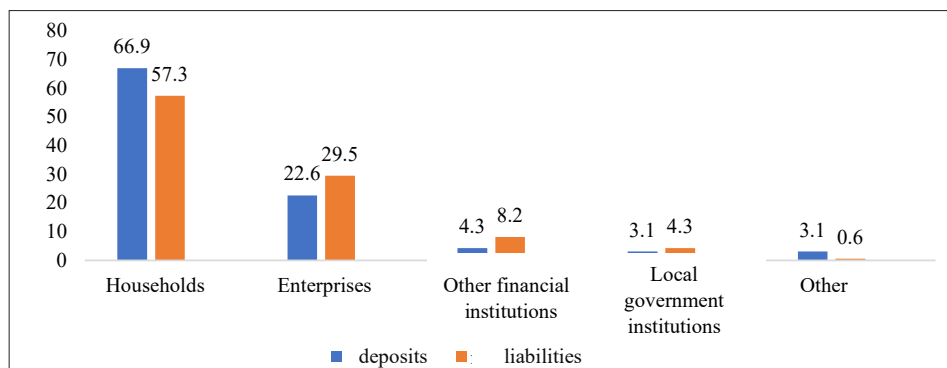
In Poland, the savings of households deposited in banks represent almost 70% of total deposits, while enterprises own slightly above 20%; the remainder, about 10% of deposits, are funds of other entities, with 4% belonging to other financial institutions and 3% provided by various local government institutions. This is how it works as far as supplying funds to the financial system, but when it comes to the amounts owed to banks, which also partially means investment loans, the entity structure is similar with a little variation: less than 60% belongs to households and 30% to enterprises; this means that households save only a little (10 percentage points) more than they absorb in the form of loans, while enterprises take out slightly more loans than they save. This is illustrated in Figure 4.

As we can see, the majority of deposits in the current pattern of national income distribution are generated by households, the figures for enterprises being three times lower. At the same time, households lead in the money owed, though the figures here are not three times but only twice as high as for enterprises. This shows that households may collectively save more than enterprises but as a community they highly rely on loans, which means that many of them have little in the way of resources of their own. Enterprises, on the other hand, despite having less deposits than borrowings with banks, are much less tied to the banking system, which might suggest that they rely more on the capital market instruments traded in the stock exchange for capital. However, the Polish stock exchange is weak, which is why it can be argued that the Polish financial system as a whole has low potential for financing economic development.

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<sup>12</sup> This was partially the effect of Poland’s “Family 500+” programme.

<sup>13</sup> As I once stated, the economy stands on two “legs” of the monetary aggregate, a form of pillars: the “transaction leg” in the form of circulating money that forms the M1 aggregate, and the “capital leg,” which co-creates aggregate M2 together with M1 (cf. Żyżyński, 2014).



**Figure 4. Deposits and liabilities of commercial banks in Poland as a percentage of the total figures (July 2019)**

Source: own study based on data from the National Bank of Poland (NBP).

As I have shown in the work cited (Żyżyński, 2014, Figure 2), the savings resource is slim due to the halving of the M2 monetary aggregate in 1990 – by those savings, the real value of which was depreciated by inflation, and no attempts were made to compensate for it, which should have been done in order to rebuild and then properly shape the monetary capital resource: it can be said that the “capital leg” of the economy was cut off at the start of the new economic system, and it is being recreated slowly and gradually.

As can be seen, deposits constitute a substantial part of the pecuniary resource. Figure 5 shows the way it has been shaped in Poland in recent years.

The element increasing M3 in relation to M2, i.e. debt securities of up to 2 years and operations with repurchase agreements between banks and the non-banking sector, i.e. instruments financing lending operations mainly in the interbank market for a limited time (mostly bonds and bills), is small – it is just ten plus billion zloty, that is approximately 1% of GDP. M2 is more important as its essential part consists of time deposits in banks, i.e. a unique capital base of the economy.

Data for December in each year		2012 PLN billion	GDP %	2014 PLN billion	GDP %	2016 PLN billion	GDP %	2017 PLN billion	GDP %	2018 PLN billion	GDP %
<b>M3</b>		<b>921</b>	<b>57.7</b>	<b>1059</b>	<b>61.6</b>	<b>1265</b>	<b>68.0</b>	<b>1261</b>	<b>63.4</b>	<b>1446</b>	<b>68.4</b>
Debt securities up to 2 years		8		4		3		4		7	
Operations with repurchase agreements		13		10		6		8		11	
<b>M2</b>		<b>900</b>	<b>56.4</b>	<b>1045</b>	<b>60.7</b>	<b>1256</b>	<b>67.5</b>	<b>1249</b>	<b>62.8</b>	<b>1428</b>	<b>67.5</b>
Deposits and other up to 2 years inclusive		416	26.0	438	25.5	441	23.7	419	21.1	416	19.7
<b>M1</b>		<b>485</b>	<b>30.4</b>	<b>606</b>	<b>35.3</b>	<b>815</b>	<b>43.8</b>	<b>830</b>	<b>41.7</b>	<b>1012</b>	<b>47.9</b>
Deposits and other current liabilities		382	23.9	476	27.7	641	34.4	654	32.9	809	38.2
Cash in circulation (outside of banks)		103	6.4	130	7.6	174	9.3	177	8.9	203	9.6

**Figure 5. Structure of the Polish pecuniary resource**

Source: National Bank of Poland (NBP).

Comparisons with other countries lead to interesting conclusions. It is noteworthy that in the USA the value of the M2 pecuniary resource in relation to GDP remains similar<sup>14</sup>: 63% in 2012 and 65%, 69%, 69% and 68% in subsequent years; but although USA's current deposits forming part of the M1 money constituted only 8% (so M1 money is 15% of GDP), while the time deposits co-creating the M2 aggregate constituted almost 5% of GDP, the deposit structure in Poland is fundamentally different and variable: whereas time deposits had a slight advantage in 2012, their share continued to drop over the years, from 26% to 20% of GDP, and the significance of current deposits grew from 24% to 38% of GDP, as a result, their number in 2018 being twice as high as that of time deposits.

In European countries, where the financial system in comparison to the United States is more tied to the banking system than to financial institutions and the stock exchange, the size of the M2 resource in relation to GDP is one hundred and several dozen percent, the global average of the ratio for Broad Money (closer to our M3) is 125%, for OECD countries it is 116%, for Japan it is 125%, for the United Kingdom it is 155%, and for China about 200%; in the USA, Broad Money is only a little higher than M2 and constitutes 90% of GDP<sup>15</sup>.

In systems based on the banking sector, the deposit part of the M2 resource is crucial for crediting the economy, and the economic equilibrium depends on a more or less harmonious relationship between savings and investments<sup>16</sup>, i.e. one where money does not sit idle, frozen as overliquidity of the banking system, but is used to foster development and the stability of financial relations. For liquid functioning of today's economies, the financial system must have the size and reliability adapted to modern requirements, and so the role of economic policy, understood in a broad sense, both fiscal and monetary, is to influence economic structures to allow them to develop properly and to build both the ability to accumulate savings and the propensity to invest.

### SURPLUS AS A SOURCE OF FINANCING FOR THE STATE

A part of the surplus of produced loaves of bread may (or even has to) be used to satisfy the needs of those who build the institutions that organise society, i.e. state institutions forming what we refer to as the public sector. Their function is

<sup>14</sup> According to FRED Economic Data Economic Research Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/graph/?g=dZn> (10.06.2020).

<sup>15</sup> According to World Bank Broad Money as a percentage of GDP, <https://data.worldbank.org/indicator/fm.lbl.bmny.gd.zs>; The formal definition of this money aggregate is as follows: "Broad money is the sum of currency outside banks; demand deposits other than those of the central government; the time savings and foreign currency deposits of resident sectors other than the central government; bank and traveller's checks; and other securities such as certificates of deposit and commercial paper".

<sup>16</sup> The tools of this policy include mainly the rates of the central bank and, to a certain extent, the current open market policy; still its primary goal is price stabilisation (i.e. direct inflation targeting strategy).

to pursue common good, to deliver goods of public and social interest (Owsiak, 2002, pp. 21–32). For that system to work, it needs a financing system, i.e. a way of supplying money to cover the operational costs of the public sector. Our simple (by definition simplified) model shows that if the cohesion of the system is to be preserved, the funds to finance the state should be provided primarily by the Baker – the only entrepreneur in our model, as he is the one that generates the surplus of the unsold loaves of bread and as such he has to give some of his income from the previous month to the state to allow it to generate demand for the loaves through its spending.

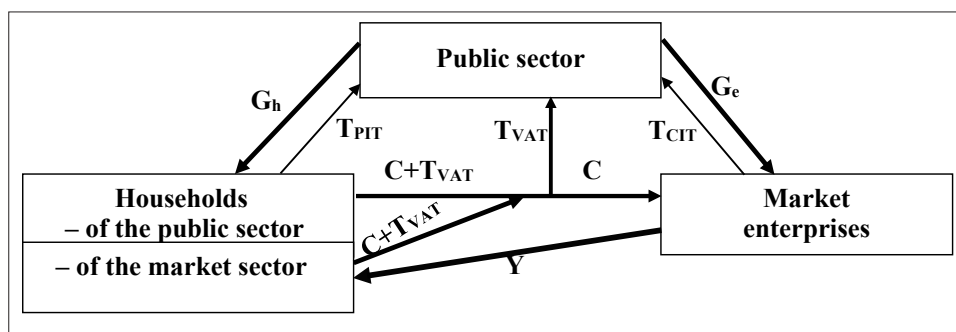


Figure 6. Circulation of money as a result of financing the public sector with taxes

Source: own study.

The model shows the logic of the economic mechanism: the system functions due to the continuous circulation of money: the earnings from the previous periods are used to finance purchases in the next cycle. If the capitalist had not been taxed, i.e. the money had not been paid to the state, then a certain part of the surplus of 500 or 700 loaves would have increased the inventory of unsold finished products and the Baker would not have made money; he earns revenue because he pays taxes (and, as we have seen in the previous chapter, either transfers some of the revenue to the financial system or makes direct investments). This shows that taxes are not a loss to an entrepreneur, but they instead incorporate money into a cycle of trade where he eventually gets his money back. In the real world, tax is of course a general obligation, with both entrepreneurs (legal entities) and households (natural persons) contributing to the financing of the common good. The money circulation mechanism related to the financing of the public sphere is depicted in Figure 6.

Taxes are an arena of gigantic misunderstandings and cynical definition-related lies, i.e. disinformation. So let us explain the basic structure of a tax system. Households pay income taxes, directly ( $T_{PIT}$ ) and indirectly ( $T_{VAT}$ ), while entrepreneurs pay income taxes ( $T_{CIT}$ ). We are leaving out other less significant taxes, paid mostly to local governments (aside from their share in the PIT and



CIT). Taxation of employees means financing the public sector by transferring a part of their income, and as such takes place at the expense of their ability to satisfy their needs: direct PIT reduces their disposable income (after tax versus before tax) and the indirect tax (VAT) reduces their real income by increasing the prices of goods and services – a reduction in real income means that they can buy less than they would be able to if there were no indirect tax. As a result, by generating these two flows of funds detached from the income stream, natural persons in fact share some of what was supposed to be used to satisfy the needs of their families, i.e. the pool of 500 (or 300) loaves of bread. Tax as a way of capturing a part of the purchasing power of the community of employees means a redistribution of income that does not remove the “overhang” of the structural, system-based surplus of the manufactured product. Tax imposed on employees means simply “poverty sharing” between employees and the state – i.e. the people employed in the public sector and others, tied to the state through a certain form of economic relations.

On the other hand, the tax paid by entrepreneurs (CIT) to the state budget is partially transferred to the households of public sector employees ( $G_{GD}$ ) and, in consumption expenses  $C$ , it returns to entrepreneurs – to that collective Baker that “bakes” the consumer goods that satisfy the needs of households. The remaining part of the tax supports central and local government spending in the market, such as purchasing of goods and services, which indirectly channels the money back to entrepreneurs. In our Great Bakery model, those transfers of funds mean the purchase of a part of the surplus of 500 or 700 produced loaves of bread. It can be easily noticed that if the surplus of the unsold product increases for the entrepreneur, for instance as a result of a drop in internal demand, where the entrepreneur has invested in technologies limiting employment, it would be necessary to increase the CIT in order to preserve the cohesion of the system.

Our model proves that the economic processes implemented in that economy and the structural changes that have led to labour cost reduction mean the need to increase the taxation of the capitalist in order to reduce system incoherence – this is simply the logic of the system. In practice, however, a reverse policy is pursued: It should be noted that when the corporate income tax (CIT) was introduced in Poland in 1992 it was at 40%, which was consistent with that logic<sup>17</sup>, but in the 1992–1996 period the CIT was gradually reduced to reach 19% in 2014. Curiously enough, the CIT reduction in 2004 from 27% to 19% entailed a certain

<sup>17</sup> It should be noted that in the USA corporate income tax rates in the period from early 1950s, when they grew from approximately 40% (the level from the 1940s and the years directly after World War II), to the late 1970s were approximately 50%, and progressive personal income tax rates reached 90%, which was later reduced to 70% (See: Spencer, 1977). True, this period ended in stagflation, which prompted President Reagan to make tax cuts, but before that period the economy was excellent and America was able not only to offer a welfare state programme but also to pursue an impressive space programme.



increase in economic growth rate, from 3.9% to 5.3%, but in the next year the rate dropped to 3.6%; it was clearly higher in the subsequent years (6.2%, 6.8% and 5.1% respectively) but in 2009 it plummeted to 1.6%, which can be considered as an effect of the global crisis. In practice, the economic growth rate depends on a number of factors – it is hard to find a reasonable explanation for the thesis that a reduction in taxes for entrepreneurs may help increase it. It must be noted that the CIT reduction was consistent with the global trend, it was a response to the reductions in other countries, to tax competition in the period where there was no free flow of labour in the EU.

The year 1992 marked the introduction of a three-bracket personal income tax (PIT) with 20%, 30% and 40% rates in 1992–1993; 21%, 33% and 45% in the 1994–1996 period; and then 20%, 32% and 44% in 1997, further reduced to 19%, 30% and 40%, and finally to two rates of 18% and 32% introduced in 2009. Significantly, in the last year where there were three rates, the highest one applied to 1.59% of taxpayers, who contributed 20.69% of the PIT proceeds; afterwards, the number of rates was reduced to two, and the second rate 32% applied to 1.59%, who contributed 20.7% of PIT proceeds; in 2013<sup>18</sup>, the last rate was paid by 2.5%, who contributed 24.7% of the PIT proceeds. The table below shows the actual structure of budget financing from taxes that emerged from those changes.

**Table 3. Relationships between proceeds from PIT, CIT and VAT**

Specification	2000	2005	2010	2015	2018
State budget					
PIT/CIT	2.64	3.69	4.00	4.33	4.07
VAT/PIT	1.16	1.30	1.24	1.10	1.24
(PIT+VAT)/CIT	5.71	8.48	8.95	9.10	9.12
(PIT+VAT+excise duties)/ CIT	7.33	10.98	11.51	11.54	11.2
Public Finance Sector					
PIT/CIT	3.00	3.66	4.10	4.58	4.34
VAT/PIT	0.97	0.99	0.95	0.82	0.91
(PIT+VAT)/CIT	5.90	7.29	7.98	8.34	8.30
(PIT+VAT+excise duties)/ CIT	7.43	9.19	9.99	10.25	9.93

Source: own study based on data from the Polish Central Statistical Office.

As we can see, natural persons, i.e. individual citizens, as a result of PIT (which we combine at this point with the healthcare system financing, separated from taxes

<sup>18</sup> 2014 was the last year when the Polish Ministry of Finance published the Tax Newsletter where the structures of tax proceeds were analysed (it used to come out at the end of every subsequent year). But after that year, the unit in charge of developing the newsletter was shut down.

in 1999) being directly charged on their income, gave the state 2.6 times more in the 1990s, and even in 2000, and the following years the entrepreneurs paying CIT gave over 4 times more. However, the indirect tax (VAT), covered mainly by consumers, which was 88% of the PIT burden back in 1995, increased over the next years by ten plus to thirty percent.

As a result, the total burden arising from direct taxes and VAT payable to the state was five times, and in the next years 9 times, higher than what entrepreneurs pay as CIT – if we add excise duties paid mainly by consumers, this important tax indirectly burdening their income, we get 11 times more than the contribution of entrepreneurs (or, to be more precise, the legal entities that are VAT payers) to the common good, a relation which has been exhibiting a growth tendency since the 1990s. If we take into account the whole public finance sector, the relations differ slightly since only a part of PIT and CIT is allocated to the state budget, with local governments taking over  $\frac{1}{4}$  of CIT and more than a half of PIT; additionally, local governments impose various local taxes. The whole public finance sector received from 3 times more in 2000 to 4.6 more in 2015 and 4.3 more in 2018.

The relation of VAT to PIT plus the healthcare contribution shows that in the case of the state budget, the VAT stream has been over 10 to 20+ or even 30% more, while, from a broader perspective, in the public finance sector it is several to ten plus percent higher, which stems from the fact that PIT is split between the state and local governments. The total proceeds from PIT and VAT for the whole sector were from 5 to 8 times higher than proceeds from CIT, and if we add the excise duty, then individual citizens contributed 9 to over 10 times more to the public than entrepreneurs or, to be more precise, legal persons that were CIT payers did. At the same time, fiscalism, as a relation of the income of the public sector to GDP, continued to decrease.

Contributions to the common good should be of course paid by those who use it – this is a common and, in principle, reasonable belief but it stems from microeconomic logic, i.e. from the perspective of an economic entity and a household. In contrast, the Great Bakery model shows that if financing is to clear the market of the product surplus, which, as a consequence of deficiency in demand (natural for the system) on the part of direct manufacturers represents non-rotating stock in the form of loaves of bread, then the funds for that surplus should be supplied by the Baker in the form of a tax for the common good, paid to finance the state.

The model leads us to a logical conclusion that for a balance of macroeconomic flows to be achieved, the entrepreneur should pay higher taxes; only then the market would be cleared of the product manufactured by his Bakery. One could say, which the supporters of popular neoliberal views would find outrageous, that there are certain benefits from Robin Hood: by taking away from the rich and giving to the poor, he causes the passive, inactive, hoarded money of rich people to be transferred to the economy and become activated in the shopping that the poor are able to do

due to the movement of some resources by Robin Hood. As a result, the economy is re-energised and entrepreneurs make money again. In the meantime, as a result of the pressure brought by the New Economy, Poland and many other countries have been pursuing a policy that results in actions in the opposite direction: more and more is taken away from employees (the poor), as a result of which companies, due to their growing profits, have growing cash resources, and since the internal demand shrinks, the only possibility of earning profit is to join the globalisation trend, i.e. expand to the outside. This will be addressed in the next chapter.

It should be mentioned that the dilemma of who is to give more to the functioning of the public sector is becoming a matter of ethics – (economic) ethics must be now approached differently. As noted by the Israeli historian Yuval Harari (2014, pp. 424–425), the author of an impressive work that is an overview of the development of humanity over thousands of years and across continents, modern days require a new combination of consumerist ethics with capitalist ethics: “The capitalist and consumerist ethics are two sides of the same coin, a merger of two commandments. The supreme commandment of the rich is ‘Invest! The supreme commandment of the rest of us is ‘Buy!’”. He believes that this makes it possible to “square the consumerist ethic with the capitalist ethic of the business person, according to which profits should not be wasted, and should instead be reinvested in production”. However, economic ethics must be reflected in the logic of economic processes. If our Baker is to reinvest the profit, someone first needs to buy his products because without sale, i.e. consumption, production would be pointless. The first basic demand creates a community of employees, who form the “purchasing power” to drive that mechanism of economic processes; as a result, as we have noted, it makes no sense to burden employees with taxes on this mechanism because this only transfers the purchasing power that will cleanse the market of the 500, or later 300, loaves of bread. This is why the tax that clears the product surplus should be in principle paid by the Baker, and if the employees’ wages have been reduced, the tax rate must be even higher so that the state generates an additional purchasing power, and the money returns to the state anyway.

The conclusion is obvious: our Baker needs to pass on his profit either to the financial system or to the public sector, and this means that the only rational solution is a tax system with a high tax rate for the entrepreneur (in any case higher than for the employees), where the tax it is not just a transfer of some of his profit but creates the mechanism because it includes an investment allowance – and the rate should grow whenever labour costs are reduced, i.e. work efficiency is improved. The reason is simple: because this is when the surplus of unsold product grows.

When the 40% corporate income tax (CIT) was introduced in Poland in 1992 and the PIT tax rates in 1992 and 1993 were 20%, 30% and 40%<sup>19</sup>, and a vast

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<sup>19</sup> In the 1994–1996 period, tax rates were increased to 21%, 33% and 45%; they were slightly reduced in 1997 to 20%, 32% and 44%, in 2009 each of them was reduced by one percentage point,

majority (nearly 99%) of taxpayers paid taxes according to either the 20% or the 30% rate, CIT was visibly much higher; CIT included an investment allowance but in the 1992–1996 period, CIT was gradually reduced to 19% in 2014 and the allowance was cancelled; it was reintroduced in 2017 but its range is limited as tax deductible costs may include only expenses for the purchase of machines and equipment to a value of PLN 10 to 100,000. As a result, while in 1995 and even in 2000 the citizens' PIT obligations towards the budget were 2.6 times higher than the CIT obligations of entrepreneurs, starting from 2010 they were 4 times as high.

It should be noted that in the USA corporate income tax rates in the period from the early 1950s, when they grew from approximately 40% (the level from the 1940s and the years directly after World War II), to the late 1970s were approximately 50%. At that time, progressive personal income tax rates reached 90%, which was later reduced to 70% but only a small percentage of taxpayers paid such high taxes. The richest taxpayers, with an income above 1 million dollars a year, paid taxes of 20–25% (31% of that group), with percentage in the next tax class (25–30%) only slightly lower (27.2% of that group) since they used savings or investment allowances (Thurow, 2009, p. 268). For all taxpayers, the mode was 15–20% (52.7% of taxpayers) but a considerable percentage (21.5%) paid a 0–5% tax. As a result, taxes actually paid by employees were lower than CIT rates. True, this period ended in the stagflation that did not have an entirely identified underlying cause, which prompted President Reagan to make tax cuts, but before that period the economy was excellent and America was able not only to offer a welfare state programme but also to pursue an impressive space programme.

A tax system containing what we define as tax credits, referred to in English terminology as tax incentives, becomes an economic policy element that does not only have a purely fiscal function, i.e. the function of supplying funds to the budget, but it also activates a certain economic mechanism by shaping the behaviour of the taxpayer, for whom it serves as a kind of a directive: "Invest or give away the money you have earned so that the state, by hiring employees (possibly also extra ones), by giving jobs to the unemployed left after the lay-offs in the Bakery, creates a demand to free you from the stock of the product surplus in the warehouse".

Therefore, the market can be cleared only through rational taxation of the entrepreneur – with a tax that includes an investment allowance and as such creates a mechanism to support activation of funds in order to create new production resources (this can be referred to as active investing) or a savings allowance, i.e. an allowance that supports the transfer of such funds to the financial system (this can be considered as a form of passive investing) to activate them within its

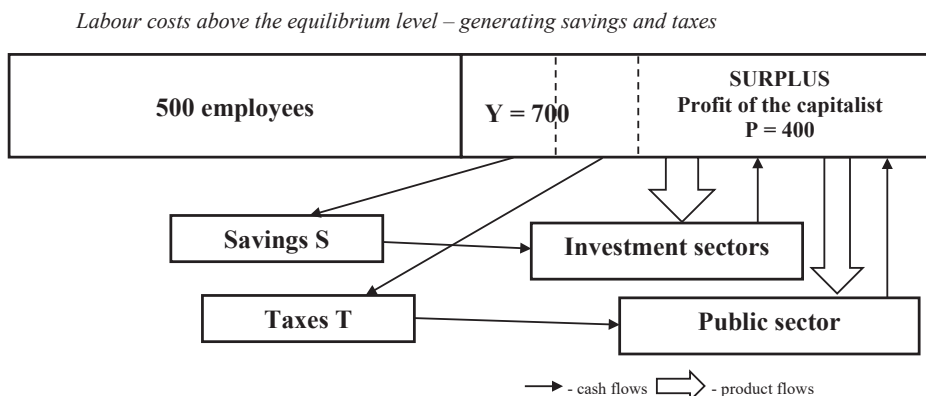
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and ultimately one was removed and only two were left: 18% and 32%. PiS (the political party Law and Justice) continued slight PIT reductions.

business. In this way, the allowance creates a mechanism through the integration of the first trend (discussed in the previous point) for “monetisation” of the surplus, i.e. one that involves saving and investing, with the second trend involving state financing.

In the meantime, the current reality is marked by continuous pressure on the reduction of corporate taxes, rivalry between countries for the inflow of foreign capital through tax incentives, and the desire to become more competitive through reduction of corporate taxes. This modern-day illusion and ill-fated trend in economic policy, leading even to certain “tax wars” with “tax dumping canons”, results only in a growing system imbalances and internal economic tensions, and brings about a crisis every now and then. The New Economy calls for leaving most money for the capitalist, because the more profit he makes the more he invests, according to the capitalist ethics addressed by Harari. But this is naive. A capitalist who, as a result of tax cuts for the richest, is left with more money at his disposal does not necessarily invest it to create more jobs or improve efficiency, because his propensity to invest does not depend on his current profit but rather on the economy he expects in the future and on the current assessment of the effectiveness of investment undertakings. With a weak and uncertain economy, he would rather invest in the stock market – in other companies, ones from outside his industry, where the risk is, at least in the short term, relatively well defined; he would rather contribute to another speculative bubble than undertake the difficult task of implementing his own investment, not to mention that he may prefer some personal goals on which he would be more willing to spend the money.

The neoliberals who use Smith for support do not necessarily read him – just like declared Marxists who have actually never reached for any of Marx’s works. As it turns out, Adam Smith definitely did not recommend supporting the profit of entrepreneurs at the expense of employees, because he understood that to succeed, entrepreneurs require the high purchasing power of consumers, i.e. mainly their employees. He saw the need for balance in the creation of income and profit streams, even if he approached the problem mainly from the perspective of the impact on prices. In Chapter IX of his fundamental work he notes wryly: “In reality high profits tend much more to raise the price of work than high wages. (...) In raising the price of commodities the rise of wages operates in the same manner as simple interest does in the accumulation of debt. The rise of profit operates like compound interest. Our merchants and master-manufacturers complain much about the bad effects of high wages in raising the price, and thereby lessening the sale of their goods both at home and abroad. They say nothing concerning the bad effects of high profits. They are silent with regard to the pernicious effects of their own gains. They complain only of those of other people.” (Smith, 2003, pp. 142–143).



**Figure 7. Savings as a financial surplus of employees**

Source: own study.

Since with generally lower levels of wages the tax system focuses mostly on taxing the income of employees, whether directly or indirectly (as we have seen in the data in Table 3), mostly with indirect tax, i.e. by increasing the prices and thus reducing real income, this results in low tax proceeds and insufficient flows from various wage-related contributions, such as healthcare or retirement contributions, and the whole social security sphere suffers in general. But other areas financed from taxes are underfinanced too, such as education, science or the development of the infrastructure for which the state is responsible.

According to our Great Bakery model, market clearing requires the entrepreneur to pay taxes. Just as the community of the Baker's employees may generate savings, the financing of the state through taxes may become the task of employees, provided that the income distribution at the level of the Baker changes, as illustrated in Figure 7.

If the portion of the Baker's income that is spent on wages is increased, employees will be able to pay the tax without this affecting the satisfaction of their needs and thus the income transferred to the public sector return due to the redistribution function of the budget. The process mimics what happened at the beginning of the 1990s in Poland, when PIT was introduced: people's income was re-calculated as a gross amount, which meant their wages were increased by the amount which they were supposed to pay as tax. It was as if railroad points were switched to redirect a part of the national income stream to support the public sphere.

## EXPORT – ENRICHING THE ECONOMY

Finally, there is a third direction for distributing (a part of) the surplus of the manufactured goods and changing it to money – that of sales abroad, or exports. Unable to sell his loaves of bread in the domestic market, our Baker may offer

them to foreign buyers. However, export has special significance not only for that specific entrepreneur but for the whole economy. In our model this will mean that the surplus products will be exchanged for foreign currencies – in the form of cash or bank account records. Export either serves as a means to finance import or becomes a tool for international expansion. Yet export cannot be treated as a self-sufficient category, but must always be addressed together with import. Capital expansion actually takes place through net export. Table 4 shows what part of GDP is represented by export and import in particular countries.

**Table 4. Export and import of countries in relation to GDP**

Export of goods/GDP in %					PL=100	Import of goods/GDP in %					PL=100
Countries	2010	2015	2017			Countries	2010	2015	2017		
<b>World</b>	<b>22.9</b>	<b>21.8</b>	<b>22.5</b>		51	<b>World</b>	<b>23.0</b>	<b>21.8</b>	<b>23.0</b>		52
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>
1	Slovakia	71.1	85.5	88.0	200	1	Slovakia	73.5	85.4	86.8	197
2	Belgium	84.1	87.5	87.2	198	2	Belgium	80.9	82.6	82.4	187
3	Czech Republic	64.3	84.4	83.6	190	3	Czech Republic	61.2	75.6	75.2	171
4	Hungary	72.3	81.4	81.7	185	4	Hungary	66.9	73.8	74.6	170
5	Slovenia	51.5	64.2	65.2	148	5	Belarus	61.2	54.1	72.8	166
6	Lithuania	29.0	60.5	63.7	145	6	Lithuania	63.2	67.0	69.2	157
7	Netherlands	58.2	61.9	63.5	144	7	Slovenia	54.8	62.1	63.7	145
8	Belarus	44.4	47.6	62.1	141	8	Estonia	61.4	63.1	61.6	140
9	Bulgaria	40.3	51.5	55.4	126	9	Bulgaria	49.9	57.6	60.1	137
10	Estonia	58.0	56.1	53.8	122	10	Netherlands	52.0	55.5	55.9	127
11	Ukraine	37.8	41.9	46.5	106	11	Ukraine	44.7	41.2	53.2	121
12	<b>Poland</b>	<b>33.4</b>	<b>41.6</b>	<b>44.0</b>	100	12	Latvia	46.4	51.3	52.8	120
13	Latvia	36.9	42.6	43.2	98	13	Malta	63.7	61.6	52.6	120
14	Ireland	54.3	42.8	41.4	94	14	Croatia	33.4	41.2	46.7	106
15	Austria	37.0	38.2	38.4	87	15	<b>Poland</b>	<b>37.2</b>	<b>40.7</b>	<b>44.0</b>	100
16	South Korea	42.6	38.1	37.5	85	16	Cyprus	33.3	28.3	42.2	96
17	Germany	36.9	39.2	36.2	82	17	Romania	37.1	39.2	40.3	92
18	Mexico	28.2	32.5	35.6	81	18	Austria	38.4	38.8	40.0	91
19	Romania	29.6	34.0	33.4	76	19	Mexico	28.5	33.8	36.6	83
20	Switzerland	31.8	31.5	33.0	75	20	Portugal	32.6	33.6	35.6	81
21	Malta	41.3	35.6	31.4	71	21	Luxembourg	41.0	33.8	34.5	78
22	Denmark	29.7	31.4	31.2	71	22	South Korea	38.9	31.6	31.3	71
23	Croatia	19.7	25.7	30.2	68	23	Sweden	30.4	27.8	28.7	65



1	2	3	4	5	6	7	8	9	10	11	12
24	Sweden	32.4	28.1	28.6	65	24	Germany	30.9	31.1	28.6	65
25	Portugal	20.8	27.8	28.4	64	25	Denmark	25.8	28.3	28.3	64
26	Russia	24.2	25.2	27.8	63	26	Greece	23.9	24.6	28.3	64
27	Finland	28.0	25.8	26.7	61	27	Finland	27.7	26.1	27.8	63
28	Italy	21.0	24.9	26.0	59	28	Switzerland	28.6	25.8	27.8	63
29	Canada	24.0	26.3	25.6	58	29	Turkey	24.0	24.1	27.4	62
30	Norway	30.5	26.7	25.6	58	30	Spain	22.0	26.1	26.7	61
31	South Africa	24.4	25.6	25.5	58	31	Ireland	29.1	26.7	26.6	60
32	Spain	17.2	23.5	24.3	55	32	Canada	24.3	26.9	25.8	59
33	Luxembourg	27.0	22.4	23.1	52	33	France	23.0	23.2	24.2	55
34	France	19.6	20.3	20.7	47	34	South Africa	22.1	27.0	23.8	54
35	China	25.9	20.6	20.4	46	35	UK	23.2	21.5	23.5	53
36	New Zealand	21.3	19.3	18.7	42	36	Italy	22.9	22.4	23.3	53
37	Turkey	14.8	16.7	18.4	42	37	Norway	18.0	19.6	20.7	47
38	UK	17.0	15.2	16.8	38	38	New Zealand	20.8	20.5	19.7	45
39	Australia	16.4	15.0	16.4	37	39	Russia	14.0	13.4	17.7	40
40	Greece	9.7	14.6	16.3	37	40	India	20.0	18.3	17.3	39
41	Japan	13.5	14.2	16.0	36	41	China	22.9	15.2	16.5	38
42	Cyprus	5.8	9.7	15.2	35	42	Australia	14.9	16.1	15.7	36
43	Brazil	9.1	10.6	12.1	28	43	Japan	12.1	14.8	15.4	35
44	India	13.5	12.5	11.6	26	44	USA	13.1	12.3	12.4	28
45	Argentina	15.2	9.3	9.1	21	45	Brazil	8.7	9.9	8.8	20
46	USA	8.5	8.3	7.9	18	46	Argentina	11.3	9.3	8.7	20

*Note: The data were sorted from the highest to the lowest value for 2017.*

Source: own study based on yearbooks of the Polish Central Statistical Office.

As we can see, top places are occupied by post-communist countries, of which we know from Table 1 that their share of employment-related costs in GDP was much lower than elsewhere. The correlation between export and that share was not high but it was clearly negative<sup>20</sup>. There are certain exceptions at

<sup>20</sup> The correlation coefficient for 2017 was  $r = -0.155$  for the correlation between the share of employment-related costs and export, and  $r = -0.184$  for the correlation with import; the regression coefficients were -0.60 and -0.68 respectively.



the beginning of that chart: Belgium, second, where export and import jointly represent well above 80% of GDP, which shows that it is a trading, transit country, acting as an intermediary (they import only to export the imported goods), and the Netherlands, seventh, with export over 60% and import over 50%, a major surplus. Poland is positioned quite high, with export of goods (similarly to the slightly lower import) constituting 44% of GDP<sup>21</sup>. But what is particularly noteworthy is that its share grew considerably in 2010 and, significantly, it is not much higher than in Germany (36.2%) which used to be ahead of Poland in 2010; until 2000, Polish export was only half the rate, constituting merely 20% of GDP. In 2018, when a slight commercial deficit reappeared (USD -5.4 billion), our main trading partners in import (USD 270.2 billion) were Germany (22.6%), China (11.6%) and Russia, while in export (USD 264.8 billion) also Germany (28.2%), the Czech Republic (6.4%) and the United Kingdom (6.2%). According to the latest data, the year 2019 was marked by a USD 2.7 billion (PLN 10.6 billion) surplus in the trade of goods, and the current account<sup>22</sup> revealed a surplus of USD 6.6 billion (PLN 25.4 billion).

Our economy is clearly characterised by strong export but since the majority of enterprises were included in the manufacturing cycles for semi-products, accessories and subassemblies for western partners (to be discussed later in the paper) interested in receiving high-quality but cheap elements, we must remain competitive especially in terms of price. One could say we have a “syndrome of a secondary, subpar economy”. The problem pertains not only to us. The high rankings of post-communist countries in the table are the consequence of the special international division of labour policy pursued by those countries and by the supranational structures that have dominated them. It is as if the Bakery in our metaphoric country was engaged (for example as a result of a takeover) to produce pies rather than bread, for export only, as semi-finished products for foreign manufacturers of some products preferred in their respective countries. As a result, the export of the Baker’s country will increase but for the needs of the employees, who need bread, to be satisfied, import must also increase because if they do not produce what satisfies their basic needs by themselves, it must be brought from abroad. Then, in the case of weak economies, high export may be balanced out with import. But strong economies will have a commercial surplus even if their export in relation to GDP is lower.

Poland’s export almost matched its import in 2017, while some countries had a substantial export surplus. Let us take a look at the balance of trade (Table 5).

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<sup>21</sup> In 2018, export constituted 43.7% and import 44.7%, with the resulting GDP deficit 0.96%.

<sup>22</sup> I would like to reiterate that the current account is created by streams of flows with the following balances: profit/loss on trade in goods (PLN +10.6 billion), exchange of services (PLN +104.6 billion), primary income (PLN -82.1 billion), secondary income (PLN -7.7 billion).

**Table 5. Balances for the import of goods in billion dollars and in relation to GDP**

Balance of goods (USD billion)					Balance of goods (% GDP)				
Countries		2010	2015	2017	Countries		2010	2015	2017
<b>World</b>		<b>-34.1</b>	<b>-21.5</b>	<b>-406.4</b>	<b>World</b>		<b>-0.05</b>	<b>-0.03</b>	<b>-0.54</b>
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>
1	China	182.1	603.7	434.4	1	Ireland	25.22	16.13	14.85
2	Germany	205.4	270.8	279.4	2	Russia	10.23	11.78	10.14
3	Russia	168.0	160.9	130.1	3	Czech Republic	3.10	8.83	8.39
4	South Korea	41.2	90.3	95.6	4	Netherlands	6.22	6.41	7.58
5	Netherlands	52.7	49.0	63.0	5	Germany	6.01	8.01	7.56
6	Brazil	10.4	12.3	60.3	6	Hungary	5.46	7.62	7.10
7	Italy	-40.1	46.1	54.1	7	South Korea	3.76	6.53	6.24
8	Ireland	56.0	46.9	49.2	8	Switzerland	3.23	5.67	5.19
9	Switzerland	18.9	38.0	35.3	9	Norway	12.43	7.17	4.82
10	Japan	77.3	-23.5	26.9	10	Belgium	3.25	4.91	4.81
11	Belgium	15.7	22.3	23.7	11	China	2.98	5.46	3.88
12	Norway	53.3	27.7	19.2	12	Brazil	0.47	0.68	3.36
13	Czech Republic	6.4	16.5	18.1	13	Denmark	3.91	3.08	2.84
14	Hungary	7.1	9.4	9.9	14	Italy	-1.89	2.51	2.78
15	Australia	19.1	-12.6	9.8	15	South Africa	2.24	-1.35	1.68
16	Denmark	12.6	9.3	9.3	16	Slovenia	-3.31	2.17	1.52
17	South Africa	8.4	-4.3	5.9	17	Slovakia	-2.33	0.11	1.22
18	Argentina	16.7	-0.1	2.1	18	Australia	1.48	-1.01	0.70
19	Slovakia	-2.1	0.1	1.2	19	Japan	1.36	-0.54	0.62
20	Slovenia	-1.6	0.9	0.7	20	Argentina	3.91	-0.01	0.33
<b>21</b>	<b>Poland</b>	<b>-18.3</b>	<b>4.1</b>	<b>0.4</b>	<b>21</b>	<b>Poland</b>	<b>-3.82</b>	<b>0.86</b>	<b>0.07</b>
22	Sweden	9.6	1.7	-0.9	22	Sweden	1.97	0.34	-0.16
23	New Zealand	0.7	-2.2	-2.1	23	Canada	-0.29	-0.63	-0.20
24	Estonia	-0.7	-1.6	-2.1	24	Mexico	-0.32	-1.24	-0.95
25	Lithuania	-12.7	-2.8	-2.6	25	New Zealand	0.45	-1.23	-1.01
26	Bulgaria	-4.9	-3.0	-2.7	26	Finland	0.29	-0.30	-1.12
27	Malta	-2.0	-2.9	-2.8	27	Austria	-1.46	-0.59	-1.54
28	Finland	0.7	-0.7	-2.8	28	Spain	-4.84	-2.52	-2.40
29	Latvia	-2.3	-2.4	-2.9	29	France	-3.47	-2.87	-3.44
30	Canada	-4.6	-9.9	-3.3	30	USA	-4.61	-4.08	-4.43
31	Belarus	-9.6	-3.6	-5.0	31	Bulgaria	-9.61	-6.04	-4.69
32	Cyprus	-7.1	-3.7	-5.9	32	Lithuania	-34.21	-6.57	-5.57
33	Ukraine	-9.3	0.6	-6.2	33	India	-6.50	-5.84	-5.70

1	2	3	4	5	6	7	8	9	10
34	Austria	-5.7	-2.3	-6.4	34	UK	-6.14	-6.32	-6.65
35	Luxembourg	-7.4	-6.6	-7.1	35	Ukraine	-6.87	0.70	-6.70
36	Croatia	-8.2	-7.7	-8.6	36	Romania	-7.50	-5.20	-6.94
37	Mexico	-3.3	-14.5	-10.9	37	Portugal	-11.88	-5.84	-7.18
38	Romania	-12.5	-9.2	-14.7	38	Estonia	-3.38	-7.02	-7.74
39	Portugal	-28.3	-11.6	-15.7	39	Turkey	-9.28	-7.37	-8.99
40	Greece	-41.0	-19.6	-24.1	40	Latvia	-9.55	-8.74	-9.60
41	Spain	-69.3	-30.3	-31.6	41	Belarus	-16.84	-6.49	-10.70
42	Turkey	-71.7	-63.4	-76.6	42	Luxembourg	-14.05	-11.37	-11.43
43	France	-91.7	-70.0	-89.0	43	Greece	-14.14	-10.00	-12.04
44	India	-107.3	-125.4	-146.8	44	Croatia	-13.74	-15.47	-16.53
45	UK	-150.7	-183.0	-174.7	45	Malta	-22.38	-26.05	-21.23
46	USA	-690.7	-743.7	-862.8	46	Cyprus	-27.46	-18.68	-27.03

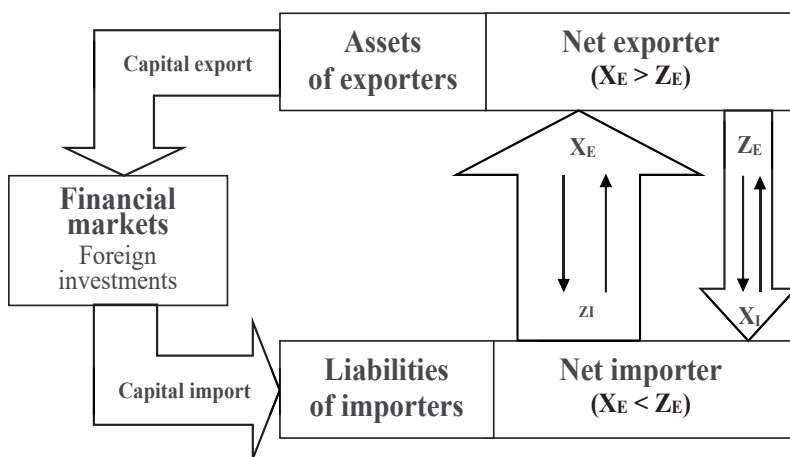
*Note: The data were sorted from the highest to the lowest value for 2017.*

Source: own study based on yearbooks of the Polish Central Statistical Office.

The world as a whole is almost balanced, with a slight negative inclination – even if the negative balance clearly increased in 2017; out of the 46 counties, 21 achieved a surplus (Poland comes in the 2017 list as basically balanced), while 25 had a trade deficit. It is a trivial observation that for some to have a trade surplus, others must have a deficit. As a result, the imbalance between the countries becomes an inevitable characteristic of the system and leads to tensions that must be compensated for by other macroeconomic balances (Cf. Żyżyński, 2009; Moździerz, 2018). First and foremost, balances of trade are accompanied by financial balances reflected in changes in the assets and liabilities of financial institutions and enterprises; balances of trade are flows that are not necessarily balanced but result in asset changes (changes in financial resources – the financial account) which compensate for those imbalances and, together with the flow account (current account), create a balance of payment that is balanced but which contains foreign exchange reserves (referred to as Official Reserve Assets) whose increase or decrease amortises relations with foreign countries. Flow relations are also accompanied by two twin balances, i.e. the balance of the state budget (public finance sector) and the financial balances of the private entities that save and take out loans.

Figure 8 illustrates the consequences of the trade imbalance between countries. The earnings of a net exporter from export  $X_E$  are higher than its spending on import  $Z_E$ , but its partner, a net importer, must spend more on import  $Z_I$  than it makes on export  $X_I$ . It would be hard to bring in more goods and services from abroad if insufficient foreign money has been made on export. However, a net exporter records asset growth, a financial surplus which is channelled to the international

financial market where the importer borrows the money that allows it to secure import being higher than export – that loan represents the importer's debt and will be reflected in the financial part of the balance of payments as foreign investment. One has a surplus, the other one has a debt – in this way the total balance of both countries is zero. The logic of the system is that the exporter must grant a loan to the importer so that the latter has the funds to buy the surplus of the exporter's non-rotating product stock and allow the importer to profit.



**Figure 8. Cash flows between net exporters and importers**

Source: own study.

As can be seen, international trade mimics internal relations: the Baker needs to pay the tax so that the state has the funds to pay the wages to the public sector employees and thus enable them to buy the loaves of bread produced by the Baker. It is a universal logic of economic processes, one we have seen before: exactly the same happens when our capitalist gathers savings so that the banks equipped with his funds could lend them to borrowers, who pay wages to their employees, and the employees purchase the loaves of bread that represent the Baker's surplus.

China is the leader in terms of the value of the balance, with a surplus of 434 billion dollars, which it uses to buy American bonds used by the American government to finance the deficit due to which some Americans may satisfy their needs – by buying Chinese products. Germany comes second, with almost 280 billion dollars accumulated. It lends money to Greece, for instance. The largest deficit (absolute value twice as high as China's surplus) was achieved by the United States: -863 billion dollars. But economic values need to be presented in a relative form; in relation to GDP, the highest surplus has been achieved by Ireland, Russia, Czech Republic, Netherlands, Germany and Hungary, while the largest deficit was run by Cyprus with over  $\frac{1}{4}$  of GDP, Malta with  $\frac{1}{5}$  of GDP and Croatia and Greece.

A trade surplus may of course have a positive interpretation: once import is financed, we have the funds enriching the country that can be used for capital expansion abroad, as illustrated in Figure 7. But to have higher import<sup>23</sup>, every economy needs to activate special mechanisms to secure the funds to finance additional purchase of goods abroad. As a consequence of our Great Bakery model, it can be said that the homeland of our Baker could give up on bread production, at least in a major part, and satisfy its needs by importation instead. But this requires money; foreign currencies must be obtained and so the country either takes out loans or sells its other assets. History, of course, shows that in order to finance the trade deficit, some countries have sought resources abroad, through military robbery – which has been probably a substantial reason behind wars.

In 2017, export in relation to GDP ranked Poland as 12th in the group of countries, almost at the end of the whole group of post-communist countries, and practically matched import, while in 2018, as it was already said, there was a deficit (PLN -20.4 billion), and in 2019 a surplus (PLN 10.6 billion)<sup>24</sup>. Since farming and industrial production in Poland creates 77% of GDP, it can be said that export encompasses almost 60 percent of farming and industrial production, i.e. well above a half of what we produce serves other countries; on the other hand, to satisfy our consumer and investment needs, we must import products of more or less the same value, with the catch that the value of import is calculated according to the market rate, which nowadays depends less on trade and more on financial (including speculative) flows, and is 40–50% below the purchasing power parity<sup>25</sup>. This makes such import quite expensive.

#### OVERPRODUCTION – AN IMMANENT CHARACTERISTIC OF A CAPITALIST ECONOMY

The three directions for distributing the product surplus that allows the Baker to change it to money, i.e. to make profit, can be presented based on the Great Bakery model as illustrated in Figure 9.

In this way, we have reached the fundamental definition of Gross Domestic Product (GDP): what has been produced is divided into what has been consumed (*C*) plus what has been allocated to investment (*I*) plus government spending (*G*) plus export (*X*).

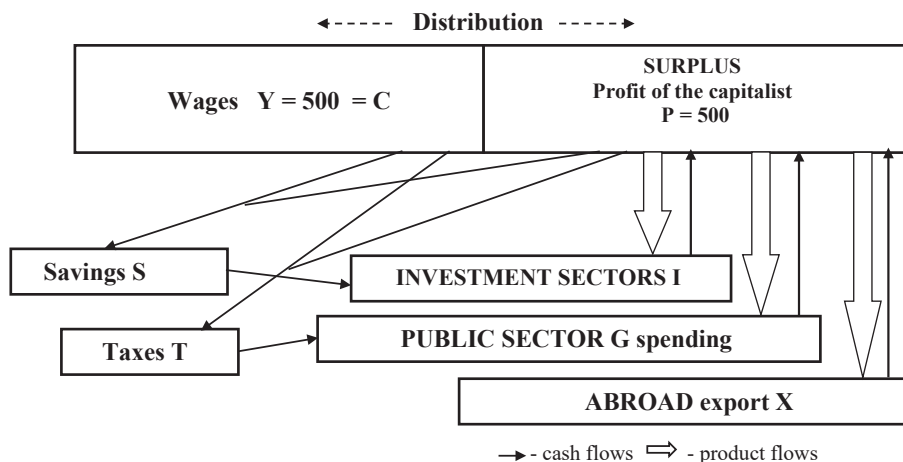
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<sup>23</sup> The United States are an exception as they have a special, highly convenient commodity, cheap in production: the US dollar.

<sup>24</sup> It must be remembered (as already mentioned) that we should look at relations with other countries holistically, and, first, take into account the whole current account and, second, consider other elements of the balance of payments.

<sup>25</sup> The PLN/USD rate in 2018 was 3.61, while the purchasing power parity was 1.78, which resulted in a rate disparity of 50.8%, its lowest value recorded in 2008 (23.5%); the disparity in relation to EUR is about 40%. (Data: OECD Purchasing Power Parity Statistics)

As has been said, the existence of a surplus, i.e. what has been produced above  $C$ , directly consumed by employees, is a consequence of the obvious fact that labour costs are merely part of the produced value. It is crucial that the surplus is originally tangible, being simply the manufactured product<sup>26</sup>, and this product must be sold, which is why appropriate financial processes must be activated for that purpose – the distribution (allocation) of money: savings must be generated and taxes must be paid. This fact is the basis for launching all the complex mechanisms and institutions of a market economy. The logic of the model suggests that both savings and taxes represent the activation of the money ultimately to be used to purchase a part of the system surplus, i.e. clear the market of the manufactured product. However, when wages are low, i.e. when they only suffice to satisfy the basic needs of employees (everyone gets their one loaf of bread), the money should be generated by the Bakery owner – the entrepreneur. If we postulate that the burden for the entrepreneur be reduced, then more money must be directly channelled to the employees, which means that the wages must rise above the equilibrium level, as reminded by Levinson. So, as we can see, it is the entrepreneur who is responsible for ensuring the cohesion of the economic system. System cohesion means that employees and the entrepreneur form a community that produces, sells, earns, spends, saves and pays taxes, and all these activities activate the money circulation processes that are to ultimately result in the money being transferred to the entrepreneur, who is at the same time the starting point for the distribution and circulation of money.



**Figure 9. Surplus distribution and cash flows**

Source: own study.

<sup>26</sup> It is easily observed that things are different for services. There is no surplus product, there is a surplus of value in relation to labour costs and that surplus is the direct financial profit of the owner of the service facility.

The distribution line marked on the chart differs as to particular enterprises; the macroeconomic state is always the outcome of millions of aggregated and averaged individual conditions. We receive a resulting distribution line that defines the macroeconomic efficiency of work, and our model confirms the trivial conclusion that the higher the efficiency (i.e. the resulting surplus):

- the more money from the entrepreneur's profit can be allocated to development,
- the better the financing for the financial sphere – from the taxes paid by the entrepreneur,
- the higher the potential export and the resulting export surplus permitting capital foreign expansion.

Still, these benefits require an efficient financial system. The model also answers the following question: what if an extreme hypothetical condition emerged where production were completely automated and, as a result, human labour reduced to zero – this extreme situation is illustrated in Figure 10. We may propose an obvious conclusion: the Baker's employee who lost their jobs as a result of technological progress would have to be absorbed by the public sector, which would have to give them either jobs or welfare benefits; some could be transferred to the sphere of social activity that is engaged in scientific research and the development of innovation and innovative high-tech enterprises – after all, someone had to invent and manufacture the automated process lines for production of the bakery products made by the Great Bakery. Both the public sector and enterprises need financing to create advanced technologies. They obtain it through taxes and through savings activated by the financial system in various forms of financial credit facilities. However, this evident logical conclusion that structural changes connected with technological progress require significant changes at the level of money creation and allocation and require higher taxes for the area of the modern manufacturing technologies eliminating human labour, this obvious truth has no chance of bypassing the beliefs of the “New Economy”, treated as inviolable political correctness.

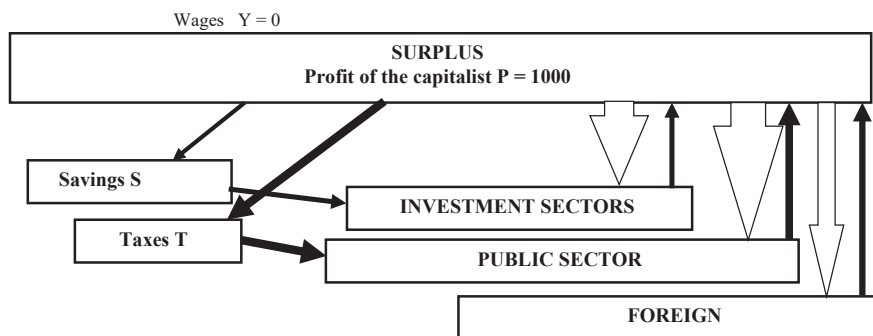


Figure 10. Distributed surpluses and cash flows with zero labour costs

Source: own study.

On the other hand, changing the paradigm and going in the other direction, i.e. increasing the funds transferred to employees (which would reduce the entrepreneur's surplus but also reduce the "problem" of finding a market for it), would mean the need to increase the flows that finance investments and the public sector from employees. In such circumstances, the employees would be the ones that would have to generate the savings and channel them to the financial system, while at the same time taking the risk connected with risky investments, and they would be the ones to pay higher taxes. Such a system seems economically "healthier" for a number of reasons as it would simultaneously build (through savings) the economic position of families, literally millions of ordinary people.

#### CONSEQUENCES OF THE INTERNATIONAL DIVISION OF LABOUR

What I have referred to as the surplus nature of a capitalist economy with its structural characteristic that in principle makes it an overproduction-based system also leads to a trivial but highly significant conclusion that every additional product manufactured by a competitor, for instance in a country that has acceded a "community of capitalist countries", can be considered by such a community as a certain barrier to their development. This is obvious because, just like every competition, the supply provided by the acceding country makes it harder to clear the community's own market. This is why such a newly accepted country is not supported in terms of development but instead attempts are made to push it into a specific, secondary role in the international division of labour. The goal is to take over its assets, use it for the community's own gain, thus eliminating competition. The country is treated as a market for the surpluses that others are unable to liquidate within their territories. The role of industry in such a country, once taken over through privatisation, is then brought down to subpar cooperation, i.e. the manufacture of parts and subassemblies for concerns from the dominant countries, and the manufacture is to be as cheap as possible and as such has a low added value, i.e. low wages and profit.

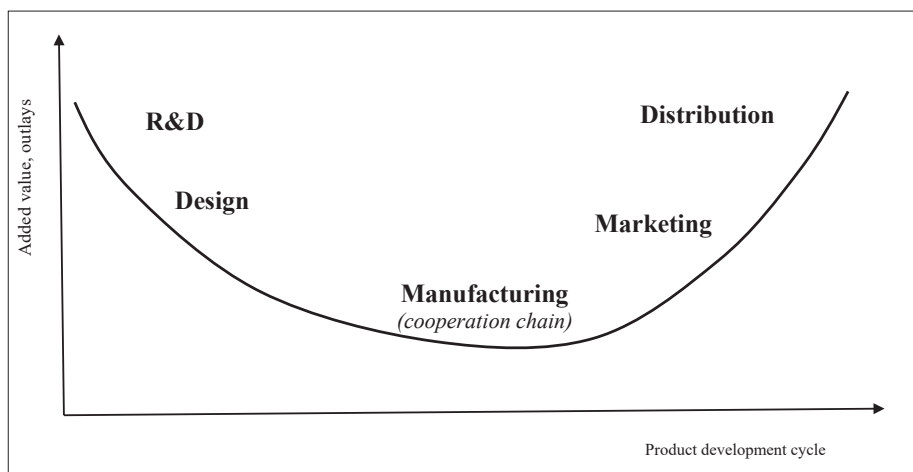
Obviously, real economy produces not only bread; loaves of bread as a metaphor for millions of actually manufactured products become insufficient for a further-reaching structural analysis. In real life, every economy participates in the international division of labour that has emerged in the globalisation process. Analysing what is happening in the modern economy requires examining the manufacturing processes for the **product manufacturing cycle**. The cycle consists of several stages:

- R&D,
- Design works,
- Production works, i.e. the manufacture and assembly of components,
- Marketing works, advertising etc.,
- Distribution and sale.



Each of those stages entails specific spending, costs and the resulting added value, that is a stage-specific ratio of labour costs and profits to the remaining spending and the value of what is being produced at that stage.

The most common situation is where the added value, which comes down to the level of wages and profits, is achieved at the initial and final stage of product lifecycle, while the manufacturing stage in the middle brings the lowest added value, hence the lowest wages and profits at that stage. As a result, the shape of the curve in a graph illustrating the level of the added value achieved at particular stages takes the shape of a convex function resembling a smiling face, which is why it was humorously termed as a “smiling curve”. It is depicted in Figure 11.



**Figure 11. Smiling curve**

Source: own study.

In today's world, the process of manufacturing various technologically advanced products in global concerns is located in various places. The international division of labour applies not only to products, like it did in the past, when wine was made only by the French and the Italians as they had vineyards, cotton was made by the British, who sourced materials from their colonies, as described in classic books; it also applies to the manufacture of products that are complex technologically and distribution-wise. Airbus, for example, a European concern, manufactures various aircraft elements in a number of countries in Europe (Germany, France, United Kingdom and Spain) but it has moved some of its production outside of Europe – to the United States, Japan, China and India. The manufacture of many industrial products encompasses various components and parts which are made in various countries. But what matters is that product development cycles take place at the central stage, where wages and profits are the lowest. Besides, it is common knowledge that the stage has been often located

by the dominant countries in third-world countries, and currently also in post-communist countries with a well-qualified workforce and a good industrial base, developed during the communist era.

This, of course, results in low wages, low profits, a secondary role of enterprises and a low propensity to invest because they are not self-reliant and are dependent on orders from the dominant partners. This explains all the low values of the data positioning Poland and other post-communist countries in the lower parts of the presented rankings.

As has already been said at the beginning of this paper: we are rich in what we produce, or, to be more precise, in the value of what we produce. This leads to the logical conclusion that reversing this trend and making Polish people a richer nation requires a policy of bringing full manufacturing cycles back to the Polish economy, so that all stages are handled in our country. We need to create the conditions for developing our own strong concerns<sup>27</sup> and, possibly, taking over the ones that have located their production in Poland while leaving the most profitable stages of the manufacturing cycles in their countries. The task is difficult, though, especially since Poland is still weak capital-wise, especially in the conditions we experience after the integration with the European Union which imposes substantial restrictions as to interference of the state in the economy as this would affect the principle of equal competition.

#### PAY VERSUS THE POSITION OF AN EMPLOYEE IN A COMPANY OR INSTITUTION

Another structural aspect related to pay must be addressed which indirectly contributes to its average level: diversification due to the employee's position in the company. Pay is the price for labour, it determines the value of what the person receiving it from the employer gives to the economy – this is a fundamental matter and the starting point. So, as has been demonstrated, our low average pay results from the low average value in what we as a society produce... or perhaps not so much value as the price that the buyers of the results of our work want to pay. After all, the average value is the resultant of individual values, and what an individual receives as pay as a result of the distribution of the produced value should depend on two factors: employee qualifications, experience and position in the organisational hierarchy of the company, the enterprise or institution he

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<sup>27</sup> It should be noted that in the 1970s Poland pursued the concept of WOGs (Large Economic Organisations) designed to create strong integrated concerns. Unfortunately, in the 1990s, while implementing an unprofessionally prepared economic reform based on the Washington Consensus, i.e. according to the concept proposed in the late 1980s by the English economist James Williamson for Latin American countries, it was decided that in order for the industry to be privatised, those large organisations must be broken down into tens of small companies focusing on specific parts of their business, as this was supposed to make it easier to sell them.

or she works for. In private businesses functioning according to market terms, pay is usually connected with the responsibility assigned to the employee, and for managerial functions – with the number of employees they are in charge of. For instance, a recently published study<sup>28</sup> shows that salary of a chief accountant in Warsaw corporations ranged, excluding extreme values, from PLN 13,500 to PLN 23,000, while the salary of regular accountants was closer to the national average: from PLN 4,000 to PLN 7,500. CFOs make from PLN 19,500 to PLN 37,000, financial controllers from PLN 12,500 to PLN 20,000, while controlling specialists from PLN 7,200 to PLN 12,000. There are also standard bonuses of 10% to 30% for higher-level positions and 5% to 10% for lower-level jobs. Heads of HR make from PLN 16,500 to PLN 30,000 and recruitment specialists from PLN 4,800 to PLN 8,300. In banks, earnings of directors are in general higher than those of corporate directors: from PLN 24,000 to PLN 38,000, with bonuses from 15% to 40%, while in shared service centres, salaries of directors are approximately 50% higher than in corporations. It should be noted that high salaries of the management in the private sector are partially a consequence of the high risk of losing their jobs: high earnings are to enable them to develop a strong financial standing to have the means to get by if they lose their jobs.

Pay always speaks (or at least it should speak) about the employee's value, how valued they are by the employer, and such evaluation depends on how they contribute to the success of the company. There is an old anecdote about Henry Ford where a work efficiency specialist that he had hired to analyse the functioning of the business identified a weak spot. "I have noticed that there is a man who slacks off, does nothing, whenever I walk across his office I see him in his chair with his legs on the desk napping, he is wasting your money". Ford responded: "He once had an idea that made us save millions of dollars and his legs were in the same place they are right now". The genius industrialist awarded people not for appearances of work but for delivering actual results.

All around the world, as the cited study demonstrated, and also in Poland, a superior in the private sector is usually paid twice or three times of what his subordinate makes. At positions that require education, pays are clearly higher than where education is not needed, which not only stems from the value of the work itself but also has a motivational dimension. Where tuition is covered from one's private funds, education is an individual investment whose cost should be compensated for by the future salary. As a result, the salaries for positions where education is used must be higher – it is a classic market effect. This led to the emergence of the concept of "fair value" (D. Dobija, 2003; M. Dobija, 2008, pp. 3–19), which approaches pay as the effect of outlays in human capital, i.e. expenses that should have a certain rate of return. In contrast, where education is treated as a public good and learning is financed by the state, pay is more

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<sup>28</sup> Goldman Recruitment Salary Survey 2018, [www.goldmanrecruitment.pl](http://www.goldmanrecruitment.pl).

egalitarian, less diversified, with non-financial incentives playing a bigger part. This may lead to various organisational and social pathologies resulting from the fact that the state “reimburses itself” for the expenses incurred to educate highly qualified staff by paying them inadequately. However, working at higher positions still entails a greater responsibility and risk, which leads to frustration and dissatisfaction, salaries are seen as unfair and as a result those who are dissatisfied often compensate themselves for the subjectively experienced unfairly low pay by seeking other advantages, including ones that break the law and custom – for example corruption.

This mechanism was observed during the era of socialism but, unfortunately, those structural system problems have remained, just like in an evolving living organism which still has its own genes despite the evolution and those genes are still active, and even if they are dormant, they resume their activity under certain conditions, for example when the organism is weakened. This applies primarily to the public sector, i.e. where the remuneration rules are set by the state. The mechanisms imposed on the public sector, especially the expenditure rule, and the strong political resistance block any attempts to build a reasonable remuneration system for the public sector, especially in institutions financed from the central budget, i.e. education, science, healthcare, central administration, central agencies and institutions, where financing has a political dimension.

#### THE WEAKEST LINK IN DEVELOPMENT: SHAPING THE STRUCTURES

At the beginning we reiterated the fundamental economic truth that we are rich as a country in what we produce. In contrast, our prosperity as individuals depends on the national income distribution mechanisms and on our place in the economic system. If we work in an enterprise producing market goods, the essential aspects include what our company manufactures and how the income earned by the enterprise is distributed. According to the rules of statistics, a low average value of wages is determined by the distribution of the variable in the population, the variable depending on what is going on in various enterprises and on the structure of what we produce in those enterprises as a country. As our analysis has shown, the structure is the consequence of the position of our economy in the international division of labour that our country has earned politically. Therefore, if the economy is dominated by handling central stages in the cycle of manufacturing complex, globally produced final products, then the added value, and consequently also wages and profits, must be low. As a result, our trivial model has shown that the ability to create the resources for development and for the financing of the public sphere is low, too. Underfinanced and, as a result, weak, the public sphere is incapable of efficiently pursuing its objectives and tasks; all entrepreneurs know that they can accomplish their business plans only provided

that they have adequate financing, and this principle applies to the public sector as well: it must be supported by appropriate cash flows from taxes to be able to perform its functions to the satisfaction of the citizens.

As our simplified yet useful model has demonstrated, there are certain structural determinants that guarantee balance between the financing of individual consumption needs on the one hand and resources for development and for the public sphere on the other. If the costs of financing the needs of employees are reduced, the public sector must be financed by entrepreneurs as the owners of capital; if employees are to be given a possibility of building their own individual assets and are to be included in the financing of their state and their local governments, employers must pay them more by giving up part of the surplus that represents their profit. It is a trivial observation that economy is a system of communicating vessels; yet the problem of building a proper structure of connections where all channels have the right size and capacity is a non-trivial, highly challenging problem, considering the multitude of possibilities of changing the political and legal constraints. As a result, this is an issue of structural changes in a broader than just the technological sense, as noted by Justin Lin (2017) in his *New Structural Economics*, which focuses on the issues of industrial policy, with an emphasis put on structural issues of national income distribution. This is particularly challenging if economic policies are subject to international interdependencies. There is a need for holistic and coordinated actions as construed by the “new industrial policy” in the context the broader “new structural policy” which captures all the institutional reforms that lead to the desired changes (Nowak, 2017). However, institutional reforms are a matter of politics rather than economics, and they entail the incredibly difficult challenge of shaping integrated development, a challenge as grand as the one we faced after regaining independence 100 years ago (Woźniak, 2019).

Jeffrey Sachs, a prominent economist providing advice at the beginning of the Polish transition period, stated in an interesting speech sent to the 10th Congress of Economists (28–29 Nov 2019) that “the road to prosperity leads through sustainable development”. And it is true that development should be sustainable. But it is not what this is about; as we have shown, the road to prosperity involves the manufacture of goods and services of a high added value rather than secondary service production of low added value – and this is the kind of production that has been located in the politically subordinated Poland by the foreign investors that invested here. Professor Sachs loves the fact that they have invested and sees it as a source of our success, but the problem is, which he seems not to notice, that their investments involved mainly privatising, i.e. taking over the post-socialist assets and, as it turned out later, those takeovers were often economically hostile as they led to shutdown of a considerable portion of the industry that was technologically advanced enough to have the potential of yielding a high added value. However, it is not just a matter of added value but something more important: how that value is distributed, how the national income is distributed. Our problem does

not come down simply to the fact that the added value is low but also to the fact that its portion that represents profit is transferred outside the country<sup>29</sup> – last year this was over PLN 130 billion; after subtracting positive transfers (to Poland), we have a balance of PLN -82 billion versus PLN -88 billion in 2018. As we can see, those are enormous amounts that serve neither development nor the financing of the public sphere through taxes, and it must be noted that those transfers from Poland increased drastically in 2004: from PLN 8 billion to PLN 30 billion – from 0.97 to 3.18 (versus 4.23 in 2018) percent of GDP. No taxes were paid on those amounts, and even if they were, they were very low and thus unreasonable, serving only as an incentive to attract foreign capital. This situation is a long-term consequence of the conceptual mistakes made in the economic fundamentals of the transition strategy, which lacked ideas for structural reforms, the need for which is understood by Justin Yifu Lin and his Polish colleagues from the Faculty of Management of the University of Warsaw.

#### BIBLIOGRAPHY

- Dobija, D. (2003). *Pomiar i sprawozdawczość kapitału intelektualnego przedsiębiorstwa*. Warszawa: Wydawnictwo Wyższej Szkoły Przedsiębiorczości i Zarządzania im. Leona Koźmińskiego.
- Dobija, M. (2008). Labor productivity ratio and international comparison of economic performance – Formalization of the PPP theory and preliminary examinations. *Journal of Transforming Economies and Societies EMERGO*, 13(1), 3–19.
- Eurostat. Retrieved from: [http://appsso.eurostat.ec.europa.eu/nui/show.do?lang=en&dataset=ilc\\_di12](http://appsso.eurostat.ec.europa.eu/nui/show.do?lang=en&dataset=ilc_di12) (2020.06.10).
- Galbraith, J. K. (2018). *Gospodarka niewinnego oszustwa. Prawda naszych czasów*. Warszawa: MT Biznes.
- Goldman Recruitment Salary Survey 2018. Retrieved from: [www.goldmanrecruitment.pl](http://www.goldmanrecruitment.pl) (2020.06.10).
- Harari, Y. N. (2014). *Sapiens – Od zwierząt do Bogów*. Warszawa: Wydawnictwo Literackie.
- Kalecki, M. (1986). *Teoria dynamiki gospodarczej*. Warszawa: PWN.
- Keynes, J. M. (1985). *Ogólna teoria zatrudnienia, procentu i pieniądza*. Warszawa: PWN.
- Levinson, M. (1992). *Nie tylko wolny rynek, Odrodzenie aktywnej polityki gospodarczej*. Warszawa: PWN.
- Lin, J. Y. (2017). Nowa Ekonomia Strukturalna dla gospodarek doganiających. In: J. Y. Lin, A. Z. Nowak (Eds.), *Nowa Ekonomia Strukturalna wobec krajów mniej zaawansowanych* (pp. 199–219). Warszawa: Wydawnictwo Naukowe WZ UW.
- Łaski, K. (2015). *Wykłady z makroekonomii. Gospodarka kapitalistyczna bez bezrobocia*. Warszawa: PTE.
- Moździerz, A. (2018). *Paradygmat deficytów bliźniaczych a doświadczenia krajów Europy Środkowo-Wschodniej*. Warszawa: PWE.

<sup>29</sup> As original income in the current account of the balance of payments.

- Nowak, A. Z. (2017). Nowa Ekonomia Strukturalna a dylematy rozwoju gospodarki. In: J. Y. Lin, A. Z. Nowak (Eds.), *Nowa Ekonomia Strukturalna wobec krajów mniej zaawansowanych* (pp. 235–248). Warszawa: Wydawnictwo Naukowe WZ UW.
- Owsiak, S. (2002). *Finanse Publiczne, Teoria i praktyka*. Warszawa: PWN.
- Roczniki Statystyczne. (chosen years). Warszawa: GUS.
- Smith, A. (2003). *Badania nad naturą i przyczynami bogactwa narodów*. Warszawa: De Agostini, Altaya.
- Thurrow, L. C. (1997). *The Impact of Taxes on the American Economy*. New York: Praeger Publishers.
- FRED Economic Data Economic Research Federal Reserve Bank of St. Louis. Retrieved from: <https://fred.stlouisfed.org/graph/?g=dZn> (2020.06.10).
- World Bank Broad. Retrieved from: <https://data.worldbank.org/indicator/fm.lbl.bmny.gd.zs> (2020.06.10).
- Woźniak, M. G. (2019). *Gospodarka Polski 1918–2018, W kierunku zintegrowanego rozwoju*, vol. 1. Warszawa: PWN.
- Żyżyński, J. (2009). *Budżet i polityka podatkowa. Wybrane zagadnienia*. Warszawa: PWN.
- Żyżyński, J. (2014). Pieniądz egzogeniczny jako baza dla emerytur kapitałowych. In: J. Czekaj, S. Owsiak (Eds.), *Finanse w rozwoju gospodarczym i społecznym*. Warszawa: PWE.

### Summary

The level of prosperity available is the value of what is produced in the economy. This is a general truth, while the level of well-being of community members is a consequence of the value added and the rules and mechanisms of national income distribution. The purpose of the paper is to show the macroeconomic principles of the division of the generated GDP value, based on the example of a simple model of the economy in a classic style: the economy is presented as the Great Bakery, which produces loaves of bread shared between employees and its owner, the Baker. The author uses this model to demonstrate the consequences of the division of the generated surplus, which is the Baker's profit from three sources: development-oriented investments and the savings associated with them, the public sector and exportation. The author shows the structural consequences of reducing wages and shifting the tax burdens to the employees. He proves that the reduction of labor costs should be accompanied by an increase in the tax burdens imposed on companies – the Baker in his model. These rules of division have macroeconomic consequences and the author shows the effects for Poland's position in a group of countries, presented as international comparisons (mainly OECD countries). The author shows that one of the key factors determining prosperity is the place of industry in the product development cycles produced by the global division of production. The amount of added value obtained at various stages of these production cycles is illustrated by the so-called smile curve. The author shows the international division of labor has led to the location of the industries of post-communist countries, including Poland, around the minimum of this curve. This causes the average level of wages and, consequently, welfare to be low. The analysis leads to the conclusion that a policy of structural changes is needed, one that will shape this division so that the country regains full production cycles and thus strengthens its economy. The author discusses the simplified thesis formulated by Jeffrey Sachs that sustainable development is the most important for prosperity. The author justifies the thesis that it is not so much development as the amount of added value generated by industry and the mechanisms of its distribution, and points out that, as Justin



Yifu Lin observes, it is the structural changes which will lead to an increase in added value and modifications in the principles of its distribution, so as to increase social well-being.

*Keywords:* GDP distribution, wages, money, exports, imports, smile curve.

### **Wynagrodzenia a logika podziału dochodu narodowego w gospodarce rynkowej – opisaney przy pomocy prostego modelu**

#### *Streszczenie*

Poziom dobrobytu jest określony przez wartość tego, co w danej gospodarce jest wytwarzane. Ale to na poziomie ogólnym, natomiast poziom dobrobytu członków społeczności jest konsekwencją wielkości wartości dodanej oraz zasad i mechanizmów podziału dochodu narodowego. Celem artykułu jest pokazanie makroekonomicznych zasad podziału wytworzonej wartości PKB na przykładzie prostego modelu gospodarki w stylu klasycznym: gospodarka przedstawiona jest jako Wielka Piekarnia, która wytwarza bochny chleba dzielone między pracowników a jej właściciela Piekarza. Autor wykorzystuje ten model dla pokazania konsekwencji podziału wytworzonej nadwyżki, która stanowi zysk Piekarza, między trzy kierunki: prorozwojowe inwestycje, z którymi powiązane jest oszczędzanie, sektor publiczny oraz eksport. Autor pokazuje strukturalne konsekwencje redukcji wynagrodzeń i przesuwania obciążeń podatkowych na pracowników. Dowodzi, że redukcji kosztów pracy powinno towarzyszyć zwiększenie obciążeń podatkowych nakładanych na firmy. Te zasady podziału mają konsekwencje makroekonomiczne i autor pokazuje, jakie są skutki dla miejsca Polski w grupie krajów przedstawianych w porównaniach międzynarodowych (głównie krajów OECD). Autor pokazuje, że jednym z kluczowych czynników decydujących o dobrobycie jest miejsce przemysłu w cyklach rozwoju produktów wytwarzanych w globalnym podziale pracy. Wielkość wartości dodanej uzyskiwanej na różnych etapach tych cykli wytwarzania ilustruje tzw. krzywa uśmiechu. Autor pokazuje, że międzynarodowy podział pracy doprowadził do ułokowania przemysłu krajów pokomunistycznych, w tym Polski, w okolicy minimum tej krzywej. To powoduje, że przeciętny poziom wynagrodzeń, a w konsekwencji dobrobytu, jest niski. Analiza prowadzi do wniosku, że niezbędna jest polityka zmian strukturalnych, które ukształtują ten podział tak, aby kraj odzyskiwał pełne cykle wytwarzania i w ten sposób umacniał swą gospodarkę. Autor dyskutuje uproszczoną tezę sformułowaną przez Jeffrey Sachsa, że dla dobrobytu najważniejszy jest zrównoważony rozwój. Uzasadnia, że nie tyle rozwój, co wielkość wartości dodanej wytwarzanej przez przemysł i mechanizmy jej podziału, wskazują na potrzebę zmian strukturalnych (co dostrzega Justin Yifu Lin), które doprowadzą do zwiększenia wartości dodanej i modyfikacji w zasadach jej podziału tak, aby zwiększyć dobrobyt społeczny.

*Słowa kluczowe:* dystrybucja PKB, wynagrodzenia, pieniądź, eksport, import, krzywa uśmiechu.

JEL: A00, A10.



*Michał Gabriel Woźniak, prof. dr hab.*<sup>1</sup> 

Division of Research on Social Inequalities and Economic Development  
University of Rzeszów

## **A new institutional orientation of the development of science, knowledge and human capital in Poland versus integrated development**

### INTRODUCTION

The transformations which took place in Poland during the last thirty years in the sphere of academic education, science and the development of human capital, which we will call the sphere of knowledge, took place mainly under the pressure of globalisation of liberalisation, that is the dissemination of neoliberal standard programmes of transition of post-socialist economy into market-oriented economy prepared by the experts from the International Monetary Fund and the World Bank. They recommended deregulation of markets, guarantee of property rights, privatisation of enterprises, reduction of budget deficit with emphasis being placed on tax cuts, creation of a broad tax base and moderate marginal tax rates, real positive interest rates determined according to market rules (in order to stop the outflow of capital and promote savings), exchange rate based on market rules ensuring competitiveness, liberalisation of import of goods and elimination of restrictions for direct foreign investments<sup>2</sup>. They were delayed due to problems which occurred in the public financing of the development of this sphere. They resulted from the public debt towards foreign creditors which was inherited from the centrally planned economy and which exceeded the capabilities of the national economy to serve it as well as the consequences of deep transformational

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<sup>1</sup> Correspondence address: University of Rzeszów, Institute of Economics and Finance, Ćwiklińskiej 2, 35-601 Rzeszów; e-mail: [wozniakg@uek.krakow.pl](mailto:wozniakg@uek.krakow.pl). ORCID: 0000-0002-6596-4367.

<sup>2</sup> For more information see (Williamson, 1990), controversies related therewith (Stiglitz, 2002; 2006; Rodrik, 2008) and problems arising therefrom in relation to Poland (Woźniak, 2019a, pp. 61–80).

crisis<sup>3</sup> caused by the adopted path to the transition to the market economy based on neoliberal recipes. In accordance with these recipes, a right response to the challenge of globalisation of liberalisation in relation to the knowledge sector, similarly to the entire public sector, was supposed to be new public management (NPM)<sup>4</sup>, which was consistent with the views promoted by mainstream economy referring to the Washington Consensus recommending the globalisation of liberalisation and adjusted macroeconomic stabilisation policy with potential modifications thereto. They took into consideration spatio-temporal cultural restrictions, but they still recommended the deregulation of markets, privatisation, reduction of the state budget deficits, with emphasis being placed on tax cuts, and other activities facilitating the standardisation of macroeconomic policies, internationalisation of national economies and economisation of all spheres of development.

New public management is the embodiment of the rules of neoliberal policy under the conditions of the globalisation of liberalisation and an advanced IT and telecommunications revolution in relation to the government sector. It promotes subordination to the rules of the market game of the knowledge sector which is the supplier of a particular type of goods generating positive external effects which are socially useful and determine the qualitative characteristics of human capital. The particular significance of these goods results from the fact that they determine the directions of modernisation in all spheres of human existence and activity. Therefore, they are significant not only in terms of business success, economic growth, the position of the national economy in the rankings of development of the knowledge-based economy, but also in terms of human and nation welfare.

The author of this paper proposes a thesis that institutional reforms in the sphere of knowledge should be programmed due to their consequences not only for an increase in GDP, which should be perceived as a fundamental set of measures of fulfilling development aspirations of nations. The possibilities of achieving the coherence of functions of objectives in the entire area of development, which consists of the sphere of economics, politics, technology and consumption as well as the social sphere, the sphere of nature and human biology and knowledge itself, are equally significant and perhaps even more significant than an increase in GDP. The degree of coherence of these functions of development objectives of an economical society is the indicator of their integration. GDP, technological

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<sup>3</sup> Costs of the transformational and stabilisation shock programmed by the so-called Balcerowicz Plan were related not only to a decline in GDP by nearly 12% in 1990 and by the next 7.6% in the following year, but also to an increase in unemployment up to 16.4% in 1993, a decline in the purchasing power of money by 40% and a decline in the real income of population by more than 22% in 1990. These problems were accompanied by the long-term spectre of crisis in public finances, which persuaded the next governments to search for savings, mainly by reducing the share of expenses on the sphere of knowledge in GDP. For more information on the costs and benefits of the transformation and the delayed reforms of the public sector see (Woźniak, 2012a).

<sup>4</sup> For more information on the NPM see (Osborne, Gaebler, 1992; Zalewski, 2005).

progress, all symptoms of the modernisation of the economy and institutional changes are extremely important measures of fulfilling people's development aspirations. As key elements related to the reform efforts of politicians, they cannot be programmed in isolation from the coherence of development in all spheres of human existence and activity. Then, as the experience of many countries show, they stop being the indicator of eudaimonia, welfare, that is life with goods, being good and among the good ones. They easily become the tools of implementation of political and economic interests of selected social or national groups. The paper also proves a thesis that in order to overcome the syndrome of particularisms in all reform efforts, an orientation towards integrated development, that is with coherent development objectives of all spheres of human existence and activity, is necessary. This would enable the creation of the environment necessary to disseminate living in welfare. This is why the holistic reflection modernisation of human capital by making it capable of acting in support of integrated development, in which particular importance is attached to the sphere of science and knowledge is recommended. From this point of view, the author of the paper has conducted a detailed assessment of key assumptions of the Act on Higher Education and Science which has been implemented in Poland since October 2018. In order to appropriately understand the diagnostic purpose of the present case study oriented in this way, the author has briefly referred to threats which accompany the development of the knowledge-based economy originating from individualism, reductionism and the still dominating mechanistic rules of thinking and conclusions drawn from the attempts to reform the knowledge sector in Poland related to the transformation and accession to the EU.

A better understanding of unequivocal purpose of the attempt made in Poland to create permanent institutional foundations for the functioning of the sphere of knowledge corresponding to the challenges of contemporary globalisation required signalling positive aspects of the implemented reform in the first place. This paper in no way undermines the purpose of efforts made by the authors of this reform for the development of the traditional knowledge-based economy. However, the present paper searches for the answer to the questions of whether, in the face of the spectre of numerous, universal and specific, development threats, institutional Xerox-modernisation in the sphere of science by treating it due to the new Act on Higher Education and Science as part of a trend of changes in the European universities based on the new public management is sufficient for Poland to move in the direction of integrated development. The conducted research and presented conclusions were based on the study of literature particularly concerning government failure, market failure, public management in the sphere of knowledge and development threats arising therefrom as well as case studies of the reforms of the sector of science and higher education which have been undertaken in Poland since 1990. The entire research process was based on the inductive and deductive inference.

### WHY THE NEW KNOWLEDGE-BASED ECONOMY IS NECESSARY

The theory of endogenous growth, whose authors made an attempt at endogenisation of technological progress, i.e. treating it as a result of conscious and organised decisions made by economical entities, provides theoretical justifications for promoting the knowledge-based economy in economic literature, economic politics and business practice. Although the first attempt to endogenise technical progress appeared at the end of the 1960s (Shell, 1966), it was only with a twenty-year delay that the first model of endogenous growth was developed which enabled approximate estimates of the impact of human capital on economic growth (Romer, 1986). Since then, research in economics and management sciences has been disseminated, and it proved that the main driving force of economic growth are improvements in the knowledge of how inputs are transformed into products, i.e. technological progress and innovations whose results can be measured and, most importantly, it can be stimulated and it is possible to manage the process of creating innovations at micro and macroeconomic levels. At the same time, the third technological wave associated with the IT and telecommunications revolution confirmed the theoretical evidence. In business practice the search for incentives to innovate and search for knowledge capable of creating technological, product, management, marketing and other innovations in order to maximise synergistic effects from their combined use have become widespread. This meant the spread of a new type of competition, i.e. competences to jointly use multiple (technological, product, management, marketing, institutional, financial and other) innovations to maximise the company's market position, its assets and profits. All of these processes required the globalisation of liberalisation, as combined with multiple innovations, it opened output markets and access to such production factors, including innovation and human capital, i.e. knowledge capable of acting in support of its users. And in these epistemological paradigms, the interests of human capital carriers are only respected in terms of their ability to achieve business objectives. These rapid transformations in the market sector and the related changes in the rules of thinking, acting and the way of living were assigned with various terms such as "post-capitalist society" (Peter Drucker) or "post-industrial society" (Daniel Bell), "third wave" (Alvin Toffler), "network society" (Manuel Castells), "connected economy" (Zbigniew Brzeziński), "digital economy" (Don Tapscott), "knowledge society" (John Naisbitt). Michael Porter's concept of innovation-driven economy became widespread in the USA, and knowledge-based economy or knowledge-driven economy became widespread in Europe. These are similar economies in the sense that their development is based on knowledge development.

The American model, which we call IDE (innovation-driven economy), is oriented towards the effectiveness of operations, maximising the productivity of production factors, company assets and profit levels in order to guarantee a dominant global market position. Knowledge is used in it to build an innovative

economy in the Porter's sense, i.e. it is supposed to enable competition on the basis of achieving synergistic effects from the ability of the business sector to jointly use all technological, product, management, marketing and other innovations (Porter, 1998). IDE, i.e. the Anglo-Saxon model of innovation-driven economy is the product of activities of business entities and the effective management of innovative process at the microeconomic level. Its mechanisms are supposed to operate according to the theoretical foundations of mainstream economics, according to neoliberal recipes possibly supported by new public management. At the macroeconomic level, its sense is expressed in maximising GDP per capita. Social development objectives, as well as institutions and non-market regulation mechanisms, are respected insofar as they favour increasing productivity and competitiveness. Universal civilisation and spiritual values such as truth, beauty, good, perfection, justice are instrumentalised in relation to economic values, which leads to a technotronic culture, objectification of human capital carriers, disregard for natural resources and hyperconsumerism.

In the European model of knowledge-based economy, which we will call KBE, knowledge is supposed to be used in economic politics and public management for the triple sustainable development of national economy and its regions in economic, environmental and social terms. The state by means of its policy with the involvement of local government institutions and enterprises, as a result of effective management methods, and universities by means of their knowledge resources, are all supposed to trigger incentives similarly to the three-bladed screw<sup>5</sup>, i.e. release synergistic effects from non-linear interactions to maximise the chances of achieving programmed development objectives. Currently, a quintuple helix model is being popularised, which is based on the cooperation of not only universities and R&D centres with industry, but also with public authorities, the media and society which uses innovations that respect the requirements of the environment and the need to build environmental awareness (Cariayannis et al., 2012).

The theoretical foundations of KBE are interdisciplinary and eclectic in nature, but unlike the IDE, they strongly emphasise the control of innovation and human capital development at the macroeconomic level. This model also makes reference to the theory of endogenous growth and thus neoclassical economics, but using the theory of sustainable development and trends indicating the need to improve markets by means of non-market strategic Community and national coordination tools to speed up sustainable development-oriented modernisation and adaptation of human capital characteristics, which has been supported since 2000 by means of separate programmes, such as "Human Capital" and "Innovative Economy", implemented under the long-term strategy decreed by the European Council, and since 2014 under the Europe 2020 Strategy (COM, 2010).

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<sup>5</sup> This mechanism is used in the triple helix model recognised as useful in the development of KBE. See (Etzkowitz, Leydesdorff, 2000, pp. 109–123).

The world technological leaders (*Frontier Area Technology*) include countries with the IDE and the KBE models. However, in general, Europe with its KBE model is lagging behind the USA in terms of an increase in GDP per capita, productivity of production factors and innovation indicators of the economy where IDE was born and is developing. The undeniable success of both models in human capital development and technological progress cannot hide the fact that there is a process of spectacular technological convergence in China, which is already successfully competing with the USA in the scope of the fifth generation of mobile technological networks (5G) enabling faster transmission, collection and processing of information and the development of artificial intelligence. Most importantly, however, the modernisation that has been taking place since knowledge has had dominant and increasing contribution to GDP growth is also accompanied by disproportionate, unstable, enclave-like development, excluding entire social groups on a global, national and local scale from participating in its fruits. As a result, modern world is faced with development threats that are difficult to overcome. These global threats have been clearly visible to a growing extent since the 1980s in all spheres of human existence and activity (Attali, 1998; Kołodko, 2013).

- 1) In the sphere of nature and biology, there is an increase in the risk of the greenhouse effect, degradation of fauna and flora, climate instability (Randers, 2014), generation and population incompatibilities and the demographic crisis in Europe threatening the entire Euro-Atlantic civilisation and increasing migration of people to Europe, the USA and other highly developed countries, the scarcity of certain raw materials and the related economic, political and social development problems, as well as those related to food security, which are particularly relevant for future generations.
- 2) With regard to the technological sphere, attention is drawn to an increase in IT risks, the risk related to intellectual property piracy, radioactivity and the development of biotechnology and artificial intelligence that can control the human imagination and individual decision-making process, manipulate lifestyles, limit free choice, subjectivity and threaten democracy.
- 3) In the social sphere, since the 1970s, there has been a return to the growing inequality of wealth and income, which occurred at the turn of the 19th and 20th century (Piketty, 2015), an increase in the risk of poverty, hunger, social exclusion from participation in the processes of modernisation and fair use of their fruits as well as the precarisation of labour (Standing, 2011).
- 4) In the economic sphere, the recent global financial crisis has revealed, contrary to the opinions promoted in mainstream economics, the growing risk of losing control over public finances, the negative consequences of the financing of economies (Dembiński, 2011), problems of regional integration which are difficult to overcome, growing problems associated with the shortcomings of international coordination and the resurgence of new nationalism (Kołodko,



Koźmiński, 2017). Attention is also drawn to the fact that new technologies associated with the digital revolution may prove incapable of overcoming a relative decline in labour productivity. This would mean a return of the world economy to the low GDP growth rate that occurred before the industrial revolutions.

- 5) In the sphere of consumption, despite the enormous advances in knowledge, the negative effects of hedonistic, irresponsible, immoderate consumption, the growing risk of hyperconsumerism (Barber, 2009), living in borrowed time and at the expense of future generations (Bauman, 2010) are being revealed.
- 6) The spiritual sphere is influenced by economic imperialism, individualistic, mechanistic and reductionist rules of thinking supported by moral relativism with rapid progress in the development of IT and telecommunications technologies and the emerging artificial intelligence. All this gives rise to information and intellectual noise that facilitates the interests of netocracy, the spread of technotronic culture, hyperconsumerism, the demand for hedonistic values and the building of a society of performance (Debord, 1967) susceptible to manipulation of its behaviour, phishing in various spheres of human activity, i.e. catching losers for particular interests (Akerlof, Schiller, 2015), and other new phenomena and processes that push away spiritual needs and moderation in terms of material insatiability, create pressure for permanent modernisation and growth for the sake of growth. These processes take place without axiologically ordered objectives and are incompatible with responsibility in the personal dimension within and between generations and, consequently, make it impossible to harmonise development in all spheres of human existence and activity.
- 7) In the political sphere, erosion of democratic state institutions is observed, as well as the growing ethnic and national conflicts between the USA and Russia, and oligarchic capitalism and the dynamically strengthening power of Chinese transnational capitalism built bureaucratically by one-party power of the heirs of communism and societies with different political cultures. The globalisation of liberalisation and the spread of developed IT and telecommunications technologies lead to religious and cultural disputes and the clash of civilisations (Huntington, 1996). In the background of these processes, the risk of local wars increases and new problems related to the maintenance of world peace arise.
- 8) The sphere of knowledge does not keep up with the answers to the development challenges and threats of the present and the search for coherent mechanisms, institutions, tools and coordination procedures enabling the construction of the knowledge-based economy and the innovation-driven economy oriented towards the transition from the GDP economy to the social, economic and political order oriented towards the harmonious improvement of the quality of valuable life in all spheres of human existence, in the spatial and intergenerational dimension.

The inadequate medical and organisational preparation of the sphere of knowledge for the rapid and fully effective neutralisation of the coronavirus threat, which became a pandemic in 2020, is a new example of the failure to keep up the sphere of knowledge which functions in the world of interests and moral relativism and which is fragmented by excessive reductionism, methodological individualism and the still dominant mechanistic approach. Although the governments of individual countries are taking drastic measures to defend themselves against COVID-19, the crisis is still ongoing and the pandemic damage is raising concern about the repetition of the economic consequences of this crisis on a scale comparable to that of 1929–1933. The question arises as to why the fragmented sphere of knowledge with its enormous resources and the spectacular scientific discoveries of recent decades, subordinated to new public management has not prevented the poor organisational and methodical preparation of globalised world economies and policies for a joint integrated effort from the expected eruption of the risk of a pandemic, for which the globalisation of liberalisation and new technologies form a particularly fertile ground.

In the case of Poland, attention should also be paid to contextual threats related to the development path of the economy and society which have determined the properties of human and social capital and the related problems of catching up with the world technology leaders in terms of development gap and quality of life. The most important of these are related to: the progressive process of social disintegration and the collapse of social capital, relatively low salaries and the related barrier of internal consumer demand, and the still insurmountable trend of the outflow of talent abroad, the demographic crisis and the increased risk of pension system collapse, the limited capacity of the public sector to adequately support pro-development tasks (concerning infrastructure, knowledge, education, science, innovation, health, etc.), servicing external debt and a rapid improvement of the quality of life.

Knowledge, i.e. true and reasonable beliefs, structured information that can be processed and used to make rational decisions in relation to all spheres of human existence and activity, has a particular role to play in solving these problems. It consists of:

- people's competences, the quality of human capital, i.e. knowledge they are equipped with which is capable of acting,
- the capacity of the organisation and the national economy to use this knowledge effectively in support of the functions of objectives across the entire integrated development space,
- the ability of human capital carriers to cooperate in an increasingly competitive environment.

It should be noted that fragmented knowledge, based on individualism, excessive reductionism and mechanistic approach practised since the Cartesian times, was a convenient tool providing logically consistent interpretations of man



as an individual, a production factor, a bearer of the objectified aspects of human capital, and therefore instead of leading to welfare and being good, it was used for such modernisation of management systems, institutions and procedures that facilitated the risk of the aforementioned global threats to human development, as well as contextual and specific for time and space, as is the case of, for example, the threats referred to in the case of Poland.

The orientation of IDE on the productivity of production factors and thus on GDP per capita by emphasising the combined use of multiple innovations and the appropriate management of the innovation process undoubtedly accelerates the modernisation of the economy, is beneficial for progress in the quality of goods and services produced, in terms of working conditions, travelling and many other processes positive in economic and social terms. However, these positive processes are associated with the confusion of the objectives of management and the means of achieving them, at the root of which lies the reduction of the perception of human nature to a one-dimensional existence that respects economic, hedonistic values, seeks for its own quantifiable benefit in market terms, carrier of the characteristics of human capital as a production factor and object of use. Also the channels of formal education, especially in the field of economic, social, engineering and technical sciences focus on development-oriented knowledge and technological progress corresponding to the interests of big business and political powers. This opens the space for the economy of manipulation and deception. Huge financial outlays, crowds of experts and people of science, and the latest developments in psychological, economic, political and other sciences are used for this purpose. This raises the question of whether it is possible, in such a widespread approach to investment in people, to acquire competences to self-limit one's own freedom and creativity due to respect for other entities and social entities (Wielecki, 2003, p. 351). Practice provides evidence that IDE does not create a favourable environment for such a subjectivity. It also does not create a favourable environment for institutionalisation which facilitates reducing unfair inequalities in the distribution of wealth and income within society, so that the fruits of modernisation can benefit as many people as possible and enable them to actively participate in it. It is also not oriented towards the creation of the knowledge and innovation needed to respect natural resources in such a way as to enable sustainable development thanks to which future generations will be able to enjoy leaving the environment in a condition that enables their successors to live in a valuable way.

KBE, i.e. the European knowledge-based economy model, with its Eurocentric vision of triple sustainable development, is intended to provide a constructive response to the weaknesses of the IDE model. It is an important, if only limited, step towards an integrated development, and it is more declarative than actual. Although this model, under the influence of the Lisbon Strategy, has placed emphasis on linking individualised development to universal development, it has

in practice taken on a diffusion-polarising character. The KBE model emerged where European funds were obtainable, and these funds more easily reached the places where local elites were better organised and were able to articulate local interests in terms appropriate to the priorities set out in the operational programmes of the national cohesion strategy under the open methods of coordination. These seemingly innovative methods of coordination consisted in building an objective and then writing it down in the form of scenarios. However, this did not happen in common participatory procedures, but through the bureaucratic apparatus of public authorities, which were tainted by the original sin of the fiction of apparent participation and the actual power of arrangements and autocracies made up of people who possessed the competences to interpret their interests in terms of the public good. Thus, addressing the problems of the general public in the interest of the welfare and of society, but without the participation of the interested parties themselves, survived, and the integration of development processes is still carried out according to the principle that key changes can be made by a narrow group of bureaucrats aware of the public good, but subordinated to their interests.

From the point of view of the development of human capital capable of acting in support of integrated development, the only way to reverse the negative trend of diffusion, polarising and enclave-like development is to reject the fiction of apparent participation in support of real empowerment of society and a holistic reflection on modernisation of human capital oriented towards the dissemination of competences to think and act in terms of integrated development. The idea is that people should be able to be guided in their choices, including political choices, by the values of a free and responsible order in such a way as to maximise the subjectivity of citizens within the limits that make this freedom permanent and mutually respectable. This is a fundamental prerequisite for the widespread acquisition of effective ways to improve people's living environment in cooperation and by using existing creative potential. This results in the emergence of the need to build human capital of a public and common good nature which is the knowledge of what kinds of public policies to support, what their implications for the implementation of the functions of objectives across the entire integrated development space are, and which political agendas best fit the development, how to vote or engage in political support, and how to consume responsibly on a personal level, towards others, including future generations, their own health and quality of valuable life.

The importance of human capital of a public good nature or increasing social welfare will become apparent if a sufficient number of voters gain more knowledge about the real consequences of different public policies for the possibility of implementing the functions of development objectives across all spheres of human existence in a harmonised way. Thus, if a sufficiently large number of people were equipped with human capital of a public good nature, then politicians would be forced to offer and implement development and institutional change programmes

focused on integrated development. This would allow public policies to become genuinely controlled by society, and politicians would have to bear in mind the risk of fulfilling their election promises. It can be assumed with a high degree of probability that it would then become possible to improve policies towards the objectives of integrated development, as political phishing would lose its effectiveness<sup>6</sup>.

In other words, the socially expected modernisation of the political sphere, the implemented development programmes and system reforms, also relating to the knowledge sector, should be sought for in the sphere of integrated knowledge transformed into creative human capital capable of creating institutional frameworks for building a common awareness of the objectives, costs, benefits and conditions of integrated development and mobilising social will to cooperate towards this goal. Support may come from the education system, which is not limited only to dissemination of fragmented and specialised knowledge based on individualism, reductionism and mechanistic approach oriented towards economic values and technological modernisation, but which patiently develops knowledge based on a holistic, interdisciplinary approach and uses it to shape competences to seek synergistic effects from alternative allocations of resources for harmonised implementation of the functions of development objectives from various spheres of human existence. It should be constantly remembered that the cost efficiency of human activities is only a means of achieving their development objectives specific to the sphere of consumption, from the area of spiritual values, subjectivity (supervisory powers), concerning non-personal beings (nature and biology). These values are to be achieved through development in the sphere of knowledge and technology, and institutional reforms in these spheres should be subordinated to them. After all, it is not only about the development of such human capital that would serve only business, political, bureaucratic purposes or new technology.

Therefore, the mission of the state, the entire education and science system should be to facilitate integrated development. The state should create an environment and social climate friendly to improving the quality of valuable life not only through appropriate institutional reforms, but also through its other entrepreneurial activities. However, this requires the mobilisation of civil society by independent experts and journalists and an education system to put pressure on political and business power centres to direct institutional modernisation towards integrated development. A democratic political space is not enough. The reason for this is that it functions as a structure of competition oriented towards gaining powers to pursue policies and institutional reforms. Its officers are guided by political interests, maximising the number of electoral votes under parliamentary democracy conditions, also by means of political phishing. It should therefore be

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<sup>6</sup> See (Olson, 2000, p. 52 et seq.).

stressed once again that if a sufficiently large number of people were equipped with human capital of a public good nature, then politicians, given the high risk of losing their supervisory powers, would have to offer and implement development and institutional change programmes oriented towards integrated development. Ignoring this risk would mean losing their supervisory powers in the future.

If the economy is to be oriented towards achieving people's development objectives in a harmonious way in order to guarantee the welfare of the participants in the economy, i.e. functioning among the goods that serve the purpose of valuable life and being good, then it is advisable for the state to promote investment in such competences that do not only determine the productivity of technology and the functioning of individuals in the world of goods, but also contribute to improving the quality of valuable life. The IDE and the KBE models do not guarantee this, which can be observed in all spheres of human existence, signalled by the threat to development objectives.

This means that there is a need for a model of economy in which knowledge and information can be a source of social capital transformations and strategy orientation towards coherent development in all spheres of human existence, quality of valuable life, respect for mutual interactions between the functions of objectives of individual spheres of human existence and the interspatial effects of the allocation of production factors (synergistic and entropy effects). This new model of knowledge- and innovation-based economy oriented towards integrated development is referred to as KIBE. The fundamental condition for its functioning is the modernisation of human capital and competences to act in support of integrated development. Only this new integrated theoretical knowledge and its new techniques (integrated analysis) with the use of IT and telecommunications technologies, inseparably from the computer, create a hope for its rational use for innovations useful in harmonising development in all spheres of human existence, for living in welfare and being good. After all, the sense of modernisation, innovation and development is not exhausted by business, political or bureaucratic objectives. Their proper purpose is a better quality of life achieved by harmonising development objectives in all spheres of human existence.

In the new knowledge-based economy it is not enough to be oriented towards the GDP per capita growth, as is the case of the American innovation-driven economy model, or even towards economically, socially and ecologically sustainable development implemented in the European knowledge-based economy model. After all, GDP reflects only quantitative and partial effects of development. It expresses the value of annual value-added transactions in a given country, regardless of whether they bring economic benefits or losses to society and the environment as a result of the development of material production, and is thus oriented towards short-term effects. Nobody is informed about how its fruits are shared, who uses them and to what extent, what their regional distribution is, and therefore whether they are inclusive or exclusive in terms of subjectivity and space.

It is obvious that neoliberal ideology, business and political institutions based on this ideology referring to the value of the individual who is supposed to search for their own benefit quantifiable in market terms, do not guarantee the appropriate human capital characteristics necessary to achieve the objectives of integrated development. The human capital that grows out of them is supposed to be knowledge capable of acting in support of its buyers, which does not have to be in line with the interests of its carrier, especially since the actual markets are ineffective, dominated by transnational corporations and monopolised.

Human capital with characteristics specific to the implementation of integrated development may be created by combining economic, social, territorial, behavioural, cultural and technological aspects in an analytical process. Only in a holistic approach can the full costs, benefits and operation of the national economy, i.e. market mechanisms, institutions and management procedures created by non-market entities (the state, local governments, civil society institutions) as well as the whole range of multiple opportunities and threats, inconsistencies and inefficiencies of their regulators, be examined due to the effects on the overall objectives of integrated development. Such an analytical process allows to gain knowledge that is not susceptible to biased manipulations as opposed to fragmented diagnoses. It is necessary to examine the functions which the entities of the economic system perform in relation to the objectives of integrated development. Business, political, employee and bureaucratic interests must not be ignored, as these are the characteristics of the existing rules of people's thinking and activity. Institutional orientation towards the ability to compete is not enough to harmonise development objectives, although it is necessary in order to make the results of actions more economical. It is also not enough to maximise synergistic effects from the use of broadly defined innovations. Business entities need to learn how to cooperate, i.e. focus their efforts on achieving common benefits resulting from synergistic effects from maintaining mutual cooperative relations within a co-opetition system (Cygler et al., 2013). This requires knowledge facilitating a stronger coordination of actions undertaken by entities at different levels of management and human capital of a public and common good nature and motivating for rational cooperation. The need to disseminate the rules of thinking and acting based on a holistic reflection modernisation of human capital useful for the development of KIBE is also justified by the already existing advanced IT and telecommunications technologies, new challenges and threats related to the spread of autonomous machines, robotisation, artificial intelligence, biotechnology, in order to make peace, not to decide on life and death and the unfair distribution of natural resources, property and income.

In an internationalised digital economy and technology, the knowledge needed to compete with prices and labour costs is no longer sufficient. Business success depends on the ability to obtain synergistic effects from multiple innovations, while personal success depends on competences, including innovative competences.

This means that it is not enough to limit ourselves to orienting the knowledge sphere towards the problems of human capital modernisation and innovation for the purpose of triple sustainable development. Economic development is supposed to serve the development at the personal level, i.e. to serve people, not just business interests, bureaucratic and political structures interested in achieving desired (for their purposes) levels of benchmark productivity of production factors, use of labour resources, enrolment rates and others, which do not reflect the qualitative problems of modernisation related to the dissemination of competences to reach current and reliable information which is needed at a given time, competences to communicate, to be creative, e.g. in terms of creating digital products and services. After all, the improvement of the institutional order cannot be abstracted from the reflection on why a person treated as a carrier of human capital in a form reduced to the production factor should strive for socio-economic development and not for their own monetary interests, regardless of the function they may perform in the socio-economic system. This is the reason for the need of a system of formalised education to disseminate a new kind of knowledge, which is holistic, integrated, useful for the creation of modernised human capital, enabling acting in support of integrated development, because the one rooted by generations in hedonistic values, based on reductionism, individualism and the mechanistic approach, is not able to prevent the risk of multiplying the threats to humanity. This could be achieved through well-programmed institutional reforms in the knowledge sphere. These Xerox-modernisation-based reforms of the scientific and knowledge sphere subordinated to neoliberal recipes are oriented towards building an innovative economy, but they focus on practical skills of solving the emerging problems, i.e. on the *techné* sphere, and are not properly integrated with the *sofia* (in Greek: *wisdom*) sphere (Piontek, 2020), and thus exclude integrated education system management. The attempts of the reforms which have been made in Poland since the transformation are also an example of this.

#### POST-TRANSFORMATION PATHOLOGIES OF THE REINSTITUTIONALISATION OF THE SPHERE OF KNOWLEDGE IN POLAND

For the reasons indicated in the introduction, the implementation of the new school system in Poland and in the field of academic education corresponding to the recommendations of the new public management was not undertaken together with the implementation of the Governmental Stabilisation and System Transformation Programme. It is true that the ideology of education and upbringing promoted for the needs of the concept of the communist man was spontaneously removed from the area of economic and social sciences and the *homo oeconomicus*<sup>7</sup> ideology

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<sup>7</sup> For more information, see (Woźniak, 2020, pp. 173–188).



was introduced in this place. It was not until 1999 that under four reforms of the public sector, also the decentralisation of responsibility for education decisions and delegation of responsibility for education development from the state to local authorities took place. Apart from the quantitative successes expressed in high enrolment rates, plans to modernise curricula, instil creativity, entrepreneurial attitudes, release the ability to adapt to the changing needs of the labour market failed. Schools were not prepared for this in terms of staff, and the state did not secure the education sector with adequate material and financial resources. In connection with these problems, further reforms proved necessary. The one from 2009 was oriented towards popularisation of compulsory education for six-year-olds, modernisation of teaching at the junior high school level, and at the secondary and technical school level towards expanding the curriculum of Polish and foreign languages, mathematics, religion/ethics and physical education, and introducing subjects to be chosen by students. An increase in teaching effectiveness was to be facilitated by fewer classes, a larger number of groups and a new organisation of the secondary final school examinations. Unfortunately, decentralisation activities facilitated the dismantling of school supervision, they were not supported by the necessary motivational instruments, in terms of staff and material resources. The commonly repeated projects concerning the quality of education served the purpose of utilising free funds from the Human Capital operational programme rather than improving the curricula, adjusting them to the requirements of the labour market and the quality of education staff. The low quality of education at primary and secondary levels did not facilitate the construction of ambitious university programmes. Removal of shortages in staff with higher academic education inherited from the centrally planned economy was achieved through spontaneous development of non-public higher education institutions and an increase in the number of students at public universities, however, while at the same time the share of R&D and academic education expenditure in GDP decreased and there was a lack of curriculum reforms. This resulted in a decrease in the quality of teaching and the collapse of the R&D sector, whose share in GDP decreased from about 0.98% in 1990 to 0.65% in 1995 and after the next ten years to 0.58%<sup>8</sup>.

After institutional reforms carried out in the sphere of science and academic education, until the implementation of Act 2.0, the following were left: the pathology of low salaries and low expenditures on R&D, lack of conditions for the development of work of interdisciplinary research teams and consortia, and thus lack of significant competitive research results and the inadequacy of academic education in terms of the challenges of the innovation-driven economy. A shortage of graduates of engineering and technical faculties became apparent.

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<sup>8</sup> Already in the years 1994–1998 less than 0.5% of GDP was spent on R&D sphere from the state budget. Technological modernisation was to be implemented through the liquidation of the national R&D base and the inflow of direct foreign investments. See more information on the consequences of this policy for the innovation of the economy (Bal-Woźniak, 2020, pp. 214–248).

In academic education there were often didactic programmes based on obsolete knowledge, not adapted to the challenges of rapidly changing needs of the economy in connection with the development of IT and telecommunications technologies and the opening of national economies to the diffusion of innovation. After all, for many years, the knowledge that has not been updated has been structured in a better way. The one based on too far-reaching reductionism was also desired by the average student, who wanted to obtain a diploma with the best possible grade as easily as possible. Ambitious didactic programmes, saturated with new non-textbook knowledge oriented towards creativity, were more of an object of tolerance than desire, and were often met with disapproval, especially in the non-public sector of academic education, oriented towards producing as many diplomas as possible, because the financial income of higher education institutions depended on it. In the environment of public higher education institutions, their authorities also wanted to demonstrate before the accreditation committee the efficiency of teaching expressed in quantitative rather than qualitative indicators. Similarly, in the sphere of research and scientific publications, quantitative rather than qualitative indicators were important.

New types of institutional solutions in the sector of science and academic education, inconsistent with the challenges of increasing competition, have been modified three times since 1990: in 1998, together with other three reforms of the public sphere, and in 2007 and 2011 (Journal of Laws 2011, No 84, item 455), but these modifications did not change the essence of functioning of the education system and practising science. The pathology of low salaries and low expenditures on R&D continued, so there were no conditions for an active human resources policy, linking costs to the quality of the teaching product, and all this made it impossible to discount the benefits of opening the gateway to the original curriculum. As a result, higher education institutions did not respond adequately to what and who they were teaching for, they did not cooperate with employers and did not follow the fate of their graduates. They became “producers of the unemployed” with humanistic knowledge to a greater extent. In the areas of extended autonomy, the symptoms of freeing oneself from the responsibility for the quality of teaching, scientific and discretionary work were visible. In order to avoid this pathology, not only the objectives of the reform, but also its institutions, tools, mechanisms and detailed procedures must be oriented towards coupling autonomy with responsibility in an integrated way, and should be systematically monitored and adapted in this respect. It should also be noted that only then can institutional change in the sphere of knowledge foster inclusive modernisation, involving the widest possible range of social groups to participate in it and benefit from the fruits of this modernisation, if it spreads the competences to be creative, active, if it is oriented towards the welfare of all social groups and not the comfort of the academic world and its leaders. The question arises whether this is how the Constitution for science was decreed by Act 2.0.



## WHAT TO EXPECT FROM ACT 2.0

The direct area of activity of the Act on higher education and science, implemented since October 2018, popularly known as Act 2.0, is the sphere of knowledge and technology (Journal of Laws of 2018, item 1668). However, indirectly, the fruits of this Act should be expected in a better implementation of the function of objectives in all spheres of human existence and activity, i.e. in the entire space of development. The resources and quality of knowledge, the axiology that science and education affirm, are the potential that determines the sustainability of economic growth, the condition of social capital, civil society, its understanding of the importance of freedom, subjectivity, justice, will and the way they use these and other values. They also influence the shape of institutional changes in the economy, the political sphere, the rules of thinking and acting, and thus people's work, the nature of consumption, the functioning of the family, the use of natural resources and the deposit of spiritual values.

The legislator's intention was to overcome the problems related to the failure of science and academic education to keep up with the development challenges and threats to the Polish economy resulting from the globalisation of liberalisation and the digital revolution. This meant that the idea of the reform relied on the Xerox-modernisation of models implemented since the beginning of the 21st century at European universities with the hope that thanks to the implementation of competition mechanisms, market competition, economic efficiency and orientation of higher education institutions towards a positive financial result, the costs of their functioning would decrease and the productivity of scientific work would increase. This is the reason for the reference to the canons of new public management, which emerged in response to the processes that are taking place under the pressure of the modern wave of globalisation, liberalisation and the IT and telecommunications revolution.

Act 2.0 changes the academic system and the relations between the people who create it (teachers, doctoral students, students). It also regulates many other issues that have so far been included in separate Acts (e.g. the problem of financing higher education institutions). It is a comprehensive but, at the same time, a weighty collection of about 470 articles additionally supplemented by the Act introducing it, which has about 350 articles with many references, often double ones. It also regulates aspects which have so far been included in other legal acts. Such comprehensiveness is not synonymous with the objectives of integrated development.

The positive side of the reform regulated by Act 2.0 is the system of financing public higher education institutions by means of an integrated subsidy for teaching purposes (for all institutions) and for research purposes (for academic institutions). The decision on its allocation will be made in an autonomous manner by the university authorities. The idea of linking its financing from public funds with

the quality of teaching and scientific results should have a positive impact on the quality of life from the perspective of supplying the economy with better human capital. A higher education institution obtains most money if there are 13 students per one academic employee, which is supposed to make it no longer profitable to maintain once admitted students and educate them in too large lecture and practice groups from the point of view of the quality of the didactic process.

The system of student scholarships, the issue of university federations, the issue of computerisation of higher education institutions, which may improve the quality of the academic environment and students' lives, have been precisely defined. Additional financial support for the following initiatives of excellence also gives hope in terms of the improvement of the financial condition of any higher education institution which is motivated by rational premises:

- 1) Teaching initiative for the 10 best universities whose graduates will perform best on the labour market (according to indicators taking into account the situation in the regional labour market)
- 2) Research initiative for universities with outstanding research achievements in the form of a guarantee of higher funding of at least 10% for 6 consecutive years, which may in the long term enable the emergence of higher education institutions able to compete on the transnational market.
- 3) Regional initiative of excellence, for regional specialisation for those higher education institutions that will operate in one of the three leading scientific disciplines in the region. However, this initiative is related to the risk of pursuing undue benefits by the political and lobbying forces of a given region or a higher education institution. This is the source of the problem of creating appropriate mechanisms protecting against this risk. The provided mechanisms for obtaining access to funding for regional higher education institutions do not guarantee a departure from the pursuit of undeserved benefits for formal rather than real scientific achievements.

The solution according to which the entity granting the postdoctoral degree refuses to grant it if the opinion is negative should also be positively assessed. However, allowing the postdoctoral dissertation to remain is ambiguous. There is no obligation to obtain the postdoctoral degree and the possibility of obtaining the position of professor who will have all the rights of an independent employee, except for being the supervisor of a doctoral dissertation, is open. This may have a negative impact on the development of scientific research and the appointment of higher education institution authorities, as it is difficult to expect a general ignorance of the alternative cost in the pursuit of promotions only because the ethos of a research and teaching employee requires it.

The reform was based on autonomy, which is a positive determinant of decision-making powers and the possibility to act, understood as limiting ministerial regulations concerning the functioning of a higher education institution in exchange for increasing the powers of the one-person authority, i.e. the rector. The rector,

supported by a new body (Council), may freely shape the financial and staff policy of a higher education institution and its internal structure. A higher education institution becomes a corporation employing employees who “produce” publications, and their main task is to “produce” graduates useful for the labour market and business. Thus, the emphasis is still placed here on the subjective approach to the carrier of human capital. The question arises about the presence in the curriculum content of the knowledge that is to serve the empowerment of the carrier of human capital, its self-reflection competences and how it is to influence this content and management in the academic sphere.

Management in the sphere of science and academic education will continue to be seemingly autonomous, but in practice it will be centralised in the hands of the rector, technocratic and carried out with the support of the new body, i.e. the Higher Education Institution Council. It does not contain “fuses” limiting the abuse of the rector’s authority beyond the generally applicable provisions of administrative, criminal and civil law. The market control mechanism cannot operate efficiently here, and with the adopted solution, the control mechanism of the founding body no longer operates. A higher education institution becomes a typical case of nobody’s property, whose rector manages public funds. The consequences of this type of supervisory powers are well known not only from practices used in the centrally planned economy<sup>9</sup>, but also from pathologies that occur when using subsidies from EU funds.

In the clash with the adopted procedures for the election of higher education institution authorities, there is a risk of exclusion, nonconformism and freedom of thought, concentration on seeking access to sources of power in the academic environment, and thus achieving formal and not real scientific promotions and access to financial resources. It also facilitates the selection of the reviewers’ palette, which is devoid of clearly defined criteria and does not eliminate the “I support your interests and you support mine” agreements, as well as a lack of proper protection of ownership supervision in the management of assets which are intended to accumulate knowledge in society and which, without having a private character, become nobody’s property. Symptoms of the phenomenon of pursuit of undue benefits are clearly observed already at the stage of Act 2.0 implementation .

In the parametric evaluation, which is decisive for the awarding of a specific scientific category to a higher education institution, and scientific promotions to employees, these are mainly publications in journals indexed in the most important international databases that count, and in the case of book monographs – published in the so-called prestigious publications, the list of which is created by committees of experts approved at the central level. The value of a scientific paper or book is therefore not determined by its content, but by the place of publication, the value that a scientific “production” can obtain on a market whose rules define international

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<sup>9</sup> For more information on economic consequences of non-private property, see (Woźniak, 1993, pp. 60–70).

and national “centres” and in reality cartels and monopolies. This is supposed to cause creative destruction in the scientific journals market. However, the fact that scientific discoveries have a different nature from business innovations and are not only intended for business purposes is ignored. They are born in an exchange of views, preferably in an interdisciplinary dialogue that enhances the quality of scientific products. That is why scientists, above all, need interdisciplinary research teams, open meetings, conferences and scientific seminars, which are a source of raising the general level of the academic community, as they quickly and continuously assess and inspire each other and develop their understanding of the world. In order to disseminate this conference dialogue, they need publications after them. The practical importance of scientific discoveries is best expressed in their ability to achieve integrated development objectives. Therefore, they need to be evaluated in interdisciplinary research teams.

The adopted system of parametric evaluation may result in a decrease in interest in publications in national scientific journals and their marginalisation, similarly to what happened in the business sphere as a result of subjecting national business entities to asymmetric competition in the early 1990s. Financial support for the best national scientific journals is supposed to prevent it. However, reducing the parametric evaluation to one, possibly the highest-scoring, annual publication per researcher and underestimating scientific conferences must result in the extinction of national scientific journals, conferences, seminars and open debates. If it is a creative destruction, then it will have external effects in the form of weakening the academic debate in Poland and also lowering the prestige of regional academic circles. Another problem is to apply the same or structurally analogous criteria to the evaluation of achievements in all scientific disciplines. From the point of view of integrated development, underestimating the specificity of social sciences and humanities is dangerous. The risk is that one will get stuck in a technotronic culture and underestimate the holistic approach to development, which depends not only on the processes taking place in the technological and business sphere. Better technologies are intended to serve a better quality of valuable life, which is the product of the possibility of harmoniously achieving the functions of development objectives not only in the economic and technological sphere. These are intended to serve social and individual welfare. If we want to pursue integrated development, i.e. achieve the function of development objectives across the entire space of personal development, it is necessary to properly assess the contribution of various sciences to achieving synergistic effects from alternative allocations of resources to various spheres of human existence.

Division of higher education institutions into research entities (universities and polytechnics) may strengthen the position of Polish science. Higher education institutions which, after evaluation based on such criteria, will not obtain at least B+ category in at least two disciplines, will not have the right to offer doctoral studies (in the new nomenclature: doctoral schools) or even MA studies of a general academic

profile. Such a solution does not automatically mean increasing the usefulness of the products of science and academic education to achieve development objectives in personal, social and even economic terms.

The development challenges and threats of the world of globalisation of liberalisation and digital revolution create a demand for new theoretical knowledge and new techniques of its acquisition. The importance of integrated analysis based on external reflection and self-reflection, the ability to use technologies that connect the physical, digital and biological worlds, including human psyche and spirituality, is growing. They will determine changes in all spheres of human existence and activity, not only when pursuing business and political objectives, and ultimately progress in the development of an innovation-driven economy whose purpose is to improve the quality of valuable life. The reforms oriented towards the creation of integrated knowledge and the competences that emerge from it, opening a perspective for the development of interdisciplinary research, promoting such initiatives are necessary for this purpose.

Transformation of traditional university education techniques (hybridisation) can be facilitated by university consortia offering a common basket of courses conducted by top-class academic teachers, whose programmes may be prepared by the best scientists. Such modernisation of the teaching process would open the way for the dissemination of an integrated approach in academic curricula. Students prepared at earlier stages of education to self-reflect, to formulate their own objectives of self-organisation of the educational process could participate in it. However, universities must first prepare the teaching staff of lower levels of education to develop their competences to actively participate in the process of creating and disseminating knowledge capable of acting in support of integrated development. Therefore, there is a need for institutionalised procedures for compulsory cooperation between the science and academic education sector and education and upbringing at different levels. In the light of the signalled weaknesses of Act 2.0, the problem of finding a decalogue of knowledge for integrated development remains open.

## CONCLUSIONS – WHAT SHOULD BE CHANGED

Building a new knowledge-based economy is a much more complicated problem than overcoming the Fata Morgana of *Frontier Area Technology*, which seems to be the main objective of Act 2.0. In the institutionalisation decreed by this Act, Poland's place in the world economy and its prestige, and, more specifically, the sphere of knowledge, especially Polish science in world rankings, is important. However, the improvement in the quality of valuable life, which is people's objective, requires a holistic reflection modernisation of human capital (Woźniak, 2012b, pp. 191–231; Woźniak (Ed.), 2020). This extremely complex process requires an

integrated approach in which fragmented knowledge, orientation towards economic values, technotronic culture, individualistic approach, mechanistic thinking and extreme reductionism are not enough. These vast and useful knowledge resources need to be brought together in a coherent whole, and used not only for external reflection oriented towards resources and living environment of the carrier of human capital. In an open economy and in advanced IT and telecommunications technologies, it is even more important to enable internal reflection oriented towards understanding one's own emotional, informational and cognitive limitations, the multiple consequences of these limitations in personal and group interactions and the decision-making process as well as the mechanisms enabling their reduction.

The realisation of a holistic reflection modernisation of human capital requires showing the functions of different values in relation to the possibility of achieving the functions of development objectives specific to different spheres of human existence. However, coherent institutional changes extending the freedom of initiative, strengthening the subjectivity of the person and the possibilities of activity and the inclination to bear responsibility for free choice are of a key importance.

The dissemination of psychological knowledge regarding self-management and solid knowledge about the functioning of social and political spheres, as well as reflection on the functionality of spiritual values may help to rationalise individual decision-making process, to protect against modern techniques of manipulating these limitations by various interest groups and limit a person's subjectivity. These objectives cannot be achieved within the framework of institutions oriented towards building an innovation-driven economy and even towards triple sustainable development as it is practiced in the EU. These complex problems are also not promoted by Act 2.0.

Spontaneous efforts at the level of research units are not enough. A good institutional economic system, especially in the sphere of science, education and social policy, should create sufficiently strong incentives to modernise teaching and research programmes in this direction, protect such initiatives from being obstructed by groups operating at universities and pursuing undue benefits as resources which are public property, and in fact nobody's property, are particularly exposed to it in the absence of effective control mechanisms on the part of the Ministry of Science and Higher Education.

In the search for better institutional solutions for the functioning of the sphere of science, knowledge and human capital development, it should be borne in mind that they play an ancillary role not only towards the sphere of business, politics and knowledge itself. The social mission of science at a time when soft development factors are of a key importance and when the classical ones are becoming scarce is also important. Its social mission is expressed not only in seeking the truth about what is going on. It would then serve mainly itself. For a better quality of valuable life in all spheres of human existence, its mission is fulfilled when scholars can



provide a coherent recipe for what to do to make it better for all social groups and for everyone individually. In view of this understanding of the social mission of science and knowledge, it should be borne in mind that no founding body of the public sector, where the assets of its entities are exposed to the risk of being treated as nobody's property, can renounce the tools that guarantee an effective performance of the tasks by the entities it establishes. In the case of the sphere of science and education, these tools are also related to the entrepreneurial, stimulation and control functions of the state in support of the directions of human capital modernisation, development of scientific research and cooperation of science with the sphere of business, desired from the point of view of the possibility of achieving the objectives of integrated development.

Higher education institutions should devote more attention to trainings and practical entrepreneurship courses and additional activities (projects, initiatives, measures), both for students and teachers aspiring to the role of academic entrepreneurs, in order to encourage the emergence of creation of entrepreneurial intentions and knowledge capable of acting in support of integrated development. Such university activities should be supported by educational curricula and educational policy guidelines, so that they can be coherent with integrated development policy objectives and national entrepreneurship.

Institutional changes in the sphere of science and academic education decreed by Act 2.0 do not guarantee proper fulfilment of the state's entrepreneurial and promotional functions in support of human capital modernisation adjusted to the implementation of the strategy oriented towards integrated development. There has been a failure to apply effective institutional brakes to the pursuit of undue benefits and the provision of human capital unsuitable for harmonisation of objectives across the entire space of development. The reform of the sphere of science and knowledge is anchored in the recipes of neoliberalism and its coherent new public management focused on the *techné* sphere.

Academic self-government and free choice cannot be detached from the social responsibility of the executive authorities of its subjects simply because the sphere of science and education disposes human resources most equipped with knowledge. Its carriers have their own interests, and therefore it must be borne in mind that it is not the social mission of science but the logic of a minimum effort to guard them that can be a fundamental determinant of their rules of operation. For this reason, the fourth mission of science expressed in the social service of a higher education institution under the regulations decreed by Act 2.0 will not materialise itself. Neither the rector nor the interest groups that conditionally support their autonomy will have a legitimate interest in this mission. Apparent activities are to be expected in this respect to which the regional initiative of excellence may therefore be exposed. Experience shows that radical reforms should be properly monitored so that the inevitable shortcomings in such cases can be remedied in

time. The introduction to the Higher Education Institution Council of an observer representing its founding body in an advisory capacity could change the nature of its functioning. It would not affect the autonomy of the higher education institution granted by this Act, but could reduce information delays and asymmetry, which are the fundamental limitations of the rational decision-making process (Akerlof, Shiller, 2015). It would also *ex ante* make the founding body better armed with information to take possible advisory and remedial measures and improvements of statutory regulations.

It is also an urgent task to launch a path of grants, also addressed personally to individuals who have demonstrated outstanding research achievements and in organising team research, in particular of an interdisciplinary nature, which requires an orientation towards integrated development. The process of monitoring the research results of a higher education institution and rewarding such results should also be subject to this objective.

The de-bureaucratisation of procedures concerning research grants and academic didactics, which are the source of popularisation of patronage and which promote management by obstruction, and, above all, which kill creativity, initiative and originality, are also important. They are also the source of high transaction costs. Students are required to fulfil a large number of information duties and formalities. Student assessments of the didactic process are highly unreliable when they are not obligatory and are not standardised. Random assessments can only result in highly charged applications. This has a negative impact on the academic staff, who instead of developing in the desired direction, spend their time on meeting the requirements imposed by common law or internal regulations of higher education institutions. In order to rationalise bureaucratic procedures, there is a need for obligatory permanent monitoring, a register of unnecessary procedures and a report containing relevant, consulted and subsequently implemented recommendations. However, the de-bureaucratisation should be associated with opening opportunities for the reliable accounting of higher education institutions, and thus their organisational units, for what they have declared in their scientific development, teaching and transfer programmes at the national and international levels. It is necessary to end the functioning of such programmes mainly in the sphere of declarations, which are then not reliably accounted for. Act 2.0 opened the door to moving an employee without scientific achievements to pursue an academic career in the area of a didactic path. These quasi free promotions may cause many negative consequences for the quality of the didactic process. It is necessary to require that the statute of a higher education institution define the criteria of promotion for teaching achievements. Such a pattern should be clarified as a matter of urgency. Teaching evaluation should not focus on compliance with formal teaching procedures, but on its qualitative characteristics, adapting curricula to the challenges of the future, in particular the dissemination of knowledge capable of working towards integrated development, the modernisation of teaching methodology and the technical base. This process



will not be carried out spontaneously without revitalising the teaching career by appropriately rewarding the teaching mastery, taking into account achievements in this respect in the system of financing higher education institutions and promoting by the Ministry of Science and Higher Education in the educational process the holistic reflective modernisation of human capital in order to make students capable of thinking and acting in terms of integrated development.

It is just a signalling register of changes which could initiate the orientation of functioning of the sphere of science towards integrated development, which aims at encouraging a wide debate on institutional and procedural adjustments in the sector of science and academic education in cooperation with the educational sector oriented towards investing in human capital characteristics which are useful for development of the new knowledge-based economy, and for acquisition of synergistic effects from rational decision-making process in the scope of implementation of development objectives in all spheres of existence and activities of carriers of effects of such an investment.

#### BIBLIOGRAPHY

- Akerlof, G. A., Shiller, J. A. (2015). *Phishing for Phools. The Economics of Manipulation and Deception*. New Jersey, Princeton: Princeton University Press.
- Attali, J. (1998). *Dictionnaire du sécul XXI*. Paris: Fayard.
- Bal-Woźniak, T. (2020). Sfera technologii w perspektywie podmiotowej. In: M. G. Woźniak (Ed.), *Gospodarka Polski 1918–2018. Modernizacja w kierunku zintegrowanego rozwoju*, vol. 3 (pp. 207–248). Warszawa: PWN.
- Barber, B. R. (2009). *Skonsumowani. Jak rynek psuje dzieci, infantyлізуje dorosłych i połyka obywateli*. Warszawa: Wydawnictwo Literackie Muza.
- Bauman, Z. (2010). *Życie w czasie pożyczonym. Rozmowa z Citali Rovinsona Madrazo*. Kraków: Wydawnictwo Literackie.
- Carayanis, F. G., Barth, T. D., Campbell, D. F. (2012). The Quintuple Helix Innovation Model: Global Warming as a Challenge and Driver for Innovation. *Journal of Innovation and Entrepreneurship*, 2(1), 1–12. DOI: 10.1186/2192-5372-1-2.
- COM (2010). *Europe – 2020. A European strategy for smart, sustainable and inclusive growth*. European Commission Brussels, 3.3.2010.
- Cygler, J., Aluchna, M., Marciszewska, E., Witek-Hajduk, M. K., Materna, G. (2003). *Kooperencja przedsiębiorstw w dobie globalizacji. Wyzwania strategiczne, uwarunkowania prawne*. Warszawa: Oficyna a Wolters Kluwer Business.
- Debord, G. (1967). *La Société du Spectacle*. Paris: Buchet-Chastel Éditeur.
- Dembinski, P. H. (2011). *Finanse po zawale. Od euforii finansowej do gospodarczego ładu*. Warszawa: Studio EMKA.
- Etzkowitz, H., Leydesdorff, L. (2000). The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple Helix of University-Industry-Government Relations. *Research Policy*, 29(2), 109–123. DOI: 10.1016/S0048-7333(99)00055-4.

- Huntington, S. P. (1996). *The Clash of Civilization and the Remaking of World Order*. London: Simon & Schuster.
- Kołodko, G. W., Koźmiński, A. (2017). *Nowy pragmatyzm kontra nowy nacjonalizm*. Warszawa: Prószyński i S-ka.
- Kołodko, G. W. (2013). *Dokąd zmierza świat. Ekonomia polityczna przyszłości*. Warszawa: Prószyński i S-ka.
- Olson, M. (2000). Big bills left on the sidewalk. Why some nations are rich, and others poor. In: M. Olson, S. Kähkönen (Eds.), *A Not-so-dismal Science* (pp. 52–54). Oxford: Oxford University Press.
- Osborne, D., Gaebler, T. (1992). *Rządzić inaczej. Jak duch przedsiębiorczości przenika i przekształca administrację publiczną*. Poznań: Media Rodzina of Poznań.
- Piketty, T. (2015). *Kapitał XXI wieku*. Warszawa: Wydawnictwo Krytyki Politycznej.
- Piontek, F. (2020). Zarządzanie nauką i edukacją a budowa nowej cywilizacji. *Nierówności Społeczne a Wzrost Gospodarczy (Social Inequalities and Economic Growth)*, 61, 184–196. DOI: 10.15584/nsawg.2020.1.13.
- Porter, M. E. (1998). *On Competition*. Boston: Harvard Business School.
- Randers, J. (2014). *Globalna prognoza na następne czterdzieści lat*. Raport dla Klubu Rzymskiego dla upamiętnienia 40 rocznicy „Granicy wzrostu”. Warszawa: WSP im. J. Korczaka w Warszawie.
- Rodrik, D. (2008). *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*. Princeton: Princeton University Press.
- Romer, P. (1986). Increasing Returns and Long-Run Growth. *Journal of Political Economy*, 94(5), 1002–1037.
- Shell, K. (1966). Towards a Theory of Inventive Activity and Capital Accumulation. *American Economic Review*, 56(1/2), 62–68.
- Standing, G. (2011). *The Precariat: the New Dangerous Class*. London and New York: Bloomsbury Academic.
- Stiglitz, J. E. (2002). *Globalization and Its Discontents*. Washington, DC: W.W. Norton Company.
- Stiglitz, J. E. (2006). *Making Globalization Work*. New York-London: W.W. Norton Company.
- Ustawa o zmianie ustawy Prawo o szkolnictwie wyższym, ustawy o stopniach naukowych i tytule naukowym oraz o stopniach i tytule w zakresie sztuki oraz o zmianie niektórych innych ustaw*. Dz.U. 2011, nr 84, poz. 455 z późniejszymi zmianami.
- Ustawa z dnia 20 lipca 2018 r. Prawo o szkolnictwie wyższym i nauce*, Dz.U. 2018, z dnia 30 sierpnia 2018 r., poz. 1668.
- Wielecki, K. (2003). *Podmiotowość w dobie kryzysu postmodernizmu. Między indywidualizmem a kolektywizmem*. Warszawa: Centrum Europejskie Uniwersytetu Warszawskiego.
- Williamson, J. (1990). What Washington Means by Policy Reform. In: J. Williamson (Ed.), *Latin American Adjustment: How Much Has Happened?* Washington: Institute for International Economics.
- Woźniak, M. G. (1993). *Kierowanie. Rynek. Transformacja. Bariery stabilizacji*. Kraków: Instytut Badań Rynkowych.

- Woźniak, M. G. (2012a). *Gospodarka Polski 1990–2011. Transformacja*, vol. 1. Warszawa: Wydawnictwo Naukowe PWN.
- Woźniak, M. G. (2012b). Holistyczna modernizacja refleksyjna kapitału ludzkiego odpowiednią na wyzwania i zagrożenia rozwojowe współczesnej fali globalizacji liberalizacji. In: M.G. Woźniak (Ed.), *Gospodarka Polski 1990–2011. Droga do spójności społeczno-ekonomicznej*, vol. 3 (pp. 191–230). Warszawa: Wydawnictwo Naukowe PWN.
- Woźniak, M. G. (2019a). *Gospodarka Polski 1918–2018. W kierunku zintegrowanego rozwoju*, vol. 1. Warszawa: Wydawnictwo Naukowe PWN.
- Woźniak, M. G. (2019b). Integrated development and modernisation of human capital are needed. *Nierówności Społeczne a Wzrost Gospodarczy (Social Inequalities and Economic Growth)*, 60, 7–30. DOI 10.15584/nsawg.2019.4.1.
- Woźniak, M. G. (2020). Duchowe wyznaczniki modernizacji w kontekście aksjologii zintegrowanego rozwoju. In: M. G. Woźniak (Ed.), *Gospodarka Polski 1918–2018. Modernizacja w kierunku zintegrowanego rozwoju*, vol. 3. Warszawa: Wydawnictwo Naukowe PWN.
- Zalewski, A. (2005). Reformy sektora publicznego w duchu nowego zarządzania publicznego. In: A. Zalewski (Ed.), *Nowe zarządzanie publiczne w polskim samorządzie terytorialnym* (pp. 17–66). Warszawa: Wydawnictwo Szkoły Głównej Handlowej.

### Summary

The author of the paper demonstrates that in order to overcome contemporary developmental threats, it is necessary to shift towards a new model of the knowledge-based economy. The features of this model are compared with both the American model of the innovation-driven economy and the European model of the knowledge-based economy. Against this specific background, the drawbacks are presented of reforms carried out in the knowledge sector in Poland since 1990. The focus is placed on an analysis of the reforms in science and higher education implemented in Poland since late 2018. Despite the fact that it was based on recommendations of the new public management system, the author considers not only the strengths but also the weaknesses of the approach, and the fact that the latter may prove to be an obstacle in the modernisation of human capital, which is to effectively harmonise development goals in all spheres of human existence and activity. The author calls for the following solutions to limit the drawbacks referred to above: inviting an observer to the University Council in an advisory capacity, launching a path of individual-oriented interdisciplinary research grants, introducing a reliable process for the university and its organisational units to account for the actual implementation of previously declared programmes of scientific development, student teaching and transference of own achievements, mandating and standardisation of student appraisals in teaching programmes, development of a criterion matrix as a reference for promotions related to teaching achievements, enhancing the status of awards for teaching excellence, with obligatory and permanent monitoring of management procedures at universities in order to reduce bureaucracy.

**Keywords:** economy of Poland, economic policy, human capital, integrated development, public management, knowledge management.

## **Nowa orientacja instytucjonalna rozwoju nauki, wiedzy i kapitału ludzkiego w Polsce a zintegrowany rozwój**

### *Streszczenie*

Autor artykułu dowodzi, że dla przezwyciężania współczesnych zagrożeń rozwojowych konieczne jest przejście do nowego modelu gospodarki opartej na wiedzy. Konfrontuje cechy tego modelu z amerykańskim modelem gospodarki napędzanej innowacjami i europejskim modelem gospodarki opartej na wiedzy. Na tym tle ukazuje wady reform sektora wiedzy przeprowadzanych po roku 1990 w Polsce. Koncentruje analizę na wdrażanej w Polsce od końca 2018 r. reformie w sferze nauki i szkolnictwa wyższego. Pomimo, że oparto ją na zaleceniach nowego zarządzania publicznego, zauważa w niej obok zalet wady, które mogą okazać się przeszkodami w modernizacji kapitału ludzkiego zorientowanej na efektywne harmonizowanie celów rozwojowych we wszystkich sferach bytu i działania ludzkiego. Dla ograniczenia tych wad postuluje: wprowadzenie do Rady Uczelni obserwatora reprezentującego jej organ założycielski z głosem doradczym, uruchomienie ścieżki grantów adresowanych personalnie zorientowanych na interdyscyplinarne badania, rzetelne rozliczanie uczelni i jej jednostek organizacyjnych z deklarowanych programów rozwoju naukowego, dydaktyki i transferu własnych osiągnięć, standaryzację i obligatoryjność studenckich ocen programów dydaktycznych, zdefiniowanie wzorca kryteriów awansów za osiągnięcia dydaktyczne, dowartościowanie nagradzania za mistrzostwo dydaktyczne, obligatoryjny permanentny monitoring procedur zarządzania w uczelniach w celu ich odbiurokratyzowania.

*Słowa kluczowe:* gospodarka Polski, polityka gospodarcza, kapitał ludzki, rozwój zintegrowany, zarządzanie publiczne, zarządzanie wiedzą.

JEL: A30, E10, I26, I29, Q02.

*Ewa Gruszevska, dr hab.*<sup>1</sup> 

Department of Political Economics  
University of Białystok

## **Institutional bases of household income dispersion in Poland and in France. A retrospective analysis<sup>2</sup>**

### INTRODUCTION

The paper analyses income dispersion in Poland and in France, readdressing the issues approached by the author almost twenty years ago. A study conducted at the beginning of the system transition in Poland revealed the existence of a relatively low (when compared to France) income dispersion. But the income dispersion in Poland gradually grew, and by the second decade of the 21st century the Gini index was comparable to that for France, where, in contrast, it had dropped substantially by that time. Therefore, the study focused on the growing income dispersion in Poland. Additionally, a question emerged about the institutional determinants shaping the income of and the income differences between particular social groups. The objective of the study was to identify the institutional sources of the growing income dispersion. A benchmarking analysis was conducted for income dispersion in France and in Poland for the years 1975–2017 in the context of institutional transformations, especially starting from 1990.

### GROWING INCOME DISPERSION WORLDWIDE

The world is becoming increasingly diverse in many aspects. This is especially visible in the economic dimension, and is highlighted the most in income changes. Many authors addressing the issue of dispersion in the economy point to the growing income, financial and other inequalities between rich and poor countries (Keeley,

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<sup>1</sup> Correspondence address: Warszawska 63, 15-062 Białystok; e-mail: gruszew@uwb.edu.pl.  
ORCID: 0000-0002-4943-0250.

<sup>2</sup> Funds of the Faculty of Economics and Finance, University of Białystok, BST-403.

2015; Jolly, 2006; Piketty, 2014). The issues of economic inequalities have been addressed by a plethora of authors. Economists “consider social inequalities either as a functional phenomenon in respect of the social system or, on the contrary, as an undesired anomaly which should be fought by the state” (Sowa, 2019, p. 134). Most academic papers on this topic were published between 1998 and 2005 (Trannoy, 2017, p. 523). Inequality as a category may apply to various characteristics, not only economic ones. It may pertain to income, wages, consumer and investment expenses, education outlays, public spending etc. Disproportions in the distribution may be connected either with expenditures on an activity or with its results.

The OECD states that the gap between the rich and the poor continues to increase. If we compare the income of the richest 10% inhabitants of the OECD countries to the 10% poorest citizens in 2018, we obtain a ratio of 9.6. In the 1980s it was 7, in the 1990s it was 8 and, at the turn of the 21st century, it was already 9 (Global, 2018, p. 71). The growing inequalities are confirmed by the increasing Gini index for income in the majority of country groups. It is also noteworthy that country groups are becoming closer to one another in terms of income dispersion (Figure 1).

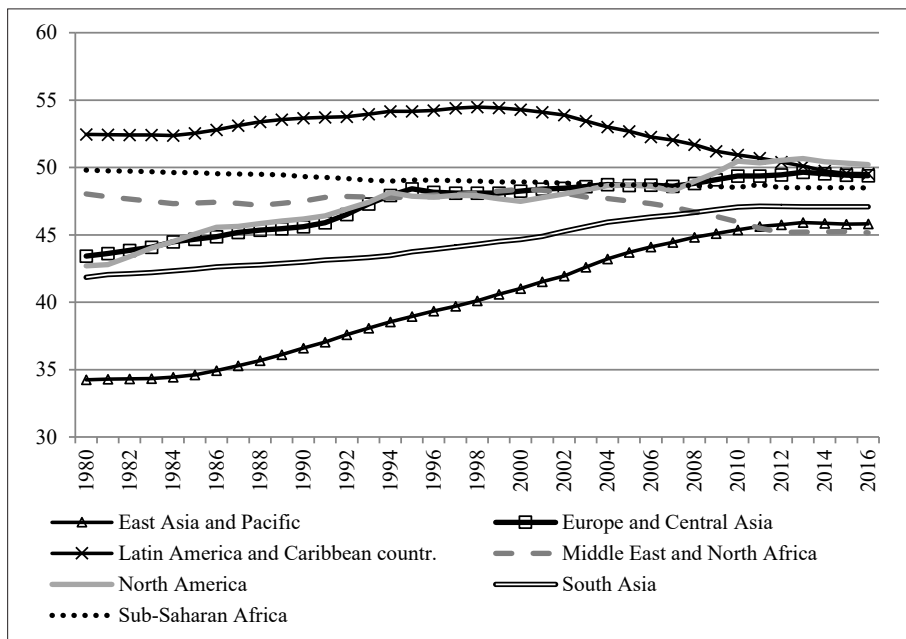
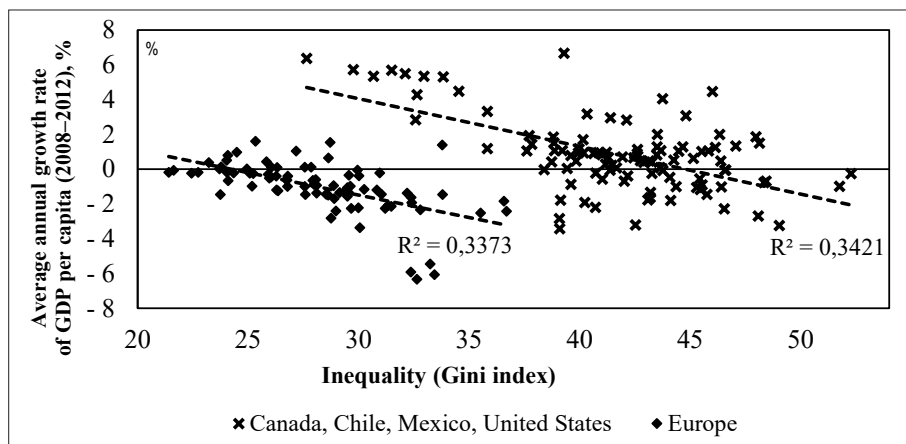


Figure 1. Gini index by country group in the 1980–2016 period

Source: (Time to Face the Challenge, 2018, p. 72).

Analyses of income dispersion among European countries show that today Europeans experience higher inequalities than they did 40 years ago. Between 1980 and 2017, the income of 1% of inhabitants in Europe receiving the highest

wage grew more than two times faster than in the group with below average income. In 1980, 20% of Europeans lived below the poverty line, while in 2017 the share had increased to 22% (Blanchet et al., 2019, p. 4).



**Figure 2. Gini index versus GDP per capita – two models (2008–2012)**

Source: (Royuela et al., 2014, p. 14; *In It*, 2015, p. 68).

One of the economic issues under discussion is whether inequalities should be treated as a negative phenomenon that limits economic growth or whether it is harmless. “Inequality is a violation of human dignity; a denial of the possibility of everybody’s human capabilities to develop (...). It is a socio-cultural order which (for most of us) reduces our capacity to function as human beings, our health, our self-respect, our sense of self, as well as our resources to act and participate in the world” (Therborn, 2015, p. 1). The growth of inequalities leads to a number of economic, social or psychological consequences. However, no consistent model has been created to identify the consequences of inequalities for economic growth beyond doubt. Complex as they are, inequalities affect the results of economic activities through various channels and with various lags. Studies undertaken by economists present partial results for the impact of inequalities. A majority of researchers describe the negative consequences of inequalities in the economy by stating that higher inequalities affect the ability to invest as a result of a drop of trust in business or an increase in political instability, or lead to social unrest, limit the extent of human capital accumulation (groups with lower income shorten the time of education) and reduce the interest in the capital market (*In It*, 2015, pp. 60–61).

Studies using a database of the OECD countries by Vicente Royuela, Paolo Veneri and Raul Ramos (2014, p. 14) have shown that the consequences of income inequalities differ between various country groups as to their intensity. In European countries, the impact of inequalities on growth is stronger; growing inequalities affect the GDP per capita growth rate more than in non-European



OECD countries (Figure 2). According to OECD analysts, in a 20-year period (1985–2005), 19 of the studied countries from that organisation experienced an over 2 percentage point increase in inequalities as measured by the Gini index, and that change reduced the economic growth rate by 4.7 percentage points in the 1990–2010 period. So if the inequality ratio had remained unchanged in the studied period, the average accumulated growth in 19 OECD countries would be 33% (versus the 28% recorded in that period) (*In It*, 2015, p. 67).

Other economists (Li, Zou, 1998; Forbes, 2000; Keeley, 2015; Rubin, Segal, 2015) point to the positive sides of the existence of inequalities in the economy as well. They refer to the impact of income dispersion on entrepreneurship, on risk-taking and on the propensity to innovate or accumulate capital by groups with the highest income (though with limited benefits for the whole society). Taking actions to make income more equal may limit the effectiveness of resource use (and reduce the effectiveness of the public sphere) (Keeley, 2015, pp. 67–68). Friedrich August von Hayek stated that no economic development would be possible without inequalities. Economic progress is a process where some win, while others lose. Some benefit more, while others less. This is treated as a natural phenomenon. “The successful use of this entrepreneurial capacity (and, in discovering the best use of our abilities, we are all entrepreneurs) is the most highly rewarded activity in a free society, while whoever leaves to others the task of finding some useful means of employing his capacities must be content with a smaller reward” (Hayek, 2012, p. 239). One may bring up yet another argument of liberals: “Liberty means diversity and at the same time mobility. It limits the arbitrary restrictions imposed by some on others. Even though it does not prevent some from achieving privileged positions, it prevents those privileges from being institutionalised. People who are in a bad situation are guaranteed a chance of building a much better position in the future” (Gwiazdowski, 2016, p. 61). From this perspective, inequalities determine the possibility of change. Success and the extent of benefits should depend on the contribution, commitment and productivity of individuals rather than on administrative regulations of the country or mere luck (e.g. inheritance). Despite a lack of consensus on the reasons for the existence and increase in economic diversification or the consequences of inequalities, they remain an important issue addressed in academic papers in various fields.

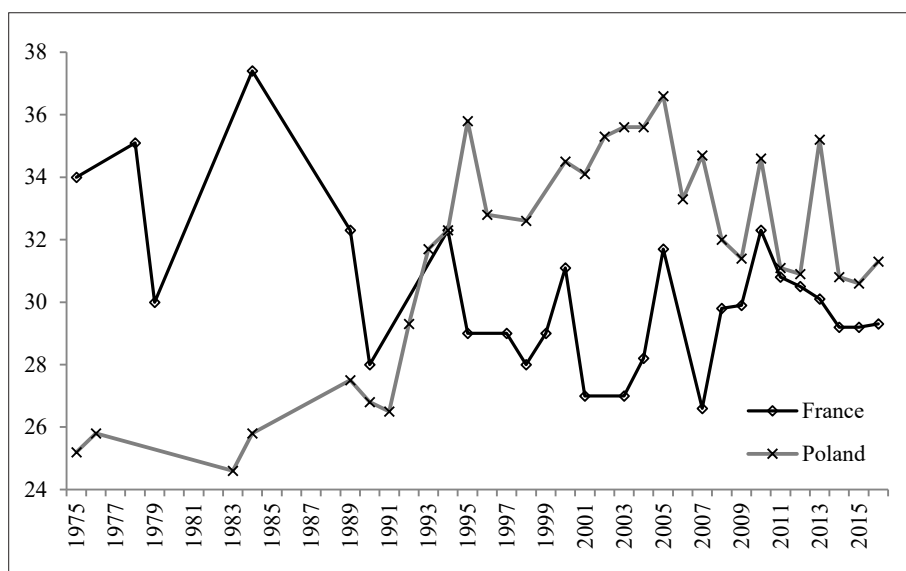
## INCOME DISPERSION IN POLAND AND FRANCE BETWEEN 1975 AND 2017

Income inequalities in socialist countries are much smaller than in Western Europe. In the 1970s and 1980s, Poland was characterised by a lower income dispersion than France. This was because the countries had different economic systems. A centrally planned economy obviously flattened the income. System transformations such as privatisation of the Polish economy and liberalisation



of business laws motivated Polish people to set up their own businesses and to endeavour to achieve higher income and to succeed. The first half of the 1990s was characterised by the dynamic expansion of newly created companies. The system transformation triggered market mechanisms, which resulted in the growing income stratification of the population. The unemployment rate growing at the initial stage of the system transformation expanded the group of people with below-average income or living in poverty.

The group of those whose start in the new institutional environment was successful and whose income increased dynamically was also expanding. The market system introduced in Poland continued to divide society into those who capitalised on the transition (business owners) and those who incurred the largest social costs: workers, farmers and other employees. The growing economic and social inequalities were already visible at the beginning of the 1990s. A comparison between Poland and France shows that in the mid-1990s the scale of income dispersion growth in Poland exceeded the dispersion in France (Figure 3).

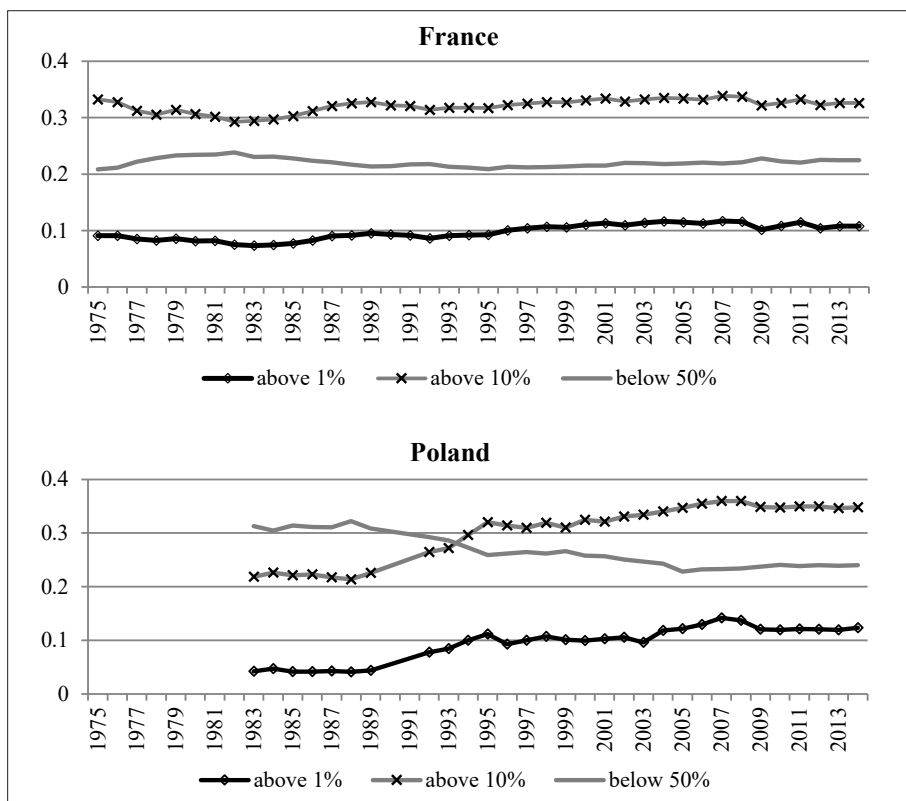


**Figure 3. Gini index for income in Poland and France between 1975 and 2017**

Source: (World Income Inequality Database, <https://www4.wider.unu.edu>).

The underlying cause of those changes include the expansion of the income earned by the richest people in Poland, and especially the group making more than 10% of the highest income. At the beginning of the 1990s, the index for Poland equalled and then exceeded the share of people making 50% and less versus the mean value. In France, the relationship between the share of those groups was relatively stable (Figure 4).

In the case of France, inequalities remained higher than the mean value for the OECD countries in the 1970s and 1980s, and after that time they gradually started to drop. In that period, Anglo-Saxon countries (USA, United Kingdom, Canada, Australia) recorded a considerable growth in income dispersion. As a result of these processes, the level of inequalities in France in the first decade of the 21st century was lower than the mean value for the OECD countries, and is currently closer to the level for countries of continental Europe, such as Germany, Estonia, Poland or Switzerland (Frémeaux, Piketty, 2013, p. 10).



**Figure 4. Income\* dispersion (groups: above 1%, above 10% and below 50%) in France and in Poland between 1975 and 2014**

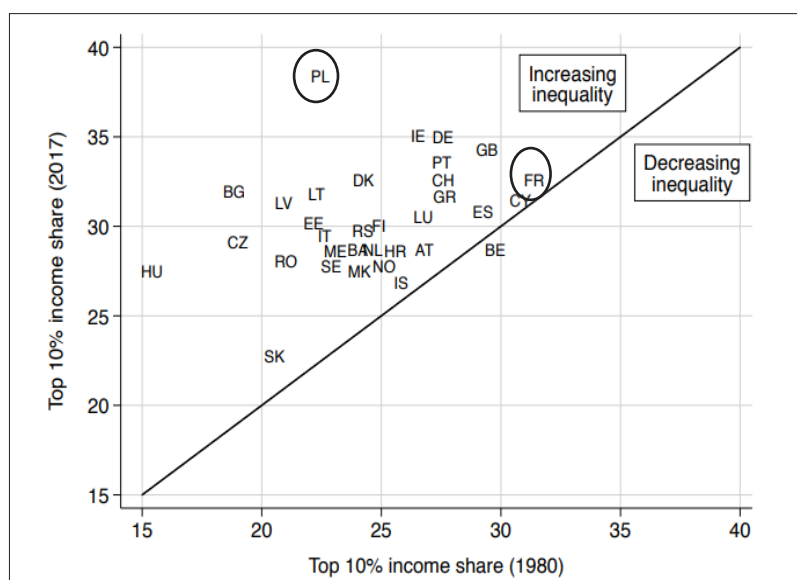
Note: \* Income before tax.

Source: (World Income Inequality Database, <https://www4.wider.unu.edu>).

Since the beginning of the 1990s, the growth rate of income dispersion in France has been relatively slower than the European average. Income before tax per adult in France recorded a real growth of 39% in the period from 1978 to 2015 (the same growth rate pertained to 50% of those with the lowest earnings). The income

of the highest paid 10% increased by 44%, of the highest paid 1% increased by 67%, while of the highest paid 0.001% increased by 158% (Alvaredo et al., 2017, p. 21). Income of the French with the highest earnings (1% of the richest French) grew 1.7 times faster than for groups with earnings below 50% of the income. Studies conducted for a longer period in France show that income inequalities dropped considerably in the first half of the 20th century. Thomas Piketty concludes that this happened because of the owners of large fortunes, who were subject to major turbulence between 1914 and 1945. They never recovered from the losses suffered in that period. This was due to the dynamically growing rates of progressive capital taxation and to pre-tax income inequalities (Piketty, 2003, p. 1036). On top of that, spending on social benefits and social welfare increased in the post-war period faster than total income (Carré et al., 1978, p. 225).

Studies by Thomas Blanchet, Lucas Chancel and Amory Gethin (2019, p. 29) suggest that Poland is one of the European Union countries where the share of the income group from the ninth decile (10% of people with the highest income) increased the most. The growth rate for this group is also noticeable in Hungary. Although all European countries except for Belgium recorded growth in the share of the richest group, a dynamic increase in the share of this group in Poland (and the highest share of that group) is clearly visible. In France, the position of that group changed slightly over that time – the country is very close to the line connecting the hypothetical points with identical share in 1980 and 2017 (Figure 5).



**Figure 5. Share of the group above 10% of the highest income in European countries (1980 and 2017)**

Source: (Blanchet et al., 2019, p. 29).

The income of the group with the highest earnings in Poland especially accelerated at the beginning of the system transition. The rate of that growth is startling if we compare those changes to the figures for France. The intensiveness of income growth for the 1%, 0.1%, 0.01% and especially the 0.001% groups substantially increased the inequalities. The group of the 10% with the highest earnings (57% in Poland and 42% in France) contributed to those inequalities the most (Table 1).

**Table 1. Growth of income and inequalities in Poland and in France between 1989 and 2016**

Income group (distribution of national income before tax per adult)	Poland		France	
	Aggregate real growth (%) 1989–2015	Share in total growth (%) 1989–2015	Aggregate real growth (%) 1983–2014	Share in total growth (%) 1983–2014
Total population	73	100	35	100
Below 50%	31	13	31	21
Central 40%	47	30	27	37
Highest 10%	190	57	49	42
Highest 1%	458	24	33	21
Highest 0.1%	1019	9	98	21
Highest 0.01%	2273	3	133	8
Highest 0.001%	5066	1	144	3

Source: (Bukowski, Novokmet, 2019, p. 39).

The sources of those inequalities should be addressed. We should search for the underlying causes that could be influenced to limit income dispersion, especially once it is no longer socially acceptable.

### INSTITUTIONAL SOURCES OF INEQUALITIES

The progressing income inequalities in Poland have become highly visible and the acceptance of gross differences in income is decreasing. The opinion of the public becomes especially important when it comes to individuals with very high incomes. Those earnings may be perceived as not matching the effort made or the qualifications held. This invokes public debate about the actions that the state can take to limit the substantial disproportions in wages or income.

The key concept that dominated the thinking about inequalities for many years was a theory by Simon Kuznets. Attempts may be made to explain away the faster growth of income dispersion in Poland with his inverted U-curve hypothesis. According to this theory, countries with a low income level (pre-industrial phase) are characterised by a relatively high level of inequalities. In time, economic growth reduces income-related and financial disproportions. This

happens up to a certain level of income. Simon Kuznets claims that in countries with high inequality levels in income, the inequalities begin to increase again. The growing professional specialisation increases the distance between professional groups of various qualifications. According to this theory, the price for crossing the thresholds from an economy of an average development level to a highly developed economy is the dispersion reduction for income from various sources. It seems that an important factor in limiting inequalities in those countries is the possibility of using public funds to support the poorest. So, there is no one-way correlation between economic growth (or income level) and the scale of income inequalities (Kuznets, 1955, pp. 1–28).

Empirical verification of Simon Kuznets's theory failed to fully confirm the assumed correlations. Currently, inequalities in highly-developed countries continue to grow, even if the dispersion growth rate is much lower than it used to be, for example in the 1980s. Therefore, income changes are not in fact model-like, and observations and studies show that the relationship between inequalities and economic growth is not as direct and simple as the theory would suggest. Despite subsequent attempts to verify it undertaken by various studies, Kuznets's theory has not been confirmed (Keeley, 2015, p. 65; Blanco, Ram, 2019, pp. 400–406; Baymul, Sen, 2019, pp. 136–167). However, there are papers relevant for Poland where the authors confirm the occurrence of similar interdependencies. For example, the calculations by Paweł Kumor partially confirm the existence of a two-way correlation between wage inequalities and economic growth. Based on data for the 1970–2006 period, he demonstrates that a wage inequality higher or lower than 28.7% slows down economic growth. In contrast, studying the reverse relationship made it possible to define the impact of economic growth on wage inequalities. It turned out that a 1% GDP growth increased wage inequalities by 0.1 percentage point in the next year (Kumor, 2009, pp. 25–26).

There is no doubt that inequalities arise and persist due to the institutional system created by society. “[T]he institutional factors strictly connected with the existence of an organisation and with the economic and political game substantially [determine] the behaviour of business entities in the market and the functioning of the economy as a whole” (Sowa, 2019, p. 138). Institutions create stimuli that influence the individuals and groups that take actions. The actions cause distribution outcomes. Distribution actions and system changes create dispersion in various aspects. The institutional system is a multi-level network of interrelations between units, and it affects the activities undertaken in the economy and society. Institutions shape the attitude to work and income. They may either dynamise or suppress any decision-making, for example as regards starting a job or pursuing an investment. In order to achieve the desired result, it is necessary to shape an appropriate set of formal (created by the state and/or by enterprises, for example) or informal institutions (self-developing).

Michał Brzeziński lists the most important reasons underlying the growth of inequalities in Europe that are mentioned in the most recent academic sources (Brzeziński, 2017b, p. 3):

- 1) globalisation (developed countries opening to trade with developing countries);
- 2) technological progress (increase in pay bonuses for highly productive employees, decrease in demand for poorly qualified workforce, labour market polarisation);
- 3) deregulation of the financial sector (pay increase for well-paid employees of the sector and higher returns on the capital invested in the sector);
- 4) erosion of labour market institutions (decreasing influence of trade unions, growing popularity of non-standard forms of employment);
- 5) weaker progressivity of tax and transfer systems.

Each of those reasons has an institutional dimension and is essentially connected with the malfunction of a specific institution.

In studies on the impact of globalisation on income inequalities, their authors suggest that globalisation brings economies closer to each other in terms of income but at the same time leads to income stratification within those countries. The growing inequalities in particular countries will not be withdrawn if the global integration rate is as high as it has been so far (Clark, 2011, p. 589). Other authors claim that the impact of globalisation (e.g. direct investment increase or migration) is independent of the factors of a long-term economic development (Alderson, Nielsen, 2002, p. 1280). There are also studies where no such relationship was demonstrated (Ravallion, 2018).

As such, the growth of income inequalities in Poland in the transition period must be connected with a rapid growth of wage inequalities. Wage inequalities in Poland grew after 1989 by about 70% (until 2007) (decile dispersion). The relative stability of income inequalities in Poland after 2007 was caused by changes in taxes and social benefits (e.g. a child tax credit in 2007). Wage inequalities also dropped (Brzeziński, 2017a, pp. 5–6).

One of the actions that can be taken by the state against growing inequalities is to introduce and adjust minimum wage. The relation of minimum wage to average wage is particularly important. According to studies, the Pearson correlation coefficient calculated for the relation of minimum wage to average wage and the Gini index value is: -0.6744 (Nagaj, 2013, p. 256). In France, the ratio is definitely higher: it was 61% in the 1980s, 67% in the 1980s (Malisz, 1992, p. 28), and is currently 50–51% (OECD Database). In Poland the minimum wage to average wage ratio was much lower: at about 33% in the 1970s, highly variable in the 1980s (from 13.9 to 37.3%) (Malisz, 1992, p. 30), and 43% currently (2018) (OECD Database). So it seems that minimum wage has more impact on inequalities in France, and the effect is also increasing in Poland.

The inequalities generated by the activity of the market mechanism are adjusted by the tax system and by transfers from the state budget. At the end of the 1990s, Poland introduced instruments to shield the poorest from the consequences of the transition. In time, the vast system of social transfers, including unemployment

benefits and good disability and retirement pensions, became too much of a burden for the budgets, and so a number of shielding solutions were withdrawn (Brzeziński et al., 2013, pp. 98–99).

**Table 2. The distribution effect of taxes and transfers versus income inequalities (Gini index) in Poland and France between 2012 and 2017**

Specification	2012	2013	2014	2015	2016	2017
	France					
Gini index for income before tax and transfers	49.2	49.0	48.4	49.0	49.6	49.1
Gini index for income after tax and transfers	30.5	30.1	29.2	29.2	29.3	29.3
Distribution effect	-18.7	-18.9	-19.2	-19.8	-20.3	-19.8
	Poland					
Gini index for income before tax and transfers	47.7	47.7	47.8	47.9	46.6	47.3
Gini index for income after tax and transfers	30.9	30.7	30.8	30.6	29.8	29.2
Distribution effect	-16.8	-17.0	-17.0	-17.3	-16.8	-18.1

Source: (Country Report France, 2019, p. 78; Country Report Poland, 2019, p. 53).

The distribution effects of taxes and transfers in Poland and France have been similar in recent years; they have a similar impact in terms of reducing the Gini index for income after tax versus its amount before tax (Table 2). The author believes that the social welfare programmes introduced in Poland in recent years and at present will help reduce wage inequalities and income inequalities, mainly by increasing the income of the poorest<sup>3</sup>. Additionally, groups with low and average income will gradually become closer, e.g. as a result of minimum wage increases. The social welfare programmes introduced by the government have no material impact on income in the groups comprising the 10 or 20% of the richest people in Poland.

Redistribution effects in France are currently much stronger than twenty years ago or even before that (Table 2). As estimated by INSEE (Institut National de la Statistique et des Études Économiques), the government's fiscal policy in the period between 1970 and 1996 helped reduce income inequalities by only 7 points of the Gini index (Frémeaux, Piketty, 2013, pp. 10–13).

<sup>3</sup> However, this may not be as effective as the government expected while introducing the “Family 500+” benefit, for example. A report in 2019 suggested that the effects of the programme were running out. For instance, it mentioned that, unlike what was expected, the scale of poverty in Poland was not dropping and that there had been a relative drop in the value of the support when compared to the expenses incurred for children (*Family 500+*, 2019).



**Table 3. Opinions of Polish people about inequalities between 1994 and 2017**

Assessed statements (POLAND)	1994	1997	2003	2010	2017
	Percentages of affirmative answers				
The differences between the rich and the poor in our country are too broad	89	89	92	91	86
The wage differences in Poland are too broad	83	82	89	87	81
To achieve prosperity in Poland in the future, those who work well must be paid well	86	87	81	83	89
It should be the obligation of the government to reduce differences between those who are paid well and those who are paid poorly	71	70	80	77	76
Energetic entrepreneurs must have high income for the Polish economy to grow	69	73	57	69	73
Income inequalities are indispensable for economic progress	43	48	32	38	47

Source: (*Stosunek Polaków...*, 2017, p. 7).

Formal institutions, as the most visible elements of the institution system, work alongside invisible (informal) institutions. The latter express the rules of thinking and acting that are deeply rooted in the awareness. At the beginning of the transition, the growing inequalities were treated by society as a cost of the transformations. The growing income dispersion was a manifestation of an opportunity for development. The acceptance of the reforms in the market direction in a way meant permission to increase inequalities. Several years later, public opinion started to change. The disappointment in the social costs of the reform and in the condition of the Polish economy kept growing. The clear emergence and increase in the group that became richer, not necessarily using legitimate methods, verified the previously positive assessment of those changes. A growing percentage of society noticed the corruption and saw the high salaries of some professions in a negative light. On the other hand, a growing group of very poor people who suffered the costs of the reforms also affected the perception of the growing income dispersion (Grosfeld, Senik, 2010, p. 18). "A passive approach and the belief that nothing can be done gradually started to be replaced by greater activity by Poles, who decided to "take matters into their own hands". The changes also resulted from the poor efficiency of the state, which was no longer able to give everything to everyone, provide jobs, fair wage, full access to public services (education, healthcare)" (Gruszevska, 2012, p. 72). The gradual reduction in inequalities in the 21st century limited the scale of the negative assessments regarding inequalities in Poland (Table 3). Despite that, Polish people are convinced that income inequalities are larger. How social inequalities

are perceived does not overlap with their actual level. Attempts can be made to identify the underlying causes for this discrepancy (Tusińska, 2017, p. 131):

- “social climate” (stimulation of sensitivity to the issues of inequalities and poverty in recent years);
- the respondents do not know some terms and compare their own income to the standard of living in Western Europe, especially in Germany;
- historical determinants – attachment to equal “division of wage”.

The issue of economic inequalities has become a subject of public discussion in the context of the social welfare programmes implemented in Poland over the past few years. Especially “Family 500+” is criticised for a lack of income thresholds and for equal treatment of all beneficiaries, which the public believes does not reduce the income differences between various social groups.

Analysis of the attitudes of the French and their opinions on the disproportions in income distribution points to the growing lack of acceptance for inequalities (Table 4). The process continued up until 2010, and then the percentage of those dissatisfied dropped slightly. The respondents claimed that people who pursued a profession matching their education should make 20% more than they do now. A half of the respondents believed that unqualified workers should be paid 25% more, while the wages of directors should be cut by 40% (Antunez, Papuchon, 2019, p. 16). The high percentage of people with a negative approach to income dispersion is the group dissatisfied with the current economic policy. They also have little trust in government institutions. Every step of the authorities that will deepen poverty or deteriorate the position of the poorest may become a source of another conflict – between society and the authorities, as with the recent “yellow vests movement” in France. An example of such a hotbed was the 2012 increase in personal income tax to 45% (*France Personal...*, [http](http://)), followed by the introduction of a tax for the richest French (making more than EUR 1 million) and companies of up to 75%. A year later, the government gave up on that idea (*Francja wprowadza*, 2013), and trust in its actions dropped. Currently in France anyone who enters the highest tax bracket pays a 45% tax, and this is one of the highest tax rates in Europe. Tax proceeds now represent 46.1% of the GDP (2018), which ranks France the highest among OECD countries (*Revenue Statistics*, 2019).

**Table 4. Opinions of French people about inequalities between 2000 and 2018**

Assessed statements	2000	2004	2010	2015	2018
	Percentages of affirmative answers				
Inequalities have increased in the past 5 years	69	73	87	81	81
Inequalities are likely to increase in the future	65	69	84	81	82

Source: (*Que pensent...*, [http](http://)).

The lack of social acceptance for wage inequalities and income inequalities in France stems from processes that have been taking place at least since the 2008 recession, or even earlier. The financial situation of households did not improve as much as was expected. The real value of income per capita continued to drop for several years (2011–2013), and in the next period (2015–2018) a growth of only 0.85% per annum was recorded. So it can be assumed that after the drop in the real income of households resulting from the recession, households may not have felt the slight mean annual growth in the purchasing power of their income. During the whole period from 2008 and 2018, income grew on average by less than 0.5% per annum<sup>4</sup>.

The low purchasing power of income, and especially the deterioration in the financial situation of the middle class and people in the provinces, as well as the feeling of unjust treatment of various social groups by the authorities, all led to growing social unrest and street protests. Increase in the fuel excise duty, reduction of tax for those with the highest income and withdrawal of co-financing for flat rental for the poorest were all steps the French refused to agree to. The “yellow vest protest” [i]s primarily the outcome of the rage rising among the French in response to the recent erosion of their social model, which departed further and further from the French Republic’s key values – liberty, equality, fraternity” (Wójcik, 2018).

## CONCLUSIONS

Even though some economists disagree, inequalities pose an economic and social problem. The social conflicts witnessed by the modern world confirm the dissatisfaction with the persisting income disproportions. Inequalities are relationships between people and groups arising within social and economic systems. They are rooted in cultural reasons and they are connected with processes extending from the past to the future. On top of that is the current government policy plus many various other determinants. Endeavours to limit inequalities require reorganising the whole system (Zachorowska-Mazurkiewicz, 2011, p. 27).

In France, income inequalities in the studied period dropped versus European countries, but the public still sees them as broad and unacceptable. In such circumstances, the introduction of a regulation that will fail to meet some social expectations may bring protesters to the streets to manifest their dissatisfaction. In Poland, on the other hand, income dispersion continued to grow systematically from the 1970s, its dynamic being the highest in the second half of the 1990s. Despite that, inequalities were not considered the most important issue to be tackled at that time. They were initially seen as an inevitable characteristic of the market. Opinion polls show that in the first decade of the 21st century, Polish people were dissatisfied with income dispersion the most; social acceptance for the existing inequalities slightly

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<sup>4</sup> Author’s own calculations based on: Eurostat Database, <http://appsso.eurostat.ec.europa.eu>.

decreased after 2010. This may be connected with the growing scale of social transfers, including actions to support the poorest and the family policy activities. Additionally, the good economy and the systematically growing income improves the mood of society as regards income dispersion in Poland.

Studies discuss selected institutional determinants of inequalities. The most important instruments for the reduction in income dispersion are: taxes (both direct and indirect), transfers to population (including retirement and disability pension), minimum wage and social minimums. The activity of the state should be addressed to the poorest groups. This will reduce the already existing inequalities. Additionally, actions must be taken to reduce the inequalities at their sources of origin in the long term. Investments in human capital (education, health, free time) and in efficiency increase (innovation) should be stimulated as this helps improve the performance of the economy and increase the income to be distributed. Such solutions are more effective. As a result of those actions, income dispersion should gradually decrease. Growth of prosperity will additionally direct the attention away from the inequalities. The acceptance of income distribution in society should increase and financial inequalities not be perceived as a problem.

## BIBLIOGRAPHY

- Alderson, A., Nielsen, F. (2002). Globalization and the Great U-Turn: Income Inequality Trends in 16 OECD Countries. *American Journal of Sociology*, 107(5), 1244–1299. DOI: 10.1086/341329.
- Alvaredo, F., Chancel, L., Piketty, T., Saez, E., Zucman, G. (2017). Global Inequality Dynamics: New Findings From WID.WORLD. Working Paper 23119. *American Economic Review: Papers & Proceedings*, 107(5), 404–409. DOI: 10.1257/aer.p20171095.
- Antunez, K., Papuchon, A. (2019). Les Français plus sensibles aux inégalités de revenus et plus attachés au maintien des prestations sociales. *Les Dossiers De La Drees*, 35. Retrieved from: <https://drees.solidarites-sante.gouv.fr/IMG/pdf/dd35.pdf> (2019.09.30).
- Baymul, C., Sen, K. (2019). Kuznets Revisited: What Do We Know about the Relationship between Structural Transformation and Inequality? *Asian Development Review*, 36(1), 136–167. DOI: 10.1162/adev\_a\_00126.
- Bergson, A. (1984). Income Inequality Under Soviet Socialism. *Journal of Economic Literature*, 22(3), 1052–1099.
- Blanchet, T., Chancel, L., Gethin, A. (2019). How Unequal Is Europe? Evidence from Distributional National Accounts, 1980–2017. *WID. World Working Paper*, 6. Retrieved from: <https://wid.world/document/bcg2019-full-paper> (2019.10.11).
- Blanco, G., Ram, R. (2019). Level of Development and Income Inequality in the United States: Kuznets Hypothesis Revisited Once Again. *Economic Modelling*, 80, 400–406. DOI: 10.1016/j.econmod.2018.11.024.
- Brzeziński, M. (2017a). Czy Polska jest krajem dużych nierówności ekonomicznych? *IBS Policy Paper*, 1, 1–12. Retrieved from: [http://ibs.org.pl/app/uploads/2017/06/IBS\\_Policy\\_Paper\\_01\\_2017\\_pl.pdf](http://ibs.org.pl/app/uploads/2017/06/IBS_Policy_Paper_01_2017_pl.pdf) (2019.09.30).

- Brzeziński, M. (2017b). *Nierówności dochodowe i majątkowe w Europie – fakty, przyczyny, konsekwencje*. Retrieved from: [http://coin.wne.uw.edu.pl/mbrzezinski/research/artykuł\\_nierownosci\\_PAN](http://coin.wne.uw.edu.pl/mbrzezinski/research/artykuł_nierownosci_PAN) (2019.09.20).
- Brzeziński, M., Jancewicz, B., Letki, N. (2013). *GINI Country Report: Growing Inequalities and their Impacts in Poland. GINI Country Reports Poland*. AIAS, Amsterdam Institute for Advanced Labour Studies. DOI: 10.2139/ssrn.2385176.
- Bukowski, P., Novokmet, F. (2019). Between Communism and Capitalism: Long-Term Inequality in Poland, 1892–2015. *WID. World Working Paper*, 8. Retrieved from: <https://wid.world/document/between-communism-and-capitalism-long-term-inequality-in-poland-1892-2015/> (2019.09.30).
- Carré, J. J., Dubois, P., Malinvaud, E. (1978). *Rozwój gospodarki francuskiej*. Warszawa: PWN.
- Clark, R. (2011). World Income Inequality in the Global Era: New Estimates, 1990–2008. *Social Problems*, 58(4), 565–592. DOI: 10.1525/sp.2011.58.4.565.
- Country Report France 2019. Including an In-Depth Review on the prevention and correction of macroeconomic imbalances. (2019). Commission Staff Working Document. Retrieved from: [https://ec.europa.eu/info/sites/info/files/file\\_import/2019-european-semester-country-report-france\\_en.pdf](https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-france_en.pdf) (2019.09.20).
- Country Report Poland 2019. Including an In-Depth Review on the prevention and correction of macroeconomic imbalances. (2019). Commission Staff Working Document. retrieved from: [https://ec.europa.eu/info/sites/info/files/file\\_import/2019-european-semester-country-report-poland\\_en.pdf](https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-poland_en.pdf) (2019.10.11).
- Eurostat Database; <http://appsso.eurostat.ec.europa.eu>.
- Forbes, K. (2000). A Reassessment of the Relationship between Inequality and Growth, *American Economic Review*, 90(4), 869–887. DOI: 10.1257/aer.90.4.869.
- France Personal Income Tax Rate. Trading Economics. Retrieved from: <https://tradingeconomics.com/france/personal-income-tax-rate> (2020.02.01).
- Francja wprowadza „podatek do milionerów”. (2013). *Rzeczpospolita*. 30.12.2013. Retrieved from: <https://www.rp.pl/artikul/1075671-Francja-wprowadza--podatek-do-milionerow-.html> (2020.02.01).
- Frémeaux, N., Piketty, T. (2013). *GINI Country Report: Growing Inequalities and their Impacts in France. GINI Country Reports France*. AIAS, Amsterdam Institute for Advanced Labour Studies. Retrieved from: [http://archive.uva-aias.net/uploaded\\_files/publications/France.pdf](http://archive.uva-aias.net/uploaded_files/publications/France.pdf) (2019.09.20).
- Global Outlook on Financing for Sustainable Development 2019. Time to Face the Challenge*. (2018). Paris: OECD Publishing. DOI: 10.1787/9789264307995-en.
- Grosfeld, I., Senik, C. (2010). The Emerging Aversion to Inequality: Evidence from Subjective Data. *Economics of Transition*, 18(1), 1–26. DOI: 10.1111/j.1468-0351.2009.00376.x.
- Gruszevska, E. (2012). Transformacja instytucji nieformalnych w Polsce. *Gospodarka Narodowa*, 3(247), 61–83.
- Gwiazdowski, R. (2016). *Równość i (nie)sprawiedliwość. Dlaczego Piketty nie lubi bogatych?* Warszawa: Fijor Publishing.
- Hayek, von, F. A. (2012 [1960]). Konstytucja wolności. In: L. Balcerowicz (Ed.), *Odkrywając wolność. Przeciw zniewoleniu umysłów* (pp. 227–270). Poznań: Zysk i S-ka, FOR.
- In It Together Why Less Inequality Benefits All*. (2015). Paris: OECD Publishing.

- Jolly, R. (2006). Inequality in Historical Perspective. *UNU-WIDER. Research Paper*, 32. UN University, WIDER. Retrieved from: <https://www.rrojasdatabank.info/rp2006-32.pdf> (2019.09.16).
- Keeley, B. (2015). Income inequality: The Gap between Rich and Poor. *OECD Insight*. Paris: OECD Publishing. DOI: 10.1787/9789264246010-en.
- Kumor, P. (2009). Współzależność nierówności płac ze wzrostem gospodarczym w Polsce. *Wiadomości Statystyczne*, 7, 10–28.
- Kuznets, S. (1955). Economic Growth and Income Inequality. *The American Economic Review*, XLV (1), 1–28.
- Li, H., Zou, H-F. (1998). Income Inequality is Not Harmful for Growth: Theory and Evidence. *Review of Development Economics*, 2(3), 318–334. DOI: 10.1111/1467-9361.00045.
- Malisz, E. (1992). *Analiza porównawcza struktury dochodów ludności Polski i Francji w latach 1975–1990*. Maszynopis. Białystok: WE FUW.
- Nagaj, R. (2013). Rola państwa w niwelowaniu nierówności dochodowych. *Studia Ekonomiczne*, 139, 248–259.
- OECD Database. Retrieved from: <https://stats.oecd.org/Index.aspx?DataSetCode=MIN2AVE> (2019.09.30).
- Piketty, T. (2003). Income Inequality in France, 1901–1998. *Journal of Political Economy*, 111(5), 1004–1042. DOI: 10.1086/376955.
- Piketty, T. (2014). *Kapitał w XXI wieku*. Warszawa: Wydawnictwo Krytyki Politycznej. *Que pensent les Français des inégalités?* Retrieved from: <https://www.inegalites.fr/Que-pensent-les-Francais-des-inegalites> (2019.09.22).
- Ravallion, M. (2018). Inequality and globalization: A review essay. *Journal of Economic Literature*, 56(2), 620–642. DOI: 10.1257/jel.20171419.
- Revenue Statistics 2019*. (2019). Paris: OECD Publishing. DOI: 10.1787/0bbc27da-en.
- „Rodzina 500+” – ocena programu i propozycje zmian. (2019). Retrieved from: <https://for.org.pl/pl/d/8aac2498710dbf7b1626846048c1ca70> (2020.02.01).
- Royuela, V., Veneri, P., Ramos, R. (2014). Income Inequality, Urban Size and Economic Growth in OECD Regions. *OECD Regional Development Working Papers*, 10, 2–34. DOI: 10.1787/5jxrcmg8818r-en.
- Rubin, A., Segal, D. (2015). The effects of economic growth on income inequality in the US. *Journal of Macroeconomics*, 45, 258–273. DOI: 10.1016/j.jmacro.2015.05.007.
- Sowa, B. (2019). *Systemy gospodarcze i ich rozwój a nierówności dochodowe w wybranych państwach postsocjalistycznych*. Warszawa: CeDeWu.
- Stosunek Polaków do nierówności społecznych*. (2017). CBOS. Komunikat z badań nr 85. Retrieved from: [https://cbos.pl/spiskom.pol/2017/k\\_085\\_17.pdf](https://cbos.pl/spiskom.pol/2017/k_085_17.pdf) (2019.09.10).
- Therborn, G. (2015). *Nierówność, która zabija. Jak globalny wzrost nierówności niszczy życie milionów i jak z tym walczyć*. Warszawa: PWN.
- Trannoy, A. (2017). Inequality and Welfare: Is Europe Special? In: L. Matyas, R. R. Blundell, E. Cantillon, B. Chizzolini, M. Ivaldi, W. Leininger, R. Marimon, F. Steen (Eds.), *Economics without Borders. Economic Research for European Policy Challenges*. Cambridge: Cambridge University Press. DOI: 10.1017/9781316636404.
- Tusińska, M. (2017). Nierówności dochodowe i ubóstwo w Polsce na tle zmian systemowych. *Optimum. Studia Ekonomiczne*, 6(90), 124–133. DOI: 10.15290/ose.2017.06.90.10.



- WIID – the World Income Inequality Database. Retrieved from: <https://www4.wider.unu.edu> (2019.09.15).
- WID – World Inequality Database. Retrieved from: <https://wid.world/data/> (2019.09.30).
- Wójcik, P. (2018). *Francja 2018: Wolność bez równości i braterstwa. Prawdziwe przyczyny i skutki buntu „żółtych kamizelek”* (18.12.2018). Retrieved from: <https://www.reo.pl/wolnosc-bez-rownosci-i-braterstwa-prawdziwe-przyczyny-i-skutki-buntu-zoltych-kamizelek/> (2020.02.01).
- Zachorowska-Mazurkiewicz, A. (2011). Istota nierówności w procesie rozwoju – podejście instytucjonalne. In: A. Zachorowska-Mazurkiewicz, E. Okoń-Horodyńska (Eds.), *Współczesne wymiary nierówności w procesie globalizacji* (pp. 11–30). Kraków: Wydawnictwo UJ.

### Summary

Household income dispersion in Poland is growing systematically. Since the late 1970s, the Gini index has increased from 0.252 (1975) to 0.313 (2016). At the same time in France, the ratio has dropped from 0.34 (late 1970s) to 0.293 (2016). A higher income dispersion is also observed among various occupations and across genders. The ratio of minimum to average wages has increased from 33.7% (1975) to 45.45% (2019).

The research period covers the period of the centrally planned economy in Poland, when income leveling was an effect of government policy, and that of the market economy, which caused significant income disparities. The research problem is the growing household income dispersion in Poland. The aim of the study was to determine the institutional sources of increasing income dispersion. The study involved a comparative analysis of income dispersion in the years 1975–2017 in the context of institutional changes taking place in these countries, especially after 1990. The author applied a hypothetico-deductive method.

Having analysed income dispersion, the author made a hypothesis regarding the influence of institutional changes on this phenomenon and presented the groups of institutional factors. The conducted research indicated inequalities in Poland grew mainly as a result of high dynamics in the income of the highest earners (top 10% and 1%). The social policy of the Polish government may have had little impact on this factor. Moreover, the distributional effects of taxes and transfers were slightly weaker in Poland than in France. An increase in the scale of acceptance of the inequality level in Poland over the past few years is noteworthy. In France, the public opposition to inequality is growing, even though income inequality is lower than in many European countries.

*Keywords:* income dispersion, income inequality, minimum wage.

## **Instytucjonalne podstawy zróżnicowania dochodów ludności Polski i Francji. Analiza retrospektywna**

### *Streszczenie*

Zróżnicowanie dochodów ludności Polski systematycznie wzrasta. Indeks GINI od końca lat 70. XX w. wzrósł z 0,252 (1975) do 0,313 (2016). W tym samym czasie we Francji indeks ten zmniejszył się z 0,34 (koniec lat 70. XX w.) do 0,293 (2016). Wzrost zróżnicowania dochodów ob-

serwowany jest też w przekrojach grup zawodów i płci. Towarzyszy temu zwiększenie relacji płacy minimalnej do przeciętnego wynagrodzenia z 33,7% (1975) do 45,45% (2019).

Okres przyjęty do badań obejmował w Polsce gospodarkę centralnie planowaną, w którym to okresie spłaszczenie dochodów było efektem polityki państwa oraz gospodarkę rynkową, która silnie zdywersyfikowała dochody ludności. Problemem badawczym było rosnące zróżnicowanie dochodów ludności Polski. Celem podjętych badań było wskazanie instytucjonalnych źródeł wzrostu zróżnicowania dochodów ludności. Dokonano analizy porównawczej zróżnicowania dochodów w Polsce oraz we Francji za lata 1975–2017 na tle zmian instytucjonalnych, szczególnie od roku 1990. Wykorzystano metodę hipotetyczno-dedukcyjną. Postawiono hipotezę o wpływie zmian instytucjonalnych na ten problem oraz wskazano grupy czynników instytucjonalnych oddziałujących na nierówności dochodowe ludności.

Przeprowadzone badania wskazały, że nierówności w Polsce rosły głównie w wyniku wysokiej dynamiki dochodów najwyżej zarabiających (10% i 1%). Działania rządu polskiego z zakresu polityki socjalnej w niewielkim stopniu mogły wpłynąć na ten czynnik. Ponadto efekty dystrybucyjne podatków i transferów w stosunku do nierówności dochodowych były w Polsce nieco słabsze niż we Francji. Zwraca uwagę wzrost skali akceptacji nierówności w Polsce w ostatnich kilkunastu latach. Natomiast we Francji rósł sprzeciw społeczeństwa wobec nierówności, mimo że ich skala jest niższa niż w wielu krajach europejskich.

*Słowa kluczowe:* zróżnicowanie dochodów, nierówności dochodowe, płaca minimalna.

JEL: E02, E25, D63.




*Katarzyna Świerczyńska, dr hab. prof. UEP<sup>1</sup>* 

Department of Economic Journalism and Public Relations  
Poznań University of Economics and Business

*Filip Kaczmarek, dr hab. prof. UEP<sup>2</sup>* 

Department of Economic Journalism and Public Relations  
Poznań University of Economics and Business

*Łukasz Kryszak, mgr<sup>3</sup>* 

Department of Macroeconomics and Agricultural Economics  
Poznań University of Economics and Business

## **Political stability as a factor affecting growth in agricultural sub-Saharan African countries**

### INTRODUCTION

Most of the world's least developed countries (LDCs) are agricultural countries. The importance of agriculture and food production results from the most fundamental human needs, meeting of which is essential for survival. The majority of the population in Africa (about 65%) is employed in agriculture, but the productivity of this sector is low. A relatively large proportion of the population lives in extreme poverty and at risk of malnutrition. A number of factors, such as the decline in food production due to defective agricultural policies, political and institutional instability, chronic droughts, epidemics, deterioration of the environment, declining infrastructure and insufficient

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<sup>1</sup> Address for correspondence: Department of Economic Journalism and Public Relations, Niepodległości 10, 61-875 Poznań, tel.: +48 61 856 95 68; e-mail: katarzyna.swierczynska@ue.poznan.pl. ORCID: 0000-0002-0439-783X.

<sup>2</sup> Address for correspondence: Department of Economic Journalism and Public Relations, Niepodległości 10, 61-875 Poznań, tel.: +48 61 856 95 08; e-mail: filip.kaczmarek@ue.poznan.pl. ORCID: 0000-0001-8287-7487.

<sup>3</sup> Address for correspondence: Department of Macroeconomics and Agricultural Economics, Niepodległości 10, 61-875 Poznań; e-mail: lukasz.kryszak@ue.poznan.pl. ORCID: 0000-0001-8660-9236.

investment in agricultural research in sub-Saharan African (SSA) countries negatively affect agricultural performance (Paarlberg, 2005; Karembu et al., 2009). This issue is particularly noteworthy since long-term demographic projections clearly show that the future of SSA countries and their capacity to meet the needs of a young and rapidly growing population have a potential for both regional and global impact.

The study work presented in this paper is conceptually grounded in institutional economics. Therefore, the assumption of a lack of influence of institutions on the economy is rejected. Due to the typical quantitative character of this study, the panel model estimation methods, the nonparametric Spearman's rank order correlation test and quantile regression were all used for the empirical analysis. Three hypotheses were tested in this paper: first, that political stability has a statistically significant impact on GDP per capita in SSA countries; second, that political stability is significantly and positively correlated with selected factors, which are presumed to be beneficial for agricultural activity in SSA countries; and third, that the impact of political stability on GDP per capita decreases after a particular level of income is reached.

The paper is divided into four parts. The first part provides a literature review, focusing in particular on the potential impact of the political situation on agricultural activity. The second part is a justification of the method selection, and a specification of the sample and statistical data used. The third part of the paper is devoted to an evaluation of the research results. The fourth part draws conclusions and implications from the results. The most notable results of the study include the demonstration of the significant influence of political stabilization on economic growth in SSA countries and the effect of increasing safety in a country on agricultural activity, e.g. by reducing the share of food imports and increasing agricultural production

## LITERATURE REVIEW

This paper focuses primarily on the issues of the rule of law and political stability. It was Smith (2007) who believed that good governance and political stability was a prerequisite for long-term development. However, the debate on how political stability should be achieved is ongoing in the subject literature (Waguespack et al., 2005). According to the Regime Type Theory, political stability is directly linked to democracy. In autocratic systems decisions are often taken in an impulsive manner and in line with the interests of the autocrats, which may differ from those of the general public. In turn, in the light of the Veto Players Theory, it is irrelevant whether democracy or autocracy is concerned, as achieving political stability depends on the existence of a sufficient number of independent institutions.

Researchers have no doubt that the institution of the state is still the basic unit of social and political life (Łoś-Nowak, 2009, p. 17), although, as Hobsbawm (1999) noted, people in SSA countries, thanks to fertile land and low population density,

were able to function without the existence of state structures. The latter condition has lost its relevance largely due to the current birth rate in SSA countries. Moreover, there is a feedback effect between population growth and socio-political instability in agricultural countries (Turchin, 2005). One theory explaining the collapse in agricultural countries is the demographic-structural theory (Goldstone, 1991). Amartya Sen (2000) reached even more far-reaching conclusions and claimed that famine in developing countries is not due to food shortages, but to the incompetence of those in power. Therefore, the policies pursued by the state and their effectiveness have an impact on particular areas of the economy, including agriculture. In low-income countries, this impact is “critical”, given the low level of economic development and the significant number of people living below the poverty line.

Historical research shows that the institution of the state could have contributed to increasing productivity in agriculture because it offered protection and a sense of security. The absence of an efficient state resulted in limiting the cultivated area to areas that could be protected by the inhabitants themselves (Earle, 1997; Wickham, 1989). However, the existence of a state is not a sufficient condition for increasing productivity. In order for this to happen, the state must serve its purpose properly. This is only possible when it has the capacity to generate national income (Ottaway, 2006), the division of which is sufficient to ensure the existence of a society – in the case of SSA countries, this is not obvious. This leads to a further feedback effect, where the instability impedes the income generation the state needs to fulfil its functions. Better quality of governance allows for enlargement of the area where, in a broad sense, security is “provided” by the institution of the state. In this sense, the quality of governance can be linked to political stability, freedom from acts of violence that destabilise the situation and the economic and agricultural activities.

However, the term “political stability” is not unambiguous (Trzciński, 2015). One can focus on various aspects of stability: lack of violence and presence of public order (McCulloch, 2013); lack of political violence or low risk of such violence (Lijphart, 1977); maintaining the social behaviour of individuals within the limits dictated by their political roles (Ake, 1975); political predictability attracting investment to a given country (Shepherd, 2010); or the stability of executive power (Alesina et al., 1996). In the vast majority of cases, political stability facilitates growth, including an increase in agricultural production. However, it cannot ensure economic efficiency all the time, as many reforms accelerating economic efficiency were carried out at a time of political crises (Binswanger, Deininger, 1997). In some cases, stability and good governance can even reduce efficiency. In countries with a weak, inefficient bureaucracy, it is corruption that may increase efficiency (Huntington, 2006).

The disruption of the state is gradable. Wars and armed conflicts are the most acute form of instability. Apart from the staggering numbers of deaths they cause, they have many significant direct consequences in terms of material and intangible assets (Rydzak, 2011). Wars and armed conflicts result in the destruction or loss

of homes, land, labour, tools, cattle, livestock and other productive assets (Brück, 2001; Bundervoet, Verwimp, 2005; Gonzalez, Lopez, 2007; Verpoorten, 2009). The weakening of the agricultural production potential is also accompanied by deteriorating health care and worse functioning of markets and institutions (Justino, 2012). As the risk of conflict increases, direct foreign investment decreases (Suliman, Mollick, 2009). War and armed conflicts result in a decrease in the quality of life and the occurrence of problems such as malnutrition. The mutual relationships between wars and armed conflicts on the one hand and food security on the other are also subject to investigation (Martin-Shields, Stojetz, 2019). In fact, the phenomena occurring in agriculture may influence conflicts, e.g. the intensity of conflicts in Iraq and Pakistan is lower during the harvest when the demand for workers is higher (Guardado, Pennings, 2016). The protracted nature of crises is a serious problem. Some countries are unable to recover from crises (protracted crisis), which are so prolonged that the state of affairs, which was expected to be temporary, becomes permanent (Collier, 2008).

In addition, economic globalisation precedes political globalisation (Stiglitz, 2007). This leads to problems caused by the fact that the level of development of political institutions is inadequate in relation to market institutions. Some researchers believe that it is the consistently applied principles of the free market that lead to hunger and poverty (Korten, 2002; Ziegler, 2013; Bello, 2011). Others are less radical, but remain critical of some aspects of the free market and globalisation (Chang, 2016; Rodrik, 2011). On the other hand, the dysfunctionality of the state extends to different contexts, including the economic one (Kłosowicz, 2017). The impact of the quality of governance on development and poverty has been studied at the level of individual countries, e.g. Botswana (Sebudubudu, 2010). Research into the influence of the quality of government on agricultural productivity has also been conducted. The primary factor limiting agricultural productivity is not a weakness in the area of natural resources or a lack of the technological potential to increase production using available resources, but rather the weakness of the institutions and policies (Hayami, Ruttan, 1971).

The conclusions of the productivity analysis are sometimes surprising. Variables such as the rule of law, corruption control and government effectiveness, examined separately, have a positive effect on agricultural productivity. When all the variables are included in the model: the rule of law significantly increases the efficiency of agriculture, but political stability and accountability lead to decreases in efficiency (Lio, Liu, 2008). There are several mechanisms having an influence on the quality of governance over agricultural productivity. The state creates and maintains the institutions responsible for the functioning of the market. The degree of property protection or the efficiency of the judiciary in terms of protecting contracts encourages or discourages investment and production (Lio, Liu, 2008). Osman *et al.* (2012), Przeworski *et al.* (2000) state that sudden or haphazard policy changes have a strong negative impact on economic decisions and thus harm

growth and productivity. Poor management affects productivity through, among other things, taxes on production (Méon, Weill, 2005) and corruption, which can be dangerous as it leads to the imposition of unpredictable taxes (Campos et al., 1999). Many countries with inadequate regulations and policies have imposed high indirect taxes on agriculture (Schiff et al., 1992). In developing countries, on the other hand, the existence of good quality regulatory systems has a positive impact on agricultural productivity, but this is not the case in developed countries (Bayyurt, Yilmaz, 2012).

Analyses concerning African countries are also conducted in the mainstream of institutional economics. For example, Omoteso and Ishola Mobolaji (2014) and Fosu (2013) claim that institutions influence productivity in African countries. Based on a study of 27 sub-Saharan countries, Osman *et al.* (2011) suggest that political stability has a positive and significant impact on economic performance. Due to the differences in the mechanisms of institutions – state and market – there is an evident need to examine the relationship between institutions and economic development opportunities for particular groups of countries in greater depth. This is particularly true of sub-Saharan countries, as they remain the poorest area of the world, especially agricultural countries where the quality of life is relatively poor.

## DATA AND METHODS

Panel data for 39 SSA countries<sup>4</sup> in the period 1995–2017 were used in the research. Conclusions are drawn both for the whole group of SSA countries and for countries classified as African agricultural countries. What is important is that the division was made according to the median – i.e. the classification into agricultural and non-agricultural countries was based on the criterion of the median percentage of employment in agriculture (Cf. Table 1)<sup>5</sup>. Thus, the panel was divided into countries above the median (agricultural countries) and below the median (non-agricultural countries)<sup>6</sup> (cf. Table 1). The dependent variable adopted in the study was the level of

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<sup>4</sup> The following countries were analysed: Burkina Faso, Burundi, Central African Republic (CAR), Chad, Ivory Coast (Côte d'Ivoire), Ethiopia, Eswatini, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Sierra Leone, Sudan, Benin, Cameroon, Gambia, Ghana, Kenya, Madagascar, Malawi, Mozambique, Rwanda, Senegal, Togo, Tanzania, Uganda, Zambia, Botswana, Gabon, Lesotho, Namibia, the Republic of South Africa (RSA), Zimbabwe, Angola, Congo, Democratic Republic of the Congo, Liberia and Mauritania.

<sup>5</sup> For countries with a median varying between more than 61.3% and less than 61.3% in parts of the reference period, the median for the entire reference period was used. In particular, it was the case of Burkina Faso, Mauritania, Sierra Leone, Zambia and Zimbabwe.

<sup>6</sup> Compared to, for example, European countries, almost all African countries can be classified as agricultural countries, cf. Table 1.

GDP per capita PPP (in constant prices from 2011)<sup>7</sup>, while the independent variable was political stability (cf. Przeworski et al., 2000; Fosu et al., 2006; Osman et al., 2011). This reflects the level of security and stability in a given country, and its value can be estimated on the basis of the annual empirical research data of the World Bank located in the World Governance Indicators database, which allows one to measure the level of the rule of law, corruption control, efficiency of authorities, quality of regulations, participation and accountability and political stability.

**Table 1. Descriptive statistics of the variables for 39 sub-Saharan African countries in the period 1995–2017**

Variable	Mean	Median	SD	Min	Max
GDPpc_PPP11	3130	1790	3520	373	20 900
PoStab	-0.652	-0.477	0.862	-2.99	1.18
Hc	1.69	1.61	0.403	1.05	2.89
GDPpc_gr	1.79	1.91	4.70	-36.8	37.0
AGR_VA_GDP	26.0	25.1	15.2	1.83	79.0
Agr_va_gr	3.46	3.52	8.67	-45.4	91.6
Emp_agr_sh	56.9	61.3	20.2	4.60	92.6
Arable_l	13.7	10.2	12.7	0.321	48.7
Arab_HpP	0.259	0.222	0.171	0.0902	1.48
Fertil	14.4	8.53	16.7	0.0004	89.6
Electr_acc	26.5	20.4	20.6	0.0100	91.4
Electr_acc_R	12.9	7.99	15.0	0.0100	89.9
Food_ex_sh	34.7	28.6	27.6	0.0157	99.1
Food_im_sh	17.8	16.2	8.37	0.474	62.4
Food_prodiN	105.	100.	27.3	44.3	207.

Variable names: GDPpc\_PPP11 – GDP per capita PPP (const 2011); PoStab – political stability; hc – human capital; GDPpc\_gr – growth of GDP per capita; AGR\_VA\_GDP – share of agricultural value added in GDP; Agr\_va\_gr – share of agricultural value added in growth; Emp\_agr\_sh – share of agricultural employment in percent; Arable\_l – share of cultivated land in percent; Arab\_HpP – cultivated land in hectares per person; Fertil – fertilisers in kilograms per hectare of farmland; Electr\_acc – access to electricity, in percent; Electr\_acc\_R – access to electricity in rural areas, in percent; Food\_ex\_sh – share of food export in export volume; Food\_im\_sh – share of food import in import volume; Food\_prodiN – food production index (according to WDI, data 2004–2006 = 100).

Source: own study based on WDI (2019) and Penn World Tables (2019).

The variable “political stability and absence of violence/terrorism” has typical values ranging between approximately -2.5 and 2.5 (it may take lower or higher values). It determines the likelihood of destabilisation of the political situation in

<sup>7</sup> In the study, relationships between the levels of variables and not their variations were analysed, cf. Voigt (2011).

a given country or of politically motivated violence, including acts of terrorism. It is a resultant of partial measures which characterise the level of security<sup>8</sup>. Moreover, a number of variables aimed at approximating human capital<sup>9</sup>, the nature of agricultural activity or infrastructural development have been adopted in the research (cf. Table 1).

In order to verify the hypotheses adopted in the introduction, a panel model with fixed effects, quantile regression and non-parametric tests were used.

There are two basic models for the analysis of panel data: fixed effects and random effects models. The difference between the two models is primarily in the treatment of the individual effect  $\alpha_i$ , which includes unobservable and constant over time factors affecting the level of the explained variable. In the model with fixed effects, this parameter is assumed to be systematic and can be estimated as a free term for each unit (e.g. country). In turn, in the model with random effects, it is treated as a random variable which has a normal distribution and is not directly subject to estimation. As Woodbridge (2002, pp. 251–252) points out, the difference between the two types of models lies primarily in the fact that in the former case the correlation between the individual effect and the vector of explanatory variables is allowed, while in the latter case it is assumed that there is no such correlation. It is hard to assume that this correlation does not exist in secondary data, so the use of fixed effect models seems to be justified. Furthermore, fixed effect models deal, by construction, with the one of the important sources of endogeneity, i.e. the omitted variable problem, as they cover the impact of all other variables that are not included in the model.

To check the robustness of the results, control variables were included in the model. An advantage of this approach is that factors affecting the dependent variable are taken into account in the models, which reduces the risk of finding a spurious statistical relationship between the explained variable and the explanatory variables. Based on the results of previous studies (and the availability of statistical data for the analysed group of countries), the following control variables were considered:

- development of the infrastructure approximated by the share of the population of the country with access to electricity and, alternatively, by access to electricity in rural areas (cf. O’Gorman, 2015; Kodongo, Ojah, 2016; Świerczyńska, 2019) (Electr\_acc and Electr\_acc\_R variables);
- level of human capital per employee determined on the basis of the number of years of education and the expected rate of return on different levels of education (cf. Romer, 1993), based on Penn World Table data (hc variable);

<sup>8</sup> The *World Governance Indicators* database (World Bank, 2019) provides data on the methodology for estimating the value of a variable, including those relating to partial measures. Political stability is the resultant of 21 variables obtained from 9 different sources (e.g. government stability, ethnic tensions, political demonstrations). The variable is estimated based on results from the survey.

<sup>9</sup> Human capital index is taken from the Penn World Table database. It is based on years of schooling and returns to education (cf. PWT, 2020).



- development of financial markets expressed as a share of private loans by banks in GDP (Beck et al., 2001; Adeniyi et al., 2015), based on data from the World Bank (CrePriGDP variable).

The general form of the panel model with fixed effects is as follows:

$$y_{it} = \beta_0 + X_{it}\beta' + \alpha_i + \varepsilon_{it} \quad (1)$$

where  $X$  is the vector of independent variables,  $\alpha_i$  is the individual effect, and  $\varepsilon_i$  is a pure random error. The final model takes the following form:

$$PKBpc_{it} = \beta_0 + \beta_1 PKBpc_{i,t-1} + \beta_2 PoStab_{it} + \rho X_{it} + \alpha_i + \varepsilon_{it} \quad (2)$$

where  $PKBpc_{it}$  is the level of GDP per capita in a given period in a given country;  $PoStab$  is political stability and  $X_{it}$  is a vector of control variables. As heteroscedasticity and autocorrelation may be issues in the calculations, all models were estimated using Beck-Katz standard errors.

In the second stage of the study, the correlation of the political stability and the variables concerning agricultural production in agricultural and non-agricultural SSA countries was compared using non-parametric tests. The idea was to select a group of factors which would match 2 criteria: presumed beneficial effect for agriculture and access to data<sup>10</sup>; and then to divide the sample into two subgroups: agricultural and non-agricultural countries based on the median value for the whole sample. Despite the efforts, the number of observations in the subgroups was so small that we excluded the possibility of using an econometric model and decided to apply non-parametric tests. Due to the missing data and data credibility issues, the conclusions drawn from the quantitative studies were formulated with caution.

The impact of political stability on the level of GDP per capita may also vary at different levels of economic wealth within a country. In the third stage, quantile regression analysis of individual deciles of the distribution of GDP per capita was conducted, both for agricultural and non-agricultural countries. Due to the fact that the data have a panel structure, an innovative model of quantile panel regression with fixed effects was used (Machado, Silva, 2019). Therefore, the model of quantile regression was estimated using the method of moments.

## RESULTS

In order to gain a better understanding of the economic mechanisms in SSA, studies were carried out in which the explained variable is GDP per capita. The results of the estimation for the political stability impact variable (Model 1) and

<sup>10</sup> Data for SSA countries is very limited, where the missing data decreases the number of observations for quantitative studies

models including control variables (Models 2–6) are presented in Table 2. Models 2 and 3 include the infrastructure variable, in the first case with respect to the country average and in the second case for the rural areas. Due to the loss of observation in Model 3 (numerous data gaps for the variable), only the total access to electricity variable was considered in the following steps. The specification of model 4 included a variable approximating the level of human capital, while a variable concerning the level of development of financial markets was included in model 5. Adding further control variables would result in the loss of too much information and hence reduced reliability of the result. Therefore, only 4 control variables were included. In the last presented specification, an additional variable was added, which characterises the share of a country's arable land<sup>11</sup>. Regardless of the stage of the study, this variable has a statistically significant negative impact on GDP per capita.

On the basis of the empirical analysis it was found that a higher level of political stability was a significant determinant of GDP per capita in the SSA countries in the period in question. The inclusion of control variables also allowed the confirmation of the positive impact of infrastructure, financial development and human capital on the explained variable. This allows us to confirm the conclusions of earlier studies (Świerczyńska, Kryszak, 2019). At the same time, it turns out that the focus of the economy on agriculture is a factor which negatively affects the explained variable. The limitations of the empirical stage include the lack of data which reduced the number of observations when subsequent control variables were added.

The next stage of the research involved an analysis and comparison of the relationships between selected variables with the level of political stability in agricultural and non-agricultural SSA countries in the 1995–2017 period. The use of non-parametric Spearman's rank correlation tests allowed us to state the following patterns. Firstly, in both groups, both the percentage share of people employed in agriculture and the share of added value of agriculture in GDP correlate negatively with political stability, although the strength of these relationships is greater in non-agricultural countries. This may mean that in more industrialised countries, the stabilization of the political situation is an important factor in the movement of labour force from agriculture to other sectors of the economy. In both groups of countries, it was found that both electrification across the whole population and in rural areas positively correlates with the variable of political stability, which is a conclusion consistent with the estimation of the previously discussed panel models (cf. Table 3).

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<sup>11</sup> According to WDI data, arable land includes land defined by the FAO as land under temporary crops (double-cropped areas are counted once), temporary meadows for mowing or for pasture, land under market or kitchen gardens, and land temporarily fallow. Land abandoned as a result of shifting cultivation is excluded.

Table 2. Fixed effects panel model estimation of GDP per capita (const. PPP 2011) using observations for 1995–2017 (with PCSE<sup>b</sup>)

Variables <sup>a</sup>	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Const	3322.47*** [79.454]	1987.16*** [70.768]	3060.61*** [72.060]	1215.45*** [358.361]	1161.47** [463.965]	1324.55*** [444.160]
PoStab	179.910*** [40.333]	178.092*** [28.274]	265.708*** [50.047]	191.742*** [28.735]	199.556*** [26.951]	245.764*** [29.148]
Electr_acc		46.334*** [2.624]		41.269*** [2.152]	37.339*** [3.178]	37.830*** [2.943]
Electr_acc_R			37.196*** [4.782]			
hc				584.533** [215.813]	555.277* [291.339]	738.955** [305.580]
CrePriGDP					17.436** [7.399]	19.374** [7.343]
Arable_I						-33.813*** [6.250]
Joint test on named regressors	19.897***	157.508***	30.9675***	145.674***	112.762***	116.033***
Robust test for differing group intercepts	202.491***	146.351***	102.79***	147***	154.306***	196.711***
Within R <sup>2</sup>	0.014	0.318	0.190	0.329	0.324	0.336
LSDV R <sup>2</sup>	0.968	0.979	0.975	0.979	0.980	0.981
Hausman test ( <i>p</i> -value)	0.042	0.001	0.001	0.001	0.001	0.001
N	741	702	611	648	551	535

<sup>a</sup>No collinearity problem was detected<sup>b</sup>PCSE – Panel Corrected Standard Errors.Notes: \*, \*\*, \*\*\* indicate statistical significance: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

Source: own study based on WDI and data (2019) and Penn World Tables (2019).

**Table 3. Results of estimation of the Spearman's rank correlation of the political stability variable with selected variables concerning agricultural production in agricultural and non-agricultural SSA countries in the years 1995–2017**

Variables*	Agricultural countries		Non-agricultural countries	
	rho	p-value	rho	p-value
Emp_agr_sh	-0.1765	0.0004	-0.4428	0.0000
AGR_VA_GDP	-0.3104	–	-0.4138	0.0000
Food_im_sh	-0.1496	0.0094	nc	nc
Food_ex_sh	-0.1435	0.0126	nc	nc
Fertil	0.3999	0.0000	nc	nc
Electr_acc	0.1654	0.0012	0.2100	0.0001
Electr_acc_R	0.1660	0.0033	0.1064	0.0656
Arab_HpP	nc	nc	0.3369	0.0000
Arable_l	nc	nc	-0.164	0.0039

*Notes:* explanations as in Table 1; nc – no statistically significant correlation.

Source: own study based on WDI data (2019).

Significant differences were found with regard to the variables related to the contribution to and the result of agricultural production. Firstly, in agricultural countries, the improvement in political stability is linked to an increase in fertiliser use, which may imply an improvement in productivity. Secondly, in agricultural countries, a higher level of political stability is associated with a decrease in the share of imports of agricultural products based on raw materials in total imports (greater self-sufficiency, agricultural production satisfies the needs of the domestic market), and, thirdly, it also correlates with a decrease in the share of exports of agricultural products based on raw materials (which means an increase in the share of exports of other categories of goods, potentially more technologically advanced, e.g. processed agricultural products) (cf. Table 3). On the basis of the obtained research results, it should be stated that stabilisation of the political situation may contribute to undertaking activities that are more productive from the point of view of the agricultural SSA countries.

In the last part of investigation, the quantile panel regression was used to determine whether the impact of political stability on GDP differs for different quantiles of GDP distribution (cf. Table 4).

The results of quantile regression indicate that political stability had a stronger impact on the level of GDP per capita in non-agricultural countries, but the same trend was observed in both groups of countries, i.e. in those with increases in income, measured as GDP per capita, the impact of political stability became weaker. At relatively high levels of GDP, the role of political stability ceased to be statistically significant. This means that once a certain level of national income is reached, its further growth is more dependent on other factors. Given that

agricultural countries are the poorest of the SSA countries, it can be assumed that, for them in particular, action to maintain political stability is crucial to promote economic growth.

**Table 4. Results of quantile regression concerning the influence of political stability on GDP per capita level in agricultural and non-agricultural countries of sub-Saharan Africa in the years 1995–2017**

Function / decile	Agricultural (N=399)		Non-agricultural (N=342)	
	Parameter	constant	Parameter	constant
Location	76.454 (74.696)	1539.60*** (59.93)	346.36 (294.75)	5385.12*** (140.76)
Scale	-55.2** (26.481)	152.40*** (21.25)	-83.66 (95.08)	530.17 (45.41)
$\tau = 0.1$	167.51** (80.77)		480.39** (215.28)	
$\tau = 0.2$	139.66** (63.03)		450.86** (183.13)	
$\tau = 0.3$	119.29** (52.71)		411.16 (145.09)	
$\tau = 0.4$	98.02** (46.14)		374.67*** (119.03)	
$\tau = 0.5$	77.09* (45.67)		348.94*** (109.42)	
$\tau = 0.6$	60.75 (49.60)		317.37*** (111.11)	
$\tau = 0.7$	36.80 (60.63)		287.42** (125.73)	
$\tau = 0.8$	14.24 (74.17)		255.02* (151.43)	
$\tau = 0.9$	-2.70 (85.63)		226.01 (179.72)	

Notes: \*, \*\*, \*\*\* indicate statistical significance: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

Source: own study based on WDI and WGI (2019) and Penn World Table data.

## CONCLUSIONS

The situation of the agricultural sector in SSA countries is a resultant of many historical (pre-colonial, colonial and post-colonial), geoclimatic, social and political factors. While most of them are given and the potential for change is excluded or very limited, the quality of governance and political stability can be

adjusted. The results of the studies are consistent with those of Hayami and Ruttan (1971), Hall and Jones (1997), and Lio and Liu (2008) on the links between the quality of governance and agriculture. The quality of governance is, according to many researchers, a key element in poverty reduction and regional development. In this context, the study in current institutional (and constitutional) economics, as well as the related trend of economic analysis of law, is not only of cognitive but also of practical value. The results of the study suggest that the improvement in one of the elements of government quality, namely political stability, may contribute to an increase in agricultural productivity in agricultural countries in Africa, taking into account the links between political stability and the scale of the use of fertilisers in agricultural activity (which indicates a shift in methods to more modern ones). Moreover, the results of the study show that the links between political stability and GDP per capita are stronger in the case of the poorest countries, which means that a country may break out of the vicious circle of poverty when its political situation ceases to be a threat to its people. This is also of relevance for agricultural organisations and institutions. As early as in 2012, the FAO's Intergovernmental Committee on World Food Security adopted "Voluntary Guidelines on the Responsible Governance of Tenure". The basic principles of responsible legal title management include values consistent with the general principles of good governance: recognition of rights to land and resources, respect for human dignity and freedom from discrimination, equality and justice, the rule of law, a holistic and balanced approach, participation, transparency and accountability. The importance of the quality of governance, including political stability, goes beyond agriculture, as it has become an important factor in reducing extreme poverty and implementing sustainable development.

## BIBLIOGRAPHY

- Adeniyi, O., Ajide, B., Salisu, A. (2015). Foreign capital flows, financial development and growth in sub-Saharan Africa. *Journal of Economic Development*, 40(3), 85–103. DOI: 10.35866/caujed.2015.40.3.004.
- Ake, C. (1975). A definition of political stability. *Comparative Politics*, 7(2), 271–283. DOI: 10.2307/421552.
- Alesina, A., Özler, S., Roubini, N., Swagel, P. (1996). Political instability and economic growth. *Journal of Economic Growth*, 1(2), 189–211. DOI: 10.1007/BF00138862.
- Bayyurt, N., Yılmaz, S. (2012). The impacts of governance and education on agricultural efficiency: an international analysis. *Procedia-Social and Behavioral Sciences*, 58, 1158–1165. DOI: 10.1016/j.sbspro.2012.09.1097.
- Beck, T., Demirgüç-Kunt, A., Levine, R. (2001). Legal theories of financial development. *Oxford Review of Economic Policy*, 17(4), 483–501. DOI: 10.1093/oxrep/17.4.483.
- Bello, W. (2011). *Wojny żywnościowe*. Warszawa: Instytut Wydawniczy Książka i Prasa.

- Binswanger, H. P., Deininger, K. (1997). Explaining Agriculture and Agrarian Policies in Developing Countries. *Journal of Economic Literature*, 35(4), 1958–2005.
- Brück, T. (2001). Mozambique: The economic effects of the war. *War and Underdevelopment*, 2, 56–88.
- Bundervoet, T., Verwimp, P. (2005). Civil War and Economic Sanctions: An Analysis of Anthropometric Outcomes in Burundi. *Households in Conflict Network Working Paper*, 11. Retrieved from: <http://www.hicn.org/papers/wp11.pdf> (2019.07.25).
- Campos, J. E., Lien, D., Pradhan, S. (1999). The impact of corruption on investment: Predictability matters. *World Development*, 27(6), 1059–1067. DOI: 10.1016/S0305-750X(99)00040-6.
- Chang, H.-J. (2016). *Żli Samarytanie. Mit wolnego rynku i tajna historia kapitalizmu*. Warszawa: Wydawnictwo Krytyki Politycznej.
- Collier, P. (2008). *The Bottom Billion. Why the Poorest Countries are Failing and What Can Be Done about it*. Oxford: Oxford University Press.
- Earle, T. K. (1997). *How chiefs come to power: The political economy in prehistory*. Palo Alto: Stanford University Press.
- Fosu, A. (2013). Growth of African Economies: Productivity, Policy Syndromes and the Importance of Institutions. *Journal of African Economies*, 22(4), 523–551. DOI: 10.1093/jae/ejs034.
- Fosu, A., Bates, R., Hoeffler, A. (2006). Institutions, governance and economic development in Africa: An overview. *Journal of African Economies*, 15 (suppl\_1), 1–9. DOI: 10.1093/jae/ejk004.
- Goldstone, J. A. (1991). *Revolution and rebellion in the early modern world*. Berkeley: University of California Press.
- González, M. A., Lopez, R. A., Rigoberto, A. (2007). Political violence and farm household efficiency in Colombia. *Economic Development and Cultural Change*, 55(2), 367–392. DOI: 10.1086/508715.
- Guardado, J., Pennings, S. (2016). *The seasonality of conflict*. Manuscript, World Bank July. Retrieved from: <http://pubdocs.worldbank.org/en/550371467251931899/The-Seasonality-Conflict-Sтивен-Pennings.pdf> (2019.07.20)
- Hall, R. E., Jones, C. I. (1997). Levels of economic activity across countries. *The American Economic Review*, 87(2), 173–177.
- Hayami, Y., Ruttan, V. W. (1971). *Agricultural development: an international perspective*. Baltimore, Md/London: The Johns Hopkins Press.
- Hobsbawm, E. (1999). *Wiek skrajności*. Warszawa: Świat Książki.
- Huntington, S. P. (2006). *Political order in changing societies*. New Heaven: Yale University Press.
- Justino, P. (2012). War and poverty. *IDS Working Papers*, 391, 1–29. DOI: 10.1111/j.2040-0209.2012.00391.x.
- Karembu, M., Nguthi, F., Ismail, H. (2009). *Biotech crops in Africa: The final frontier*. Nairobi: ISAAA AfriCenter.
- Kłosowicz, R. (2017). *Konteksty dysfunkcyjności państw Afryki Subsaharyjskiej*. Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego.



- Kodongo, O., Ojah, K. (2016). Does infrastructure really explain economic growth in Sub-Saharan Africa? *Review of Development Finance*, 6(2), 105–125. DOI: 10.1016/j.rdf.2016.12.001.
- Korten, D. C. (2002). *Świat po kapitalizmie. Alternatywy dla globalizacji*. Łódź: Stowarzyszenie Obywatel.
- Lio, M., Liu, M. C. (2008). Governance and agricultural productivity: A cross-national analysis. *Food Policy*, 33(6), 504–512. DOI: 10.1016/j.foodpol.2008.06.003.
- Lijphart, A. (1977). *Democracy in plural societies: A comparative exploration*. New Haven: Yale University Press.
- Łoś-Nowak, T. (2009). Państwo ponowoczesne. Ile tradycji, ile ponowoczesności. In: A. Lisowska, A. W. Jabłoński (Eds.), *Wizje dobrego państwa. Państwo w procesie przemian. Teoria i praktyka* (pp. 17–41). Toruń: Wydawnictwo Adam Marszałek.
- Machado, J. A., Silva, J. S. (2019). Quantiles via moments. *Journal of Econometrics*, 213, 145–173. DOI: 10.1016/j.jeconom.2019.04.009.
- Martin-Shields, C. P., Stojetz, W. (2019). Food security and conflict: Empirical challenges and future opportunities for research and policy making on food security and conflict. *World Development*, 119, 150–164. DOI: 10.1016/j.worlddev.2018.07.011.
- McCulloch, A. (2013). Does moderation pay? Centripetalism in deeply divided societies. *Ethnopolitics*, 12(2), 111–132. DOI: 1080/17449057.2012.658002.
- Méon, P. G., Weill, L. (2005). Does better governance foster efficiency? An aggregate frontier analysis. *Economics of Governance*, 6(1), 75–90. DOI: 10.1007/s10101-004-0080-z.
- O’Gorman, M. (2015). Africa’s missed agricultural revolution: a quantitative study of the policy options. *The BE Journal of Macroeconomics*, 15(2), 561–602. DOI: 10.1515/bejm-2013-0016.
- Omotoso, K., Ishola Mobolaji, H. (2014). Corruption, Governance and Economic Growth in Sub-Saharan Africa: A Need for the Prioritisation of Reform Policies. *Social Responsibility Journal*, 10(2), 316–330. DOI: 10.1108/SRJ-06-2012-0067.
- Osman, R. H., Alexiou, C., Tsaliki, P. (2011). The role of institutions in economic development. *International Journal of Social Economics*, 39(1/2), 142–160. DOI: 10.1108/03068291211188910.
- Ottaway, M., (2006). *Dysfunctional States, Dysfunctional Armed Movements, and Lootable Commodities*. In: Ch. Clapham, J. Herbst, G. Mills (Eds.), *Big African States* (pp. 187–203). Johannesburg: Wits University Press.
- Paarlberg, R. (2005). From the green revolution to the gene revolution. *Environment: Science and Policy for Sustainable Development*, 47(1), 38–40. DOI: 10.3200/ENV.47.1.38-41.
- Przeworski, A., Alvarez, R. M., Alvarez, M. E., Cheibub, J. A., Limongi, F. (2000). *Democracy and development: political institutions and well-being in the world, 1950–1990* (Vol. 3). Cambridge: Cambridge University Press.
- PWT, (2020). *Human capital in PWT 9.0*. Retrieved from: [https://www.rug.nl/ggdc/docs/human\\_capital\\_in\\_pwt\\_90.pdf](https://www.rug.nl/ggdc/docs/human_capital_in_pwt_90.pdf) (2020.01.16).
- Rodrik, D. (2011). *Jedna ekonomia, wiele recept. Globalizacja, instytucje i wzrost gospodarczy*. Warszawa: Wydawnictwo Krytyki Politycznej.

- Romer, P. (1993). Idea gaps and object gaps in economic development. *Journal of Monetary Economics*, 32(3), 543–573. DOI: 10.1016/0304-3932(93)90029-F.
- Rydzak, W. (2011). *Reputacja a działania informacyjne organizacji w sytuacjach kryzysowych i determinanty ich wyboru*. Poznań: Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu.
- Schiff, M. W., Valdés, A., Krueger, A. O. (1992). *The political economy of agricultural pricing policy* (Vol. 4). Baltimore: Johns Hopkins University Press.
- Sebudubudu, D. (2010). The impact of good governance on development and poverty in Africa: Botswana – A relatively successful African initiative. *African Journal of Political Science and International Relations*, 4(7), 249–262.
- Sen, A. (2000). *Conclusions. The Independent Inquiry Report into Population and Development (IIRPD)*. New York: Anchor Books.
- Shepherd, B. (2010). *Political Stability: Crucial for Growth?* LSE Ideas Strategic Brief. London: London School of Economics and Political Science.
- Smith, A. (2007). An Inquiry into the Nature and the Causes of the Wealth of Nations, S. M. Soares (Ed.), MetaLibri, Digital Library.
- Stiglitz, J. E. (2007). *Wizja sprawiedliwej globalizacji. Propozycje usprawnień*. Warszawa: Wydawnictwo Naukowe PWN.
- Suliman, A. H., Mollick, A. V. (2009). Human capital development, war and foreign direct investment in sub-Saharan Africa. *Oxford Development Studies*, 37(1), 47–61. DOI: 10.1080/13600810802660828.
- Świerczyńska, K. (2019). *Uwarunkowania i różnicowanie rozwoju gospodarczego krajów Afryki Subsaharyjskiej*. Warszawa: CeDeWu.
- Świerczyńska, K., Kryszak, Ł. (2019). Wpływ stabilności politycznej i praworządności na produktywność gospodarek w krajach Afryki Subsaharyjskiej. *Ekonomista*, 5, 608–635.
- Trzcinski, K. (2015). Czym jest stabilność polityczna państwa? *Przegląd Politologiczny*, 2, 37–47. DOI: 10.14746/pp.2015.20.2.3.
- Turchin, P. (2005). Dynamical feedbacks between population growth and sociopolitical instability in agrarian states. *Structure and Dynamics*, 1(1), 1–21.
- Waguespack, D. M., Birnir, J. K., Schroeder, J. (2005). Technological Development and Political Stability: Patenting in Latin America and the Caribbean. *Research Policy*, 34(10), 1570–1590. DOI: 10.1016/j.respol.2005.07.006.
- Wickham, C. (1989). *Early medieval Italy: Central power and local society, 400–1000* (Vol. 198). Ann Arbor: University of Michigan Press.
- Woodbridge, J. M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Boston: MIT Press.
- World Bank, World Governance Indicators. (2019). Retrieved from: <http://info.worldbank.org/governance/wgi/#doc> (2020.01.16).
- Verpoorten, M. (2009). Household coping in war-and peacetime: Cattle sales in Rwanda, 1991–2001. *Journal of Development Economics*, 88(1), 67–86. DOI: 10.1016/j.jdeveco.2008.01.003.
- Voigt, S. (2011). Positive constitutional economics II – a survey of recent developments. *Public Choice*, 146(1–2), 205–256. DOI: 10.1007/s11127-010-9638-1.
- Ziegler, J. (2013). *Geopolityka głodu*. Warszawa: Instytut Wydawniczy Książka i Prasa.

*Summary*

The agricultural countries of sub-Saharan Africa remain the least economically advanced region of the world, with the relatively lowest quality of life. The agricultural sector plays a particularly important role in the economies of these countries. However, it is underdeveloped as a result of factors such as inadequate agricultural policy, institutional instability, chronic droughts, epidemics, deterioration of the environment, deteriorating infrastructure and insufficient investment in agricultural research in sub-Saharan Africa. The aim of the paper is to examine the impact of political stabilization on the economic growth in these countries. We were also inclined to determine what the interdependences were between political stability and factors important for agricultural activity for both agricultural and non-agricultural sub-Saharan countries in the 1995–2017 period. The methods used in this research included panel models with fixed effects, non-parametric tests and quantile regression. It was found that stabilizing the political situation and lowering the level of conflict risk contributed to the growth of GDP per capita in both agricultural and non-agricultural countries. However, in agricultural countries, it also influenced the modernization of agricultural production methods and a shift in the proportion of agricultural production in the total volume of imports and exports. Furthermore, it was found that political stability contributed to a greater extent to the improvement of GDP per capita in the lowest income countries.

*Keywords:* political stability, sub-Saharan Africa, agriculture, institutional economy.

### **Wpływ stabilności politycznej na wzrost gospodarczy w rolniczych krajach subsaharyjskich**

*Streszczenie*

Kraje rolnicze Afryki Subsaharyjskiej pozostają najmniej zaawansowanym gospodarczo regionem świata, o relatywnie najniższej jakości życia. Szczególne znaczenie w gospodarkach tych krajów ma sektor rolniczy. Jest on jednak słabo rozwinięty, co wynika z czynników takich, jak wadliwa polityka rolna, niestabilność instytucjonalna, chroniczne susze, epidemie, degradacja środowiska, pogorszenie infrastruktury oraz niewystarczające inwestycje w badania naukowe w dziedzinie rolnictwa w Afryce Subsaharyjskiej. Celem artykułu jest zbadanie wpływu stabilizacji politycznej na wzrost gospodarczy w tych krajach. Analizowane były też związki między stabilnością polityczną a czynnikami istotnymi z punktu widzenia działalności rolniczej, zarówno w rolniczych, jak i nierolniczych krajach Afryki Subsaharyjskiej w latach 1995–2017. W badaniach wykorzystano modele panelowe z efektami stałymi, testy nieparametryczne oraz regresję kwantylową. Stwierdzono, że stabilizowanie sytuacji politycznej i obniżanie poziomu zagrożenia konfliktem przyczyniało się do wzrostu PKB *per capita* zarówno w krajach rolniczych, jak i nierolniczych. Niemniej, w krajach rolniczych wpływało także na unowocześnianie metod produkcji rolniczej oraz na zmianę udziału produkcji rolnej w wolumenie importu i eksportu. Ponadto ustalono, że stabilność polityczna przyczyniała się silniej do poprawy PKB *per capita* w krajach o najniższych dochodach.

*Słowa kluczowe:* stabilność polityczna, Afryka Subsaharyjska, rolnictwo, ekonomia instytucjonalna.

JEL: O11, O13, O43, O55.

Paweł Młodkowski, dr<sup>1</sup> 

School of International Liberal Arts  
Miyazaki International College

## Population instability and EU-production function anomaly<sup>2</sup>

### INTRODUCTION

This paper focuses on the European production function as an analytical framework for studying economic growth. This particular method should be employed with caution. It has been widely recognised in the literature that modeling economic growth based on just two factors of production is a far-reaching simplification of the underlying processes. Mankiw, Romer, and Weil (1992) introduced human capital into their model and achieved excellent results, explaining about 80% of the international variation of income per capita in this way. This particular approach to capturing output dynamics may bear a significant bias and misrepresent crucial underlying relationships due to sudden qualitative and negative quantitative changes to one of the two exogenous variables, namely: population (*POP*).

Studies of output in the European Union have been a challenge due to the dynamic changes in the underlying social, legal and institutional frameworks. Not only have socio-economic relationships been subject to substantial developments, but the composition of the working population at the national level has also been transformed since 2004. These dynamic alterations in the economic mechanisms are the result of a guided integration process as well as being external to political decisions and the common EU policies (Młodkowski, 2018). Similar reasons may disrupt any growth studies that cover former periods in European history.

Explaining the deficiency in the production function in growth studies must begin with a diligent historical review of European population developments. The

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<sup>1</sup> Correspondence address: 1405 Kano-hei, Kiyotake-cho, Miyazaki-shi, 889-1605, Japan; e-mail: pawel.mlodkowski@gmail.com. ORCID: 0000-0003-2115-4060.

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purpose is to indicate one of Europe's population characteristics: instability of the qualitative and quantitative features. This instability is clearly visible in comparison to much more hermetic countries, like China or Japan (Masui, Młodkowski, 2019). The time series analysis delivers an image of a very stable population growth in Europe, with not much variation over the last millennium. However, even a brief review of the deaths due to wars, diseases and, relatively recently, genocide, prove that European countries have suffered frequent substantial losses in the accumulated knowledge and skills. Would a production function estimated on such records deliver consistent results and credible projections? It would hardly seem so, which this empirical exercise demonstrates.

The results suggest that accession to the European Union has resulted in substantial alterations to the population characteristics at a country-level, reassembling those historically observed. Due to the Common Market, and one of the associated three freedoms, there have been qualitative and quantitative changes to the working populations of all Member States. The narrative on these changes is based on a systematic review of the country-level production functions estimated for all 27 EU Members, over the period 2004–2016. It may be concluded that attempts to project the economic growth trajectory with the production function estimated at the country-level may fail. The reason is in the altered mechanism of the transformation of labour ( $L$ ) into output. When production functions are estimated based on historical data, then the associated structural parameters reflect the characteristics of the underlying working population. Any sudden negative or positive developments in the number of citizens, or in the structure of the population, along with its productivity, invalidates the production function transformation. Prospective analysis seems to lack viability.

The paper is organised as follows: The initial section offers a historical review of population-affecting events in European history, starting as early as the late Middle Ages. It departs from the discussion on arguments about the production function, with a focus on sudden changes in population, its growth rate and composition. A diligent review of population-decreasing events from the historical perspective represents a substantial part of the paper. The narration is, however, prospective, and aimed at associating historically observed instability of  $\beta$  in the production function with post-2004 intra-EU migration, and recent inflow of refugees from the Middle-East. The information about wars, diseases, and genocides comes from multiple sources. It should be noted that in spite of a great effort to reflect lives lost as precisely as possible, the presented numbers are still greatly underestimated. The other argument in the production function, the fixed capital formation in Europe, is also addressed, but to a much lesser extent as it is not the main "issue" in the analysed framework.

This paper contributes to empirical evidence concerning the EU economy, with estimated production functions for all 27 EU Member States. Extensive data mining resulted in the compilation of a consistent set of time series that capture the EU's

population, and fixed capital formation in the EU, as two arguments in the classical production function. Various sources have been used, including the International Financial Statistics by the IMF (for private investment spending) and the World Development Indicators by the World Bank (for population and the real GDP). The estimation was based on records covering the period from 2004 to 2016, as the most closely matching mechanics that may be expected over a mid-term projection horizon.

The contribution of this paper to the discussion is twofold. First, it estimates production functions at the country level for all EU Member States. Structural parameters allow output analysis and economic policy discussion on economies of scale. Estimated production functions for the European countries show which of them are characterised by the highest and most positive economies of scale. This information may be used to aid resource allocation in the most productive manner, for the sake of the whole EU society.

Second, there are very special population-output mechanics recognised in several EU Member States. These anomalies are inconsistent with the production function framework assumptions and call for further investigation. Investigations into the “misbehaving” cases uncover several factors that are potentially responsible. Recognizing anomalies is highly important, because the EU witnesses fierce discussions about and faces decisions on managing refugees, addressing the problem of aging societies in the EU, and handling migration in the most productive manner. The empirical results presented in this paper may allow much better-informed political decisions for the sake of the whole EU-27.

### ARGUMENTS FOR THE EUROPEAN (UNION) PRODUCTION FUNCTION

A production function is an elegant instrument to handle economic growth studies. It greatly simplifies the problem at hand by reducing the number of factors of production to only two, i.e. labour (*POP*) and capital (*CAP*). In this paper, the focus is on the role that unstable population characteristics play in the production function analytical framework.

$$F(CAP, POP) = aCAP^{\alpha}POP^{\beta}; CAP, POP \geq 0 \quad (1)$$

Population is just a plain number that does not reflect any qualitative changes in the underlying output driver. When it declines (actually it is the population growth rate that declines), the production function framework becomes less useful. This is due to the negative assessment of parameter  $\beta$ . It is a common feature for the numerous countries that have joined the EU since 2004. Their respective populations have effectively declined as a result of intra-union migration to richer EU countries. However, due to other factors, the real GDP has continued to grow.



Economic expansion of the lower-income countries in the EU has been driven by a wide variety of EU-accession-related factors. Growth has been fueled by access to the Common Market, common EU policies, and a multitude of transfers from the European Commission budget. Therefore, an empirical investigation of economic growth in the EU after 2004 shows a strange situation that invalidates a production function-based study.

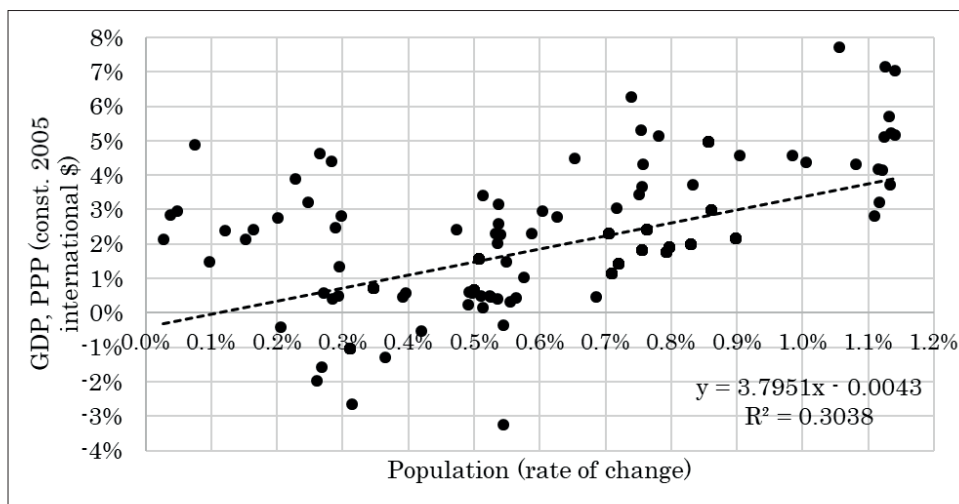
The EU population has changed its composition at national levels, and it continues to grow. As a consequence, there have been significant changes in the composition of the labour force in each of the Member States. These developments have not resulted from former mechanisms and endowments (on education and training). However, such an instability in the characteristics of the working population is not anything new in Europe. When studying economic history over the last millennium or so, one can observe that there have been numerous cases of substantial declines in the total population, along with drastic changes to the qualitative features, including skill composition of the labour force. As such, population-declining events seem to invalidate the parameters of any production function, estimated over such periods.

Europe has undergone numerous such transformations that have made growth-focused studies challenging. Over the last millennium, the continuity of European states has been a unique feature. However, this is not the only reason for the difficulties faced when investigating economic growth in Europe. The geographical coverage of each state has also differed greatly over the past centuries. A good example in this regard is the records from the period of colonial expansion. These records reflect unusual growth fueled by unprecedented factors. They belong to categories of non-replicable, one-time events, and unique policy-associated actions. These changes to a set of actual growth factors mean any studies featuring extensive coverage lack a point of reference.

Fluctuations in European population (*POP*), when cast against output, tell a straight story (Figure 1), one that clearly explains growth in Europe. When it comes to endowment of capital (*CAP*), the picture is also clear (Figure 2). There should be no doubt that private investment spending stimulates GDP growth. There is a clear positive relationship between the rates of change of both arguments of the production function and the output. However, one should be aware that gross capital formation is just a fraction of the GDP, and such a straight positive correlation results from strong collinearity.

The European population had expanded to almost 600 million by 2020. There were, however, episodes when particular countries or the whole continent experienced significant, as well as sharp, declines in the number of citizens. All estimates for population and total fatalities per conflict are rough. The assessment of losses compiled by Brecke (2009; 2012) is still incomplete and understates losses to many of European nations. Output-related effects resulting from the skills and knowledge that have been lost could be captured by a new  $\beta$ , reflecting the features of a new underlying working population.

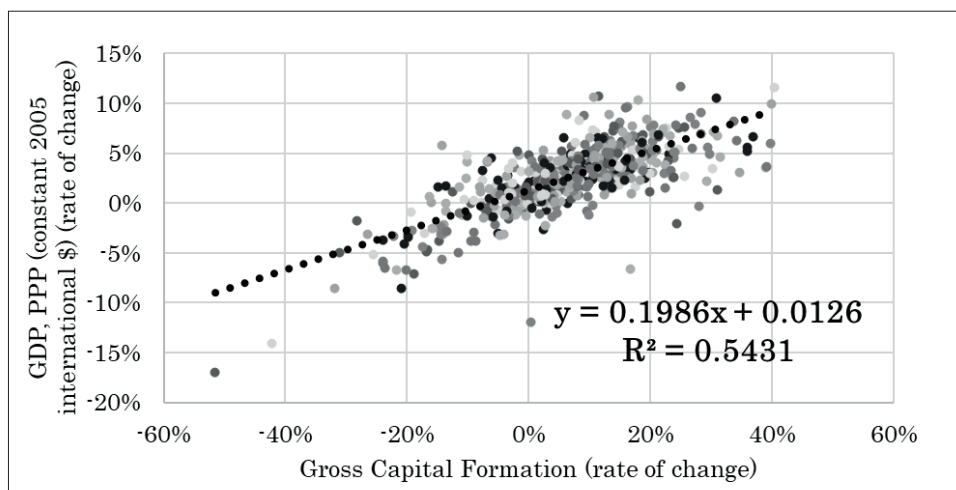




**Figure 1. Growth rate for GDP and population in Europe, 1800–2017 with a linear trend**

Source: own study based on the Eurostat and World Development Indicators database.

However, this makes the production function framework less useful. Potential recovery of work force quality may be achieved in many ways, but some unique, valuable, and productive skills may still be lost forever (if a genocide is systematic enough to kill all bearers of particular skills, for example). The timing of population declining events, geographical coverage, and associated fatalities are presented in Tables 1, 2 and 3.



**Figure 2. GDP growth rate and Gross Capital Formation in European countries, 1948–2016**

Source: own study based on International Financial Statistics, by the IMF.

Even the basic statistics accessed from Conflict Database are informative. There have been 1,167 conflicts in Europe since the year 1400, with estimated fatalities due to interstate and sub-state conflicts of 106,734,335 citizens (both military personnel and civilians). In reality, as credible estimates are missing for most of the conflicts, the European population suffered much more serious losses over that period. The picture of the relationship between population and economic growth becomes clear when the rates of growth are cast against each other (Figure 1). The consequences of the fatalities mentioned above for the production function become straightforward.

**Table 1. Summary review of conflicts in Europe, since the Middle Ages**

Century	Number of conflicts	Lives lost (underestimated)
15th	304	436 700
16th	248	1 736 420
17th	238	12 126 620
18th	95	7 160 420
19th	152	9 262 554
20th	130	76 011 621
<b>Total</b>	<b>1167</b>	<b>106 734 335</b>

Source: own study based on Brecke (2012).

Population growth is lower during the 1800–2016 period, and the production function framework has the potential to shed some light on the scale of such effects. However, the estimated  $\beta$  parameters for times of peace and of war, and other population-reducing developments, may differ. Following the original idea by Wicksell, empirical tests by Douglas and Cobb (Douglas, 1976) showed that since 1928 there has been relative stability of the structural parameters in the production function. Results obtained for the USA and British Commonwealth countries (Daly, Douglas, 1943; Browne, 1943; Williams, Douglas, 1945; Lomax, 1950; Leser, 1955), with time series covering the 1930s and 1940s, confirmed low variability of the structural parameters. However, the empirical investigations in the 1950s and 1960s revealed a stable decline in the contribution of labour to output (Douglas, 1976, p. 912). There was a slow yet systematic change in the underlying economic system and in the way production processes were organised. The significance of both variables (*POP* and *CAP*) in the production function has evolved to match the contemporary economic system and qualitative characteristics of the labour force.

Currently, national economic systems seem to be even more unstable than they were in the times of an estimated labour-related parameter of between 0.6 and 0.75, as reported by Douglas (1976, p. 904). However, in the former periods there were changes in the manner in which production was organised. This no

longer seems to be primarily about improvements in technology, management, and intensity of the capital employed. It is still possible to gain from innovation, but such technology-driven gains are restricted to one, or just a few industries. When it comes to analysis based on aggregated records, covering the whole national economy, the driving force seems to be of a different nature. This is because the previously prominent growth drivers tend to be depleted these days. In particular, economic integration in Europe and the Common Market freedoms have allowed an unprecedented realignment of the production factors on an international scale. Capital has been relocated mostly to China and other Asian countries, while the labour force flows between EU-27 countries create an unprecedented production-affecting phenomenon. This makes the production function framework much less suitable for growth studies.

Due to intra EU-27 migration, one can observe substantial alterations in the qualitative characteristics of the labour force employed in each national economy. In general, part of the workforce of the new member states has moved to the member states of the “old EU” since 2004. As a consequence, the population living in the new member states has declined. There have been national deficits in many job categories, ranging from medical doctors to industrial production line workers. Under such realignment, resulting in qualitative and quantitative alterations to the labour force, applying the production function in output studies (and projections) seems problematic due to the instability of the economic processes under pressure of sudden changes in the labour characteristics. Estimating the structural parameters based on historical records, including the period before the EU was formed, has not been appropriate. Procedures used to assess  $\alpha$  and  $\beta$  have delivered a highly unique approximation of the manner in which the factors of production have been transformed into output. However, these were different before the EU was formed, and have changed again after the new member states have joined the Common Market.

How useful would  $\beta$  be for projections and policy making, if estimated from records reflecting already non-existent economic relationships? It seems that the production function framework requires very special characteristics to be effectively and credibly applied on time series for national-level studies. This requirement is mostly about the stability of the underlying population, both in terms of the growth rate and its composition, i.e. its qualitative characteristics. When analysing the economic history of Europe over the last 600 years, it becomes obvious that this particular element (i.e.  $\beta$ ) can hardly be perceived as stable. Every case of disease (Table 2), famine, war (Table 1) or other population-decreasing development (Table 3) must have had a different effect on the real GDP than in the recovery period. This is due to a different  $\beta$  prevailing during each period preceding and following such events.

The most recent period in the European Union, after 2004, has been associated with a decline in the population of most of the new member states. Why is

the analysis of economic growth very different when the focus is on negative population developments? Empirical investigation leads to strange estimates for coefficients (i.e. negative), indicating a mechanism inconsistent with the production function framework. As such, it does not allow the application of this particular methodology to deliver arguments for the just distribution of output or for discussions concerning political economy. However, there might be some value in discovering negative  $\beta$  in European Union countries after 2004.

**Table 2. Diseases in Europe with more than 10 000 lives lost, since 1600**

Period	Disease type	Region affected	Deaths
1603	plague	England	30 000
1625	plague	England	35 000
1629–1631	plague	Italy	280 000
1636	plague	England	10 000
1647–1652	plague	Spain	150 000
1656	plague	Italy	1 250 000
1663–1664	plague	Netherlands	24 148
1665–1666	plague	England	100 000
1668	plague	France	40 000
1679	plague	Austria	76 000
1720–1722	plague	France	90 000
1738	plague	Balkans	50 000
1770–1772	plague	Russia	50 000
1813	plague	Romania	70 000
1816–1819	typhus	Ireland	65 000
1829–1851	cholera	Europe	73 279
1852–1860	cholera	Russia	1 000 000
1857	yellow fever	Portugal	40 000
1866–1867	cholera	Russia, Germany	225 000
1870–1871	smallpox	Germany	75 712
1899–1923	cholera	Europe	800 000
1918–1922	typhus	Russia	3 000 000

Source: own study, based on (Ackerknecht, 1965; Gregg, 1985; Patterson, 1993; Paneth et al., 1998; Porter, 2001; Hays, 2005; Fusco, 2007; LeMay, 2016; Ross, 2018; UCLA School of Public Health, 2018).

The literature on growth focuses on increases in population as a factor fueling the output. Population has been a steadily growing variable (the average growth rate in Europe has been at 0.65% since the year 1400, with a standard

deviation of 0.69%). Private investment spending is a highly volatile variable (the average rate of 0.68%, and standard deviation of 10.08%). There are many consequences of such a stable behaviour of one of the two arguments in the production function. In the first place,  $\beta$  must comply with the original assumption that population is a proxy for labour force. This is not always a true assumption, especially when one considers tragic events and periods of substantial reductions in population, and in consequence, a drop in the labour force. As long as the population is growing without reversals, and the labour force remains the same proportion of the population,  $\beta$  seems to work well for transforming positive, and gradual changes in population into output. The estimated  $\beta$  may reflect the quality of the labour used in the process of generating output. Accumulation of knowledge, development of skills, and passing both of them from generation to generation can be captured by this parameter. However, for all events (and periods) featuring a reduction in population, the  $\beta$  estimated for the former period is neither efficient nor valid in transforming “labour” into output afterwards. It is difficult to provide precise estimates of the losses for many of the well-known episodes of plagues, diseases and wars in the Middle Ages. Even the Renaissance, the colonial period, and the more recent times of the French Revolution or the Napoleonic Wars still lack credible statistics for such an analysis. However, all those cases of sudden reductions in populations of whole nations, and whole continents, allow a narrative that will prepare the ground for an empirical investigation.

The production function for a country, with its estimated  $\beta$ , assumes that every new member of a society contributes to the real GDP in the same magnitude. This may be true when a population grows steadily, knowledge is accumulated and passed from generation to generation, skills are perfected, and there are no events that reduce the population or modify its composition. Such an idyllic scenario has never been the case for European countries, though. Aside from the many wars, there have been many diseases that negatively affected the population of the whole continent. There were also numerous cases of more-or-less local genocide events that were detrimental for growth in particular countries. In the case of wars, the most affected fraction of any society is the one that is the most productive at that time. Not only are the young, strong, educated, ready-to-work members of a society involved, but also those who are the keepers of knowledge and masters of skills. The loss of such members by any society results in severe consequences for economic growth in the short and medium term. The recovery of knowledge has become easier and quicker in the modern era though, thanks to the availability of printed books. The skills carried by an individual may be lost permanently, and require a whole process of rebuilding them by trial-and-error. It has always been detrimental for economic growth when a war wipes out the most productive members of an underlying society.

**Table 3. Genocide in Europe in the 20<sup>th</sup> century**

Genocide name	Region affected	Deaths
Holodomor (Ukrainian genocide, part of the greater Soviet famine of 1932–33)	Ukrainian Soviet Socialist Republic	7 500 000
Porajmos (Romani genocide)	Nazi-Germany controlled Europe	500 000
Polish Operation of the NKVD (Polish genocide)	Soviet Union	111 091
Latvian Operation of the NKVD (Latvian genocide)	Soviet Union	16 573
The Holocaust / Nazi genocides and war crimes	Nazi-Germany controlled Europe	17 000 000
Genocide by the Ustaše (Serbian genocide)	Independent State of Croatia	600 000
Bosnian genocide	Bosnia and Herzegovina	301 107

Source: own study based on (Rosefielde, 1983; Niewyk, 2000; Goldman, 2011; Calic 2012; Holocaust Encyclopedia).

A disease (or a plague) affects negatively all groups of an underlying society at more-or-less the same magnitude. As a consequence, part of the knowledge and skills accumulated previously is lost (permanently or temporarily), and a growth model based on the estimated production function fails to deliver credible projections.

Genocide (Table 3) differs from wars and diseases in its impact on the composition of the labour force. As a consequence, it may be claimed that due to the focused extermination of a specific ethnic group in a society, the magnitude of the negative impact on economic growth may be even larger. Genocide is very often an action against a particular fraction in a society. Case-by-case analysis shows that in the Soviet Union and in Europe controlled by the Nazis, the targeted groups could be considered the most productive ones. In the most recent ethnic-background genocides in Europe (Bosnia), this was just a reduction of a separate part of the underlying society characterised by rather similar productivity. However, even in such cases unique knowledge and particular skills might have been lost.

As a consequence, any production function estimated on records that include periods of population decline should be approached with caution. Even if the fitness of an econometric model is reasonably high, the usefulness of  $\beta$  for any analysis and projections may be low. The reason is in the lack of actual continuity in the underlying economic mechanism. A population that changes its composition, including its knowledge and skill characteristics, is idiosyncratic for the period. One may say it is a quirk of history. The time series are no longer consistent, and therefore not compatible with the transformation method embodied in the estimated production function.

The instability of  $\beta$  characterises contemporary Europe. There are sudden changes to the labour force in the EU that occur due to intra-EU migration, and, most recently, large numbers of incoming migrants from the Middle East. The

situation in most of the new member states is analogous to historical sudden negative developments. Therefore, when working on a prospective analysis, one must monitor these new factors.

## CONTEMPORARY ISSUES IN MODELING ECONOMIC GROWTH IN THE EU

Modeling economic growth against the current situation of Europe faces a very similar problem to the one described above. In spite of there being a full portfolio of prognostic models of economic growth (ECB, OECD, IMF, European Commission), the current migration-related developments in the underlying labour force seem to create serious issues. One can find some hints for interpretation in a recent work by Jorgenson *et al.* (2017), who find a significant link between education (associated with quality of labour) and economic growth in the U.S. Currently, the European Union is witnessing a sudden, unexpected and unprecedented inflow of an uneducated population from the Middle East. There are several reasons why this group is not going to fuel European production in the same magnitude as European citizens would. The crucial argument drawn from the modern literature on growth is about the quality of labour. Empirical analysis for the U.S. indicated a strong link between education, labour productivity and output. The current investigation into the nature of the economic growth mechanism is a highly simplified approach. It is motivated by an intention to pronounce the consequences of intra-union migration for the production function framework. It may, therefore, be considered as indirect support for all the new approaches to modeling economic growth that include qualitative information on human capital, necessary in capturing the very nature of the growth mechanism.

If the inflow of migrants continues, it will result in accumulating uneducated and unskilled labour. This may trigger investment in developing proper skills that match the labour market's demand. However, cultural differences may still reduce efficiency of such endowments. The knowledge and skills possessed by migrants are very different from the pattern observed in the European labour force. While the whole European Union faces the problem of a persistent lack of jobs for young, well-educated, EU-citizens (in Spain youth unemployment was 56.1% in 2013, 57.9% in 2014, 36% in 2018, and 30.6% in January 2020), the inflow of unskilled, un-educated labour force can only aggravate the current difficult situation in this regard. There were some positive forecasts by OECD regarding the Spanish unemployment rate in 2018 and 2019 (OECD, 2017), which proved correct.

## ESTIMATIONS OF PRODUCTION FUNCTIONS FOR EU STATES

The EU in 2019 is far from being a homogenous group, in terms of economic growth experience. EU countries fall into more than one category of historical factors



for growth and growth patterns over the periods preceding economic integration. For the purpose of capturing the transformation of labour and capital into output, a simple economic model is used, based on a production function with a constant (equation 1).

Estimation of structural parameters is based on observations for EU-27 (plus the UK for comparison). The procedure is restricted to the most recent consistent records, from 2004 to 2016. This design is motivated by the fact that earlier economic performance in the new member states was based on a different legal and institutional framework. These featured a very different transformation of factors of production into output. Only after full EU accession (from 2004, or for some states even later) did the national economic systems begin to operate in a manner similar to what could be expected in the future.

For a prospective analysis (projection of economic growth in the EU up to the year 2030) based on the parameters estimated here, interested readers should refer to Młodkowski (2019). The author assumed that the population in the EU would follow the path defined by Eurostat demographic projections. There is a new factor in this regard, however, as the inflow of refugees who are granted residency in the EU might be a potentially positive growth factor. The GDP growth rate may be supported to some unspecified degree through the inflow of migrants that may cause sluggish demographic growth, and for changes in the population structure due to aging European societies.

**Table 4. Nominal value of Chinese foreign direct and portfolio investment in the EU, 2008–2016 (bln USD)**

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
Foreign direct and portfolio investment	29.51	4.84	5.59	16.5	17.11	13.37	29	33.84	55.83

Source: own study based on China Global Investment Tracker by American Enterprise Institute.

When it comes to capital fueling economic growth in the European Union, one should bear in mind that there has been a reversal in international capital flows. After 20 years of moving European production to Asia, one can observe the global expansion of China (Table 4), based on its accumulated massive foreign exchange reserves.

This process is not only about foreign investment, both portfolio and direct, but also about providing financing for large-scale infrastructure projects in Europe which are entrusted to Chinese contractors, like the nuclear power plant under construction in Bradwell, Essex, UK, to name just one example. If such cases become more frequent, expanding infrastructure with foreign capital may be an additional growth impulse to be monitored in studies and projections for the GDP.

When it comes to interpretation of the results, there is only one country that seems to exhibit a negative returns to scale: Portugal, but its parameter for *POP* is not statistically significant. The UK, as a benchmark, is the only country to exhibit constant returns to scale with the sum of estimated parameters at unity (Table 5). All other EU states seem to experience positive returns to scale, with the Netherlands and Austria at the top of the list. There is an anomaly in the case of the structural parameter estimated for population (*POP*). All small EU countries that joined the Union after 2004 have an excessively high assessment of this element which, at the same time, is statistically significant. The interpretation of such an anomaly requires an unorthodox and holistic approach to the production function. The case for Germany, the largest EU economy, is also puzzling as the estimated parameter is also negative, but not statistically significant. In alternative estimations, with different functional forms, and on rates of change of all variables, Germany was assigned the lowest structural parameter among the EU-12, at just 0.2. This may indicate the actual level of the assessment in the main empirical exercise.

**Table 5. Positive structural parameters of the production function in the EU, 2004–2016**

Country	<i>POP</i>	t-stat <i>POP</i>	<i>CAP</i>	t-stat <i>CAP</i>	<i>POP+CAP</i>
Belgium	<b>0.92</b>	9.50	<b>0.26</b>	7.40	<b>1.18</b>
Denmark	<b>1.33</b>	13.47	<b>0.23</b>	12.18	<b>1.56</b>
France	<b>1.19</b>	21.69	<b>0.24</b>	10.24	<b>1.43</b>
Germany	-1.55	-1.59	<b>0.52</b>	3.24	-1.03
Greece	1.67	2.16	<b>0.26</b>	16.17	1.93
Ireland	<b>1.69</b>	6.45	<b>0.36</b>	7.68	<b>2.05</b>
Italy	<b>0.56</b>	2.15	<b>0.26</b>	7.82	<b>0.82</b>
Luxembourg	<b>0.86</b>	4.09	0.19	1.71	1.05
Netherlands	<b>2.06</b>	10.02	<b>0.34</b>	7.41	<b>2.40</b>
Portugal	0.32	0.40	<b>0.1</b>	3.63	0.42
Spain	<b>1.32</b>	9.04	<b>0.26</b>	9.10	<b>1.58</b>
U.K.	<b>0.81</b>	4.47	<b>0.2</b>	5.27	<b>1.01</b>
Austria	<b>1.69</b>	5.26	<b>0.37</b>	2.80	<b>2.06</b>
Finland	<b>1.3</b>	3.87	<b>0.41</b>	5.34	<b>1.71</b>
Sweden	<b>1.07</b>	13.59	<b>0.33</b>	16.50	<b>1.40</b>
Cyprus	<b>0.87</b>	13.56	<b>0.23</b>	14.77	<b>1.10</b>
Czech Rep.	<b>3.88</b>	11.57	<b>0.48</b>	9.93	<b>4.36</b>
Malta	<b>3.51</b>	12.63	0.01	0.20	3.52
Slovakia	<b>27.09</b>	5.42	<b>0.4</b>	2.42	<b>27.49</b>
Slovenia	<b>6.82</b>	10.21	<b>0.37</b>	9.21	<b>7.19</b>

Source: own study.

The Ordinary Least Squares procedure delivered other interesting results. Most EU countries have been characterised with parameters consistent with the original idea behind the production function. However, there is also a substantial group of EU countries for which estimations delivered a negative assessment of the structural parameter for the *POP* variable (Table 6).

All countries listed in Table 6, except Croatia, have statistically significant parameters. The negative “role” of population in the new member states results from the co-occurrence of trends inconsistent with the production function framework implicit assumptions. It seems that the literature on the production function does not include any hints on the requirements for the “labour” argument to be useful in this particular framework. The current study intends to fill this methodological gap by providing explanations on the consequences for output studies of the unstable characteristics of the working population (captured here by *POP*).

**Table 6. Negative structural parameters of the production function in the EU, 2004–2016**

Country	<i>POP</i>	t-stat <i>POP</i>	<i>CAP</i>	t-stat <i>CAP</i>	<i>POP+CAP</i>
Estonia	<b>-4.55</b>	-8.18	<b>0.3</b>	9.20	<b>-4.25</b>
Hungary	<b>-5.28</b>	-5.81	<b>0.28</b>	4.15	<b>-5.00</b>
Latvia	<b>-1.65</b>	-5.69	<b>0.34</b>	5.82	<b>-1.31</b>
Lithuania	<b>-1.42</b>	-7.53	<b>0.24</b>	4.85	<b>-1.18</b>
Poland	<b>-42.42</b>	-3.38	<b>0.34</b>	2.79	<b>-42.08</b>
Bulgaria	<b>-3.52</b>	-20.22	<b>0.2</b>	8.23	<b>-3.32</b>
Romania	<b>-2.19</b>	-7.13	<b>0.28</b>	4.95	<b>-1.91</b>
Croatia	-1.57	-1.43	<b>0.25</b>	4.37	-1.32

Source: own study.

This is the main reason for including an in-depth historical analysis of the instability of the qualitative and quantitative characteristics of European citizens throughout the ages. There is a very similar, historically observed, common negative population tendency shared by the new member states since 2004. Simultaneously, these countries have experienced economic growth fueled by the EU accession-related factors. One can, therefore, observe a very special phenomenon in the EU. Member states that have been losing workforce still gain in terms of output due to catching-up via modernization, increased capital investment, technological advances, and switching to modern management. As such, economic growth in this group is of an intensive nature. In the second round it has the potential of releasing even more of labour for employment in other EU countries. The advanced EU economies that welcome well-educated migrants from the less-advanced EU countries continue to grow. They grow faster than they would otherwise. This would seem to be a straight extensive mode, rather than an intensive one. Therefore, there are two distinctive groups of countries in the EU

that can be recognised by the different signs estimated for the population (*POP*) parameter in the respective production functions.

## CONCLUSIONS

The production function framework is suitable only for cases maintaining stable characteristics of the working population over time. It is able to accommodate trends in growth factors (here: *CAP* and *POP*), and delivers consistent results only when the trends are positive, while the growth mode (extensive versus intensive) is not important. However, in all other cases of the intensive growth mode, any negative trends in the production function parameters invalidate this framework for any output studies. This feature of the production function framework has been discovered while estimating structural parameters on the EU data over the period 2004–2016. It should be labeled: *EU-production-function-anomaly*.

While the actual empirical evidence for this new explicit requirement for the production function framework has been discovered due to negative population (*POP*) trends, the same invalidation of the underlying analytical framework could be caused by any other production function parameter that is declining, while the growth mode is intensive.

There might be a potential solution for the anomaly observed in case of most new member states. The negative assessment of the *POP* parameter might be avoided by introducing additional variables to the transformation equation. These should probably capture any “intensive” factors characterising the production process.

Other findings and observations that open new areas for economic growth studies include the following: EU countries are not homogenous in terms of the growth mode; most of the new member states have experienced intensive growth after accession, while growth of the old member states (EU-12) has been extensive, fueled by intra EU migration and further capital accumulation, supported by growing inflows of Chinese savings.

When it comes to methodological studies on the efficiency of different modeling frameworks, the anomaly presented here may be a starting point for further investigations into the most appropriate models to deal with the intensive growth mode when its factors are declining.

Economic growth studies in the EU face the problem of an inconsistent and idiosyncratic transformation mechanism over time. Projecting the trajectory for the GDP at the national level does not seem to be problematic (see: Młodkowski, 2019), but establishing an aggregated forecast at the level of the whole EU may be a real challenge. The submission next year to the journal will present a similar growth study based on another class of macroeconomic growth models. In this way, interested readers will be offered a comparison of methods. It shall shed new

light on competing approaches to capturing the growth mechanism in the most challenging of all studies that must deal with “diversity in unity”.

## BIBLIOGRAPHY

- Ackerknecht, E. H. (1965). *History and Geography of the Most Important Diseases*. New York: Hafner Publishers.
- American Enterprise Institute (2018). *China Global Investment Tracker*. Retrieved from: <http://www.aei.org/china-global-investment-tracker/> (2018.02.28).
- Brecke, P. (2009). Violent Conflicts 1400 A.D. to the Present in Different Regions of the World, paper presented at the 1999 Meeting of the Peace Science Society (International) on October 8–10, 1999 in Ann Arbor, Michigan.
- Brecke, P. (2012). *Conflict Catalog*. Retrieved from: <http://www.cgeh.nl/sites/default/files/Conflict%20Catalog%2018%20vars.xls> (2018.02.20).
- Browne, G. W. G. (1943). The *Production Function* for South African Manufacturing Industry. *South African Journal of Economics*, (December).
- Calic, M.–J. (2012). Ethnic Cleansing and War Crimes, 1991–1995. In: Ch. W., Ingrao, T. A., Emmert (Eds.), *Confronting the Yugoslav Controversies: A Scholars' Initiative* (pp. 139–140). West Lafayette, IN: Purdue University Press.
- Daly, P., Douglas, P. (1943). The Production Function for Canadian Manufacturers. *Journal of American Statistical Association*, 39 (June), 178–186.
- Douglas, P. H. (1976). The Cobb-Douglas Production Function Once Again: Its History, Its Testing, and Some New Empirical Values. *Journal of Political Economy*, 84(5), 903–916.
- Fusco, I. (2007). The causes of the epidemic. In: F. Angeli (Ed.), *Plague, demography and taxation in the Kingdom of Naples of XVII century*. Milan: Franco Angeli.
- Goldman, W. Z. (2011). *Inventing the Enemy: Denunciation and Terror in Stalin's Russia*. New York: Cambridge University Press. DOI: 10.1017/CBO9780511994906.
- Gregg, Ch. T. (1985). *Plague: An Ancient Disease in the Twentieth Century*. Albuquerque: University of New Mexico Press.
- Hays, J. N. (2005). *Epidemics and pandemics their impacts on human history*. Santa Barbara, California: ABC-CLIO.
- Jorgenson, D. W., Ho, M. S., Samuels, J. D. (2017). Education, Participation, and the Revival of U.S. Economic Growth. *National Bureau of Economic Research Working Paper*, 22453, 1–57. DOI: 10.3386/w22453.
- LeMay, M. C. (2016). *Global Pandemic Threats: A Reference Handbook: A Reference Handbook*. Santa Barbara California, Denver Colorado: ABC-CLIO.
- Leser, C. E. V. (1955). Production Functions and British Coal Mining. *Econometrica*, 24(4), 442–446. DOI: 0012-9682(195510)23:4<442:PFABCM>2.0.CO;2-P.
- Lomax, K. S. (1950). Production Functions for Manufacturing Industry in the U.K. *American Economic Review*, 40.
- Mankiw, G., Romer D., Weil, D. (1992). Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics*, 107(2), 407–437. DOI: 10.2307/2118477.

- Masui, M., Młodkowski, P. (2019). Labor Market Flexibility in Japan 1960–2018. *Nierówności Społeczne a Wzrost Gospodarczy (Social Inequalities and Economic Growth)*, 60(4), 115–143. DOI: 10.15584/nsawg.2019.4.8.
- Młodkowski, P. (2018). Economic Growth in EMU before and after 1999. *Nierówności Społeczne a Wzrost Gospodarczy (Social Inequalities and Economic Growth)*, 54(2), 21–33. DOI: 10.15584/nsawg.2018.2.2.
- Młodkowski, P. (2019). Economic Growth Projection for the EU by 2030. *European Integration Studies*, 13, 61–69. DOI: 10.5755/j01.eis.0.13.2370.
- Niewyk, D. (2000). *The Columbia Guide to the Holocaust*. Columbia: Columbia University Press. DOI: 10.7312/niew11200.
- OECD (2017). *Euro Area – Economic forecast summary* (November).
- Paneth, N., Vinten-Johansen, P., Brody, H., Rip, M. (1998). A rivalry of foulness: official and unofficial investigations of the London cholera epidemic of 1854. *American Journal of Public Health*, 88(10), 1545–1553. DOI: 10.2105/AJPH.88.10.1545.
- Patterson, K. D. (1993). Typhus and Its Control in Russia 1870–1940. *Medical History*, 37, 361–381. DOI: 10.1017/S0025727300058725.
- Porter, S. (2001). *17th Century: Plague*. Gresham College. Accessed March 22nd 2018. Retrieved from: <https://www.gresham.ac.uk/lectures-and-events/17th-century-plague> (2018.02.20).
- Rosefielde, S. (1983). Excess Mortality in the Soviet Union: A Reconsideration of the Demographic Consequences of Forced Industrialization, 1929–1949. *Soviet Studies*, 35(3), 385–409.
- Ross, D. (Ed.). *UK travel and heritage – Britain Express UK travel guide. The London Plague of 1665*. Retrieved from: <http://www.britainexpress.com/History/plague.htm> (2018.02.22).
- UCLA School of Public Health. (2018). *Asiatic Cholera Pandemic of 1846–63*. Retrieved from: <http://www.ph.ucla.edu/epi/snow/pandemic1846-63.html> (2018.02.22).
- United States Holocaust Memorial Museum. (2010). Axis Invasion of Yugoslavia – Croatia. *Holocaust Encyclopedia*. Retrieved from: <https://encyclopedia.ushmm.org/> (2018.02.12).
- Werth, N. (2010). The NKVD Mass Secret National Operations (August 1937 – November 1938). *Online Encyclopedia of Mass Violence*. Retrieved from: <http://www.sciences-po.fr/mass-violence-war-massacreresistance/en/document/nkvd-mass-secret-national-operations-august-1937-november-1938> (2018.02.12).
- Williams, J., Douglas, P. (1945). Production Function. *Economic Record*, (June).

### Summary

The purpose of the study is to present the problematic situation when capturing the economic growth mechanism in the European Union. Due to intra-EU migration, the prominent production function framework fails to deliver consistent results. Estimation of structural parameters on data covering the post-accession period up to 2016 delivered a negative (!) assessment of the contribution of “labour” to output for most of the new member states. This result called for further investigations, and a holistic interpretation. It seems that this is the first time a methodological study on the

production function framework offers an explicit formulation of the requirements for this method to be effectively employed in output investigations. In short, the production function can be used for cases where the growth mode is extensive, while arguments display declining or ascending trends. However, when the growth mode is intensive, while any of the arguments decline in value, this particular framework will become invalid for capturing the growth mechanism. The observed failure of the production function calls for introducing a new term to the economic growth literature: EU-production-function-anomaly. The method seems to be a far-reaching simplification. The reason for utilizing a very general formulation (excluding human capital and technology) is motivated by the focus on the demographic developments responsible for the anomaly.

*Keywords:* production function, EU population, economic growth, new member states, growth mode.

## Niestabilność populacji a anomalia funkcji produkcji w krajach UE

### *Streszczenie*

Celem badawczym jest prezentacja problematycznej sytuacji występującej podczas próby uchwycenia mechanizmu wzrostu gospodarczego w krajach członkowskich Unii Europejskiej. W wyniku wewnątrzunijnej migracji, popularna funkcja produkcji przynosi niespójne wyniki podczas estymacji na poziomie kraju członkowskiego. Oszacowania parametrów strukturalnych modelu dokonano w oparciu o szeregi czasowe od 2004 do 2016 roku. W przypadku wielu nowych krajów członkowskich uzyskano ujemne oszacowanie parametru odpowiadającego za wkład czynnika „praca”. Taki wynik, istotny statystycznie, stanowił wyzwanie i przyczynę dalszych, rozszerzonych badań w celu holistycznej interpretacji przyczyn.

Wydaje się, że niniejsze studium funkcji produkcji jest pierwszym w literaturze przedmiotu, które podaje dyskusji *explicite* wymagania dotyczące poprawności metodologicznej funkcji produkcji, w zależności od natury procesów wzrostowych. Funkcja produkcji może być stosowana w przypadkach, gdy wzrost jest ekstensywny, przy argumentach podlegających trendom wzrostowym lub spadkowym. Jednakże, w przypadkach wzrostu intensywnego, gdy wartość argumentów funkcji produkcji maleje w czasie, to podejście do modelowania wzrostu staje się nieskuteczne. Zaobserwowana niezdolność funkcji produkcji do poprawnego uchwycenia procesów wzrostowych wzywa do wprowadzenia nowego terminu do literatury: anomalia funkcji produkcji na poziomie kraju członkowskiego UE. Wykorzystana metoda badania wzrostu gospodarczego jest oczywiście daleko idącym uproszczeniem. Przyczyną wyboru prostej funkcji produkcji (bez kapitału ludzkiego i technologii) jest intencjonalne skoncentrowanie się na zmianach sytuacji demograficznej, odpowiedzialnych za postulowaną anomalię.

*Słowa kluczowe:* funkcja produkcji, populacja UE, wzrost gospodarczy, nowe kraje członkowskie, wzrost intensywny, wzrost ekstensywny.

JEL: E23, E27, F22, O47.



*Katarzyna Smędzik-Ambroży, dr hab. prof. PUEB<sup>1</sup>* 

Department of Macroeconomics and Agricultural Economics  
Institute of Economics  
Poznan University of Economics and Business

*Agnieszka Sapa, dr hab. prof. PUEB<sup>2</sup>* 

Department of Macroeconomics and Agricultural Economics  
Institute of Economics  
Poznan University of Economics and Business

## **The impact of agricultural policy on income diversity among farmers in the European Union in 2005–2017<sup>3</sup>**

### INTRODUCTION

Sustainable development is one of the strategic goals of the European Union. In 1997 it became a fundamental challenge for the EU and was included in the Treaty of Amsterdam as a superior objective of EU policy (European Commission, 1997; Smędzik-Ambroży, 2018). The definition of sustainable agriculture is based on three basic dimensions: environmental, economic and social (Stępień et al., 2018; Czyżewski, Stępień, 2017). For the economic dimension, the level of agricultural income is important, because we understand economically sustainable agriculture as agriculture which enables the producer

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<sup>1</sup> Correspondence address: Department of Macroeconomics and Agricultural Economics, Institute of Economics, Poznań University of Economics and Business, Niepodległości 10, 61-875 Poznań, Poland; tel.: +48 61 854 30 21; e-mail: katarzyna.smedzik-ambozy@ue.poznan.pl. ORCID: 0000-0001-5228-2263.

<sup>2</sup> Correspondence address: Department of Macroeconomics and Agricultural Economics, Institute of Economics, Poznań University of Economics and Business, Niepodległości 10, 61-875 Poznań, Poland; tel.: +48 61 854 30 12; e-mail: agnieszka.sapa@ue.poznan.pl. ORCID: 0000-0003-2963-1175.

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to earn an income enabling the farmer and his family to have a decent standard of living<sup>4</sup> and to develop their farm (Czyżewski, Smędzik-Ambroży, 2017). The economic aspect of sustainable development can also be identified with the concept of farm viability, i.e. the ability to survive in the long-term under changing market conditions, which is undoubtedly influenced by the value of earned income (Latruffe et al., 2016).

The income situation in agriculture is determined by both exogenous and endogenous factors. At the same time, some factors like seasonality, scale of risk and uncertainty resulting from weather conditions, variable work intensity and cyclicity of production all have destabilising effects both on agricultural income and the profitability of agricultural production (Smędzik-Ambroży, Guth, 2019; Czyżewski, Poczta-Wajda, 2016). Apart from market factors, the EU Common Agricultural Policy (CAP) has a fundamental impact on the level of agricultural income in the EU countries. The financial support for specific activities, resulting from various types of agricultural subsidies, affects the level of sustainability of agriculture in different EU Member States. The CAP is also in line with one of the most important goals of the EU, which is to reduce regional disproportions in the level of development of various economic sectors, including agriculture. This leads to territorial cohesion between different regions of the EU and, as a consequence, fostering the EU's global competitiveness (European Commission, 2019).

In connection with the above, the authors attempted to determine whether the CAP had a positive effect on the level of sustainability of agriculture in the EU through a positive impact on the income situation from agriculture. Thus the main purpose of the study is to answer the question whether the CAP reduces differences in the value of agricultural income among the EU-15 countries (the so-called old members) and the EU-8 countries that joined the EU in 2004 (the so-called new members). It is assumed that subsidies within agricultural policy influence both an increase in agricultural income for individual EU countries and a decrease in differences in their values between the old and new members. Therefore, we assumed a hypothesis that the CAP subsidies reduce the differences in agricultural income between the EU-15 and the EU-8 countries. This would lead to one of the EU's most important objectives, which is to reduce regional disparities in the level of agricultural development and increase territorial cohesion between various EU regions. The time that has elapsed since the largest enlargement of the EU in history, and the related unification of the institutional environment, allows an expectation of agricultural income convergence between farmers from the old and new members. The subjective scope of analysis covered representative

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<sup>4</sup> It is desirable to have at least a parity ratio between the agricultural income per employee and the average wage per worker in the national economy (Wrzaszcz, 2012; Matuszczak, Smędzik-Ambroży, 2013).

farms in the Farm Accountancy Data Network (FADN)<sup>5</sup> from the EU countries. They represent, depending on the year, between 4,045,300 and 5,295,930 farms in EU countries. The spatial extent covered the EU-15 and the EU-8 countries, while the time frame covered the years 2005–2017. Hence, the scientific added value of this paper is derived from determining whether the CAP, by reducing regional disparities in the level of agricultural development, leads to an increase in territorial cohesion between different EU countries. As already mentioned, it is one of the EU's most important goals. While the statement of this fact is cognitively important, it should be emphasized that the studies cover a long period of up to 13 years and are representative for the EU, which ensures the use of FADN data. These aspects also represent an added value of the surveys.

## LITERATURE REVIEW

Ensuring an adequate agricultural income is one of the main objectives of the CAP. It was based upon the assumption of a disparity in income for agriculture in relation to other sectors. The achievement of parity income is to be served by intervention activities supporting agricultural income. It should be noted that over the years, the form of supporting agricultural income under the CAP has changed from price support to direct support (Josling, Anderson, 2017). However, this did not exclude income disparity in agriculture, although the farmers' income increased (Stępień et al., 2018). At the same time, agricultural income and the problem of income parity are still a sensitive area of agricultural policy.

Supporting agricultural income as part of agricultural policy has its opponents and advocates. Support for agricultural income is criticised on the basis of the neoliberal theory. According to its representatives, state interventionism in the agricultural sector is unjustified and expensive (Rembisz, 2010; Chang, 2009; Stoeckel, 2000). On the other hand, advocates of agricultural policy emphasise the special features of agricultural activities and the land factor, which imply ineffective allocation of production factors. They point out that the pressure of competitiveness causes, among other things, negative external effects in the natural environment and limits the provision of public goods (Czyżewski, Stępień, 2017). In addition, the market mechanism leads to farms undergoing a relative income deprivation (Czyżewski, Poczta-Wajda, 2016; Dow, Reed, 2013). Long-term trends in the supply of agricultural products and the demand for them imply pressure to reduce agricultural income. However, real agricultural incomes in the EU in recent decades have increased, which was undoubtedly affected by the CAP (Zawalińska et al., 2015).

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<sup>5</sup> FADN is the only source of microeconomic data and is based on harmonised accounting principles. It is based on national surveys and covers only farms in the EU countries. It is an instrument for evaluating the income of agricultural holdings and the impacts of the CAP (EUFADN, 2019).

The development of agricultural incomes and the problem of their support are the subject of many research works. In particular, there are numerous publications on the issue of agricultural income in EU countries. Some of them cover comparative analyses of agricultural income between individual EU member states (Chmielewska, 2018; Zawalińska et al., 2015; Baer-Nawrocka, 2013). The results of the comparative analyses indicate that the importance of the CAP support in the new member states was larger than in the old ones (Guth et al., 2020). Some researchers focus on the assessment of farm income disparity in relation to the income of non-agricultural sector households. For example Stępień *et al.* (2018) demonstrated that, thanks to the CAP support, the average income of farm households was approaching the average income of non-agricultural sectors. The impact of the CAP on farm income in the context of sustainable development has also been examined. The influence of CAP subsidies on the economic sustainability of farms of different economic sizes for the EU-15 and EU-8 countries was assessed. It was confirmed that the greater the disproportions between the income spreads with and without subsidies, the more important the role of CAP subsidies in shaping the economic result (Guth et al., 2020; Stępień et al., 2018). The area of dispute in the context of supporting agricultural income is the issue of interception of payments by large farms and the desirability of supporting small farms. The analyses indicate that large farms are favoured in the distribution process of support (Guth et al., 2020), which may make the income situation dependent on politics.

The analyses devoted to agricultural income concern the following areas: comparison of agricultural income in individual EU countries, assessment of agricultural income in relation to other sectors, the impact of agricultural income support on the sustainable development of agriculture and the distribution of agricultural income support among farms with different scales of production. The existing literature on agricultural income does not embrace the impact of the CAP on reducing the differences in the value of agricultural income between the EU-15 and EU new members after 2004. Only very few studies address the issue of agricultural income diversification and changes in this respect in the old and new EU members countries in relation to labour input. For example, Chmielewska (2018), based on Eurostat data, concentrated on the convergence of agricultural incomes in the EU countries per unit of hired labour. Hill and Bradley (2015) conducted extensive research on the differences in agricultural incomes in relation to labour inputs expressed in various units in individual EU countries, taking into account the division of holdings by type of specialisation and scale of production. These authors' deliberations focus on the relation of agricultural income to labour input rather than determining the impact of the CAP support on average agricultural income, which is the aim of the present paper. Therefore, this paper bridges an existing research gap. In addition, it should be noted that other analyses cover a shorter time frame than that of our analysis. This also constitutes an added value of our study.

## MATERIAL AND METHODS

In our research, the value of agricultural income per representative farm from individual EU countries was used for each of the years covered by the analysis. The main goal of the research was achieved by calculating the spread between the average value of income per farm in the EU-15 and the EU-8 countries. At this point it should be added that the commonly used measure of diversity for a given variable among countries (or groups of countries) is sigma convergence. The occurrence of this type of convergence means that the differences between the various countries (regions) for the variables in question decrease over time<sup>6</sup>. However, a commonly accepted measure of dispersion within a group of countries is the standard deviation of the natural logarithms of the wealth measures at a certain time point. In this context, the sigma convergence is identified when the standard deviation of the natural logarithms of the adopted wealth measure in a given group of countries shows a decreasing tendency (Malaga, 2004). However, due to the losses (negative income) achieved by farmers in some EU countries, it was not possible to calculate  $\sigma$ -convergence coefficients. Therefore, instead of the sigma convergence coefficients, the spans between the average agricultural income per farm in the EU-15 and EU-8 countries were calculated.

To indicate the impact of the CAP on agricultural income, the analysis was carried out in two variants. In the first one, the spreads for the value of agricultural income excluding the CAP subsidies per farm were calculated. In the second one, the value of agricultural income covering all CAP subsidies were estimated (i.e. single area payments, set-aside payments and agri-environmental payments, support for farms from less-favoured areas, other payments under rural areas support programs, subsidies for plant and animal production, subsidies for investments). To achieve the research objective, a comparative analysis of the ranges of income per farm for these two variants was made, assuming that reducing the spread meant narrowing the differences in the value of average agricultural income between the EU-15 and EU-8. Decreasing these spans would therefore argue in favour of adopting the hypothesis of the study.

The research was carried out for the 2005–2017 period. This first year was chosen as the first complete year of EU membership for all the countries covered in the survey. Those countries that joined the EU after 2004 (Bulgaria, Croatia

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<sup>6</sup> Beta-convergence is also commonly used in the literature. In contrast to sigma-convergence, it focuses on the whole process, not including dynamics. But the dynamic approach is a great advantage of  $\sigma$ -convergence in relation to  $\beta$ -convergence.  $\beta$ -convergence is criticised for the fact that its occurrence only shows that poor regions are developing faster than rich ones, while  $\sigma$ -convergence shows changes decreasing or deepening of inequalities between the selected objects over the analysed period (Sala-i-Martin, 1996; Malaga, 2004; Kusideł, 2013). There is also the concept of gamma-convergence ( $\gamma$ ), which occurs when areas with initially lower rank values overtake areas of initially higher rank values (Boyle, McCarthy, 1997).

and Romania) were excluded. It was assumed that a too short impact of the CAP on the income situation of the farmers in these countries might be inadequate to achieve income convergence with farmers from the EU-15 countries. Malta and Cyprus were also removed from the analysis because of the incomparable nature of the rural areas to other EU countries, manifested by a lower share of agriculture in the structure of production, for example. As a consequence, two groups of countries were examined. The first one, defined as the EU-15 countries, comprises Belgium, the Netherlands, Luxembourg, France, Germany, Italy, the United Kingdom, Denmark, Ireland, Greece, Spain, Portugal, Finland, Austria and Sweden. The second one, defined as the EU-8 countries, comprises the Czech Republic, Poland, Slovakia, Lithuania, Latvia, Estonia, Hungary and Slovenia.

The data came from the EU Farm Accountancy Data Network (FADN). This is a system of collecting farm accountancy data in the EU for monitoring and decision-making on the CAP (EU-FADN, 2019). FADN was established in 1965 with the specific objective of obtaining data enabling income changes in the various classes of agricultural holding to be properly monitored (Commission of the European Communities, 1982). FADN is not a single survey but an amalgamation of national surveys carried out by EU countries (Hill, Bradley, 2015). The data concerned the value of average income per representative agricultural farm from particular EU countries in each of the years 2005–2017. Depending on the year, these farms represent between 4,045,300 and 5,295,930 farms, of all the farms in the EU countries. The selection of farms for research takes place in accordance with the guidelines of the selection plan. This ensures that the results obtained are representative. The selection plan is currently prepared using the Standard Production (SO)<sup>7</sup> parameter. The FADN database contains data in the form of average values for a given group of farms (FADN, 2020). It should be remembered that the FADN methodology only takes agricultural income into account, which to a limited extent reflects the actual income situation of agricultural families. It should also be borne in mind that different methodological approaches and practices within FADN in individual countries make it difficult to assess farmers' incomes between countries in an objective way<sup>8</sup>. Despite these restrictions, FADN is the most common and comparable source of data on the income situation of agriculture in individual EU countries, which was a premise for using FADN data in this study.

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<sup>7</sup> SO (standard output) is the average value over 5 reference years of plant and livestock production obtained from 1 ha or from 1 animal, in conditions average for a specific region (Guth et al., 2020).

<sup>8</sup> For example, in Denmark, labour costs include the labour costs of family members, except for the farmer. In Poland, the cost of work of family members is not included in labour costs (Runowski, 2017).

## RESEARCH RESULTS

The data in Table 1 present how much influence the CAP has on agricultural income. However, a significantly higher positive impact of the CAP on the income situation of FADN farmers is visible in the case of the EU-8 than of the EU-15 countries. On average, in 2005–2017, farmers in the EU-8 received negative income from their agricultural activities. It was only when the value of the CAP subsidies was taken into account in this income that they amounted to EUR 12,259.48 per FADN farm (see Table 1).

**Table 1. The average agricultural income with and without the CAP subsidies per FADN farm in the EU-15 and EU-8 in 2005–2017 (EUR)**

Country	Agricultural income		CAP subsidies
	without CAP subsidies	with CAP subsidies	
Belgium	29 076.00	54 329.69	25 253.69
Czech Republic	-43 925.46	35 379.38	79 304.85
Denmark	-21 228.15	14 915.54	36 143.69
Germany	2 981.31	37 849.62	34 868.31
Estonia	-9 038.77	15 715.69	24 754.46
Ireland	1 700.31	22 030.69	20 330.38
Greece	5 930.08	12 658.85	6 728.77
Spain	15 332.15	25 270.31	9 938.15
France	4 178.92	35 540.31	31 361.38
Italy	18 794.85	25 870.23	7 075.38
Latvia	-3 421.31	12 133.85	15 555.15
Lithuania	2 015.77	12 838.23	10 822.46
Luxembourg	-16 008.23	43 982.31	59 990.54
Hungary	79.46	15 575.69	15 496.23
Netherlands	35 509.46	54 001.77	18 492.31
Austria	5 892.46	25 849.15	19 956.69
Poland	3 407.92	8 755.15	5 347.23
Portugal	5 334.46	12 854.46	7 520.00
Slovenia	-126 388.69	5 558.08	131 946.77
Slovakia	-39 369.23	-7 880.23	31 489.00
Finland	-30 034.69	19 521.38	49 556.08
Sweden	-20 751.00	16 634.54	37 385.54
United Kingdom	961.54	43 528.08	42 566.54
EU-15	2 511.30	29 655.79	27 144.5
EU-8	-27 080.04	12 259.48	39 339.52
EU	-12 284.37	20 957.64	33 242.01

Source: own calculation based on EUFADN.

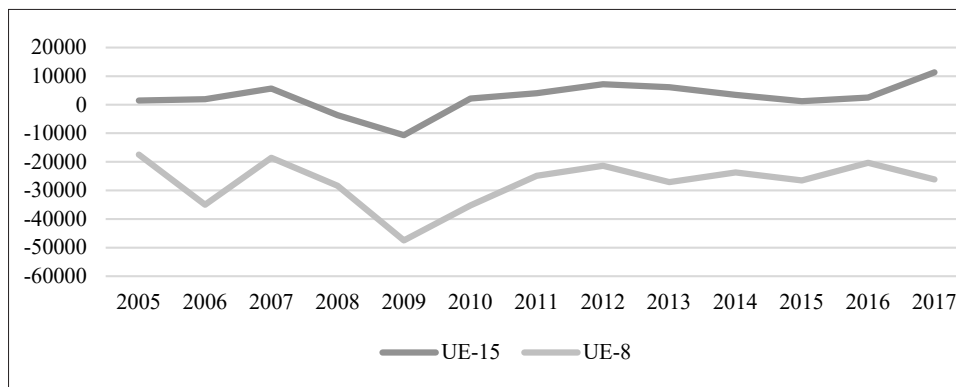


Guth and Smędzik-Ambroży (2019) confirmed such results in studies conducted for the EU divided into two groups of countries, i.e. EU-15 and EU-12. It has been proved that in the EU-12 countries the average costs of agricultural production were higher than revenues in 2004–2015. Although Malta, Cyprus and the countries that joined the EU after 2004 were excluded from our analysis, we can assume that such a situation probably will continue in the following years as well. In 2016 and 2017 the average income per FADN farm in the EU-8 was also negative at EUR -20,285.30 and EUR -26,188.30 respectively. It was only Slovakia where despite taking the CAP subsidies into account the agricultural income was still negative. The results of the analysis (Table 1) also confirm the outcomes of the study by Hill and Bradley (2015), who observed that, by comparing countries different in terms of agriculture, large gaps in agricultural income are also obtained. In the EU, these differentiations result from differences in farm size or type of production in individual countries. They also stated that comparing the incomes of farms of the same size and type from different EU countries results in much smaller differences in their income. Also, the incomes obtained by farmers in the EU-15 are higher than in the EU new members after 2004. Due to large differences in the structure of farms, the agricultural incomes among regions within countries are significant, which was especially visible in France and Germany (Hill, Bradley, 2015).

The results of the analysis reflect the view that the CAP is essential in reducing income deprivation of the agricultural sector. This deprivation is an intrinsic feature of the market mechanism and results from the peculiarities of the agricultural sector. It is also confirmed by research covering groups of countries at different levels of development, which was conducted by Poczta-Wajda (2017). It was proved that agricultural policy is of fundamental importance for reducing the relative income deprivation of the agricultural sector. Such an impact is also identified in the case of the CAP, as our study confirmed. The outcomes of the research by Stępień *et al.* (2018) show that taking the value of CAP subsidies into account meant that the average agricultural income in 2005–2015 represents 62% of the average income in economies of the EU countries. This relation was higher by 14 p.p. in the EU-15 than in the EU-8 countries. While these results advocate the beneficial effects of the CAP on the sustainability of European agriculture in the economic dimension, they also underline the income deprivation of EU agriculture relative to non-agricultural sectors. It should be added here, following the study by Swinnen (2015), that in some of the EU-8 countries (mainly the Baltic States) these income relations of agriculture to non-agricultural sectors will improve in subsequent years, because their governments successfully lobbied for a fairer distribution of direct subsidies after 2013.

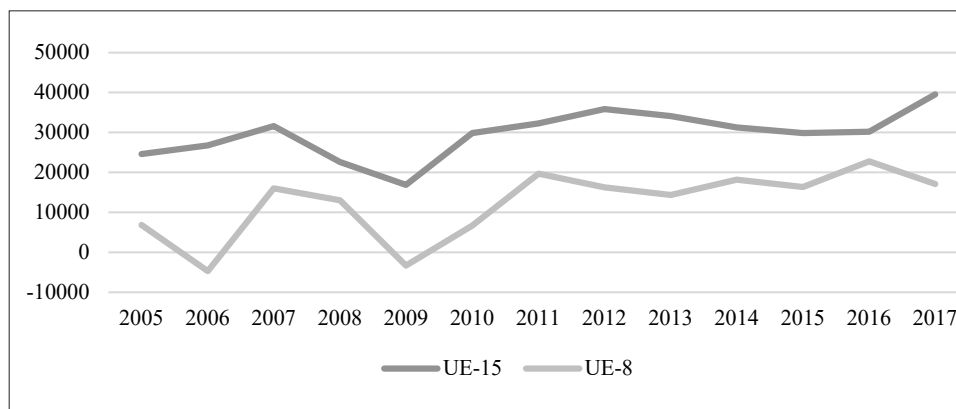
In the EU-15, only in four countries (Denmark, Luxembourg, Finland and Sweden) was the average agricultural income without the CAP subsidies per FADN farm negative in 2005–2017. In the EU-8 countries there were as many as five countries with an adequate situation (the Czech Republic, Estonia, Latvia,

Slovenia and Slovakia). This reveals that the CAP subsidies have greater beneficial effects on the income situation of farmers in the EU-8 in comparison to the EU-15. This is partly caused by the nearly 45% higher value of the CAP subsidies per farm in the EU-8 than the EU-15 (Table 1). However, is this impact great enough for the EU-8 countries compared to the EU-15 to enable convergence of agricultural income levels between these groups of countries?



**Figure 1. Agricultural income without the CAP subsidies per farmer in the EU-15 and EU-8 countries in 2005–2017 (EUR)**

Source: own calculation based on EUFADN.



**Figure 2. Agricultural income with the CAP subsidies per farmer in the EU-15 and EU-8 countries in 2005–2017 (EUR)**

Source: own calculation based on EUFADN.

To verify this, in the first step, plots of the average agricultural incomes in the EU-15 and EU-8 for 2005–2017 were created in two variants, i.e. with

and without the CAP subsidies. Comparing these plots, it can be seen that their shape is almost identical regardless of the chosen variant. This shows that the dynamics of agricultural income in the EU, regardless of whether they are members of the EU-15 or EU-8, is similar irrespective of whether these incomes include the CAP subsidies or not. In the EU-15 and EU-8 countries the largest decrease in agricultural income, both with and without the CAP subsidies, occurred in 2009. The comparative analysis of these two plots indicate also that the income gap between farmers from the EU-15 and EU-8 is narrowing. This is particularly evident within the period of 2010–2016. These plots confirm the results of the Smędzik-Ambroży and Guth study (2019). They demonstrated that in 2005–2015 the average agricultural income without CAP subsidies per farm was definitely higher in the EU-15 than the EU-8 countries. In both groups, agricultural subsidies from the CAP significantly increased the profitability of agricultural production. In the EU-15, they resulted in an increase in income per farm by as much as 679%. In the EU-12 countries this gain was even higher (Smędzik-Ambroży, Guth, 2019).

**Table 2. Agricultural income disparities with and without the CAP subsidies between the EU-15 and EU-8 countries in 2005–2017 (EUR)**

Year	Without subsidies	With subsidies
2005	18 902.31	17 759.94
2006	36 978.88	31 457.73
2007	24 245.12	15 564.77
2008	24 589.18	9 553.71
2009	36 822.30	20 198.68
2010	37 354.63	23 152.43
2011	28 814.67	12 592.97
2012	28 479.87	19 632.67
2013	33 196.33	19 779.24
2014	27 204.99	13 111.59
2015	27 788.00	13 515.08
2016	22 798.85	7 401.86
2017	37 512.25	22 431.43
Average values for selected periods		
2005–2008	26 178.87	18 584.04
2009–2011	34 330.53	18 648.02
2012–2014	29 627.06	17 507.83
2015–2017	29 366.37	14 449.46
2005–2017	29 875.71	17 297.34

Source: own calculation based on EUFADN.

The above results were also confirmed by the data presented in Table 2. It contains the differences in agricultural income with or without the CAP subsidies between the EU-15 and EU-8 countries in 2005–2017. It shows that, regardless of the year, the disparities between agricultural incomes are smaller in the case of agricultural incomes with the CAP subsidies in comparison to agricultural incomes without such support. On average, throughout the entire research period, due to the impact of the CAP, disparity of agricultural income without support was as much as 72% higher in comparison to differentiation of agricultural income with the CAP subsidies. This allows us to positively verify the hypothesis that: subsidies from the CAP cause a decrease in the differences between average agricultural income per farmer between the EU-15 and the EU-8 countries. The analyses also make it possible to state that, thanks to the CAP, agriculture in the EU-15 and EU-8 is on the path toward income convergence, thereby reducing income inequalities between farmers from these countries. These results are in line with Zawalińska *et al.* (2015). They found that since 2004 Poland and other new EU members began to catch up and then exceed the dynamics of agricultural income in the EU-15 countries. These results are also confirmed by Chmielewska (2018), who stated that in the EU after 2004 there was a convergence process of real agricultural income per full-time employee. Despite periodic fluctuations, the values of this category were levelled, especially between the EU-15 and EU-13 countries (13 new EU members after 2004).

## CONCLUSIONS

The research carried out allows us to conclude that in the investigated countries the agricultural income of FADN farms differs significantly. It is important to note that in 2005–2017 the average agricultural income without subsidies in the EU-15 was positive, while it was negative in the EU-8. Thanks to the financial support of the CAP, the average value of agricultural incomes increased, which allowed a positive agricultural income to be achieved in the EU-8. The added value of the analysis is primarily the statement that the CAP subsidies reduce the differences in agricultural income between the EU-15 and EU-8. In the process of economic integration, and as a result of the implementation of the CAP in the EU-8, income disparities between farmers in the EU-15 and EU-8 decreased. At the same time the reduction in income disparities, in the case of agricultural income including CAP subsidies, was relatively greater. Therefore, it can be concluded that the CAP contributes to increasing the economic sustainability of the EU agricultural sector and the territorial cohesion of agriculture in the analysed EU countries.

It is worth emphasising that our research also incorporated a broader debate connected with problems of agricultural protectionism in developed and developing

countries. The negative impact of agricultural protection in rich countries on developing countries is analysed, while the positive role of agricultural policy in the development of poor countries is still indicated (Chang, 2009; Timmer, 2009; World Bank, 2008; Hayami, Ruttan, 1985). The need to support agriculture is also debated considering new challenges connected with climate change, for example (Stępień, Czyżewski, 2019).

Diversification of income and direct payments among farmers in individual EU countries caused a demand for compensation for direct payments. Such a measure would be aimed at improving the competitiveness of agriculture. However, as Hamulczuk and Rembisz (2009) point out, while the income disparity in the relation between agriculture and other sectors was a premise for agricultural interventionism, the income disparity in the relation between agricultural income in one country and agricultural income in another country is not such a motive. These international differences in income may even be a theoretical premise for the agricultural development processes (Ghatak, Ingersent, 1984; Hayami, Ruttan, 1985), and the level of direct payments should depend on the effectiveness of the labour factor (Hamulczuk, Rembisz, 2009).

In the surveyed farms, the share of the CAP subsidies in the average income of agricultural holdings was relatively meaningful. This significance or even farm dependence on the CAP support is an area of controversy among economists and politicians. Farmers' dependence on EU payments may negatively affect productivity and the competitiveness of farmers, and make the income situation of farms dependent on the political situation (Zawalińska et al., 2015; Hamulczuk, Rembisz 2009). Moreover, the current method of granting the CAP payments results in their uneven distribution. So the question arises as to how much the CAP payments contribute to the economic and social sustainability of farms in the microeconomic level within particular branches or regions. In this context, it is pointed out that the development of agricultural policy should not be based on one-size-fits-all solutions, but should be more related to the regional context. However, as a side effect, this can lead to making the agricultural policy more complex rather than achieving its simplification. Given the above issues, and despite the long history of the CAP, agricultural incomes remain a subject of discussion, and therefore the advantages and disadvantages of supporting the farm income need more in-depth research.

## BIBLIOGRAPHY

- Baer-Nawrocka, A. (2013). Wpływ Wspólnej Polityki Rolnej na efekty dochodowe w rolnictwie nowych krajów członkowskich Unii Europejskiej. *Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Polityki Europejskie, Finanse i Marketing*, 9(58), 34–44.

- Boyle, G. E., McCarthy, T. G. (1997). A Simple Measure of  $\beta$ -convergence. *Oxford Bulletin of Economics and Statistics*, 59(2), 257–264. DOI: 10.1111/1468-0084.00063.
- Chang, H.-J. (2009). Rethinking public policy in agriculture: lessons from distant and recent. *Policy Assistance Series*, 7, Rome: FAO.
- Chmielewska, B. (2018). Zmiany zróżnicowania dochodów rolniczych w państwach członkowskich Unii Europejskiej. *Zagadnienia Ekonomiki Rolnej*, 2(355), 61–75. DOI: 10.30858/zer/92062.
- Commission of the European Communities (1982). Indicators of Farm Income. Working document of the Services of the Commission, VI/308/82 EN (0082d), Brussels.
- Czyżewski, A., Stępień, S. (2017). Nowe uwarunkowania ekonomiczne wspólnej polityki rolnej (WPR) Unii Europejskiej. *Ekonomista*, 6, 675–697.
- Czyżewski, B., Poczta-Wajda, A. (2016). Effects of Policy and Market on Relative Income Deprivation of Agricultural Labour. Presentation for conference 160th EAAE Seminar “Rural Jobs and the CAP”, Warsaw, December 1–2.
- Czyżewski, B., Smędzik-Ambroży, K. (2017). The regional structure of the CAP subsidies and the factor productivity in agriculture in the EU–28. *Agricultural Economics – Czech*, 63, 149–163. DOI: 3001.0012.2937.
- Dow, G. K., Reed, C. G. (2013). The Origins of Inequality: Insiders, Outsiders, Elites, and Commoners. *Journal of Political Economy*, 121(3), 609–641. DOI: 10.1086/670741.
- EUFADN (2019). Retrieved from: [https://ec.europa.eu/agriculture/rica/concept\\_en.cfm](https://ec.europa.eu/agriculture/rica/concept_en.cfm) (2019.09.16).
- FADN (2020). Retrieved from: <https://fadn.pl/metodyka/zbieranie-danych/formularze-danych-do-doboru-arozpro/> (2020.02.13).
- Ghatak, S., Ingersent, K. (1984). *Agriculture and Economic Development*. Baltimore: The Johns Hopkins University Press.
- Guth, M., Smędzik-Ambroży, K., Czyżewski, B., Stępień, S. (2020). The Economic Sustainability of Farms under Common Agricultural Policy in the European Union Countries. *Agriculture*, 10(2), 1–20. DOI: 10.3390/agriculture10020034.
- Hamulczuk, M., Rembisz, W. (2009). Kwestie wyrównania dopłat bezpośrednich producentom rolnym w Unii Europejskiej. *Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Problemy Rolnictwa Światowego*, 9, 35–45.
- Hayami, Y., Ruttan, V. W. (1985). *Agricultural Development: An International Perspective*. Baltimore: John Hopkins University Press.
- Hill, B., Bradley, D. (2015). *Comparison of Farmers’ Incomes in the EU Member States*. Study for the European Parliament’s Committee on Agriculture and Rural Development. Brussels: European Parliament.
- Josling, T., Anderson, K. (2017). *The EU’s Common Agricultural Policy at Fifty: an Outside View*. Hague: Dutch Ministry of Agriculture.
- European Commission (1997). European Union Treaty of Amsterdam, Amsterdam. Retrieved from: [http://europa.eu/eulaw/decisionmaking/treaties/pdf/treaty\\_of\\_amsterdam/treaty\\_of\\_amsterdam\\_en.pdf](http://europa.eu/eulaw/decisionmaking/treaties/pdf/treaty_of_amsterdam/treaty_of_amsterdam_en.pdf) (2015.11.16).
- European Commission (2019). An introduction to EU Cohesion Policy 2014–2020. Retrieved from: [https://ec.europa.eu/regional\\_policy/sources/docgener/informat/basic/basic\\_2014\\_en.pdf](https://ec.europa.eu/regional_policy/sources/docgener/informat/basic/basic_2014_en.pdf) (2019.09.11).
- Kusideł, E. (2013). *Konwergencja gospodarcza w Polsce i jej znaczenie w osiąganiu celów polityki spójności*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.

- Latruffe, L., Diazabakana, A., Bockstaller, Ch., Desjeux, Y., Finn, J., Kelly, E., Ryan, M., Uthes, S. (2016). Measurement of sustainability in agriculture: a review of indicators. *Studies in Agricultural Economics*, 118, 123–130. DOI: 10.7896/j.1624.
- Malaga, K. (2004). *Konwergencja gospodarcza w krajach OECD w świetle zagregowanych modeli wzrostu*. Poznań: Wydawnictwo Akademii Ekonomicznej w Poznaniu.
- Matuszczak, A., Smędzik-Ambroży, K. (2013). Próba ocen współzależności pomiędzy zrównoważeniem środowiskowym a wynikami ekonomicznymi gospodarstw rolnych na przykładzie regionu Wielkopolska i Śląsk. In: J. S. Zegar (Ed.), *Z badań nad rolnictwem społecznie zrównoważonym*, 19 (pp. 128–161). Warszawa: IERIGŻ.
- Pocza-Wajda, A. (2017). *Polityka wspierania rolnictwa a problem deprywacji dochodowej rolników w krajach o różnym poziomie rozwoju*. Warszawa: PWN.
- Rembisz, W. (2010). The Critical Analysis of the Intervention Basis and Evolution in Agriculture. *Współczesna Ekonomia*, 4(4), 7–15.
- Runowski, H. (2017). Problem oceny poziomu dochodów rolniczych w Unii Europejskiej. *Roczniki Naukowe SERiA*, XIX(5), 185–190. DOI: 10.5604/01.3001.0010.6233.
- Sala-i-Martin, X. (1996). The classical approach to convergence analysis. *The Economic Journal*, 106(437), 1019–1036. DOI: 10.2307/2235375.
- Smędzik-Ambroży, K. (2018). *Zasoby a zrównoważony rozwój rolnictwa w Polsce po akcesji do Unii Europejskiej*. Warszawa: PWN.
- Smędzik-Ambroży, K., Guth, M. (2019). Subsidies from the Common Agricultural Policy of the EU versus Agricultural Incomes in the European Union Countries in 2005–2015. *Hradec Economic Days*, 9(2), 307–316.
- Stępień, S., Czyżewski, A. (2019). Quo vadis Common Agricultural Policy of the European Union?. *Management*, 23(2), 295–309. DOI: 10.2478/manment-2019-0032.
- Stępień, S., Guth, M., Smędzik-Ambroży, K. (2018). Rola Wspólnej Polityki Rolnej w kreowaniu dochodów gospodarstw rolnych w Unii Europejskiej w kontekście zrównoważenia ekonomiczno-społecznego. *Zeszyty Naukowe SGGW w Warszawie; Problemy Rolnictwa Światowego*, 18(3), 295–305. DOI: 10.22630/PRS.2018.18.3.87.
- Stoeckel, A. (2000). *Solving the Problem – The Political Economy of Agricultural Reform*. Barton: Rural Industries Research and Development Corporation – Centre for International Economics.
- Swinnen, J. (2015). *The Political Economy of the 2014–2020 Common Agricultural Policy. An Imperfect Storm*. London: Centre for European Policy Studies – Brussels: Rowman and Littlefield International.
- Timmer, C. P. (2009). *A world without agriculture. The structural transformation in historical perspective*. Washington DC: The American Enterprise Institute for Public Policy Research.
- World Bank (2008). *World Development Report, 2008: Agriculture for development*. Washington: World Bank, DC, USA.
- Wrzaszcz, W. (2012). Czynniki kształtujące zrównoważenie gospodarstw rolnych. *Journal of Agribusiness and Rural Development*, 2(24), 285–296.
- Zawalińska, K., Majewski, E., Wąs, A. (2015). Long-Term Changes in the Incomes of the Polish Agriculture Compared to the European Union Countries. *Roczniki Naukowe SERiA*, XVII(6), 346–354.



### *Summary*

The aim of paper is to answer to the question whether the EU's Common Agricultural Policy reduces the differences in the average agricultural income between the EU-15 countries and those that joined the EU in 2004. The hypothesis was assumed that the CAP subsidies reduce the differences in agricultural income between these two groups of countries. Spreads between average income of farmers from the old and new members were calculated. The analysis is carried out in two variants. In the first one, the agricultural income does not include the CAP support, in the second one the agricultural income covers all CAP subsidies. The spatial scope of research involves two groups of countries: EU-15 (Belgium, the Netherlands, Luxembourg, France, Germany, Italy, the United Kingdom, Denmark, Ireland, Greece, Spain, Portugal, Finland, Austria and Sweden) and EU-8 (the Czech Republic, Poland, Slovakia, Lithuania, Latvia, Estonia, Hungary and Slovenia). The subjective scope of the survey covers representative farms from the EU countries (representing 4,045,300–5,295,930 farms in the EU countries, depending on the investigated year). The time frame of the analyses concerns the years 2005–2017. The data from the Farm Accountancy Data Network (FADN) are used. The study positively verifies the hypothesis that: subsidies from the CAP cause a decrease in the differences in average agricultural income between the EU-15 and the EU-8 countries. This contributes to an increase in economic sustainability and in the territorial cohesion of agriculture for the EU countries.

*Keywords:* agricultural income, income disparities, the European Union, the Common Agricultural Policy.

### **Wpływ polityki rolnej na zróżnicowanie dochodów rolników w Unii Europejskiej w latach 2005–2017**

#### *Streszczenie*

Celem artykułu była odpowiedź na pytanie, czy polityka rolna UE powoduje zmniejszanie różnic w wartości dochodów rolniczych pomiędzy krajami UE-15 i krajami, które przystąpiły do UE w 2004 roku (UE-8). W artykule postawiono hipotezę, że subwencje ze wspólnej polityki rolnej (WPR) powodują zmniejszanie różnic w dochodach rolniczych pomiędzy tymi grupami krajów. Obliczono rozpiętości pomiędzy średnimi dochodami rolników z krajów UE-15 i UE-8 (tj. bez Malty i Cypru). Analizę zrealizowano w dwóch wariantach. W pierwszym, dochód rolników nie obejmował wsparcia WPR, w drugim wariantcie, dochody rolników uwzględniały różne subwencje WPR. Zakres przestrzenny analiz obejmował kraje UE-15 (tzw. stare kraje), czyli: Belgię, Niemcy, Włochy, Wielką Brytanię, Danię, Irlandię, Grecję, Hiszpanię, Portugalię, Finlandię, Austrię i Szwecję oraz kraje UE-8 (tzw. nowe kraje), czyli: Czechy, Estonię, Litwę, Łotwę, Polskę, Słowację, Słowenię i Węgry. Zakres podmiotowy obejmował reprezentatywne gospodarstwa rolne z tych krajów (reprezentowały one w zależności od roku od 4 045 300 gospodarstw do 5 295 930 gospodarstw rolnych w krajach UE). Analizy obejmowały lata 2005–2017. Dane pochodziły z europejskiego FADN (*Farm Accountancy Data Network*). W wyniku analiz pozytywnie zweryfikowano hipotezę, że subwencje z WPR powodują zmniejszanie różnic w dochodach rolniczych pomiędzy UE-15 i grupą krajów, które przystąpiły do UE w 2004 roku. Przyczynia się to do zwiększenia zrównoważenia ekonomicznego oraz powoduje zwiększenie spójności terytorialnej rolnictwa z krajów UE.

*Słowa kluczowe:* dochody rolnicze, nierówności dochodowe, Unia Europejska, wspólna polityka rolna.

JEL: F02, F49, H29.

*Julia Włodarczyk, dr hab.*<sup>1</sup> 

Department of Economics  
University of Economics in Katowice

## Gender differences in income distributions in Poland

### INTRODUCTION

Gender differences manifest themselves in a variety of economic phenomena, with the persistence of disparities between distributions of income earned by women and men being one of the most expressive and widely discussed issues.

A growing amount of literature investigates gender-based income inequality, its causes and consequences. A greater interest in this area over the last decades was brought about by the increasing number of women entering the labour market, their greater financial independence, the emergence of a substantial gender pay gap in many countries and the observation that lower earnings of women together with their shorter working lives reduce their pension entitlements, which translates into a greater risk of poverty (Gregory, 2009). This is a vital issue, especially if wage reflects not only the individual's education and previous professional experience, but also expected labour market participation in the future (Goldin, 2014), as well as stronger or weaker gender identity norms, such as an aversion to situations when wives earn more than their husbands (cf. Bertand et al., 2015; Hederos Eriksson, Stendberg, 2015). Besides, even gender differences in the attitude toward competition and remuneration schemes are likely to include discriminatory effects (Heinz et al., 2016).

The relationship between economic growth and gender income inequalities is dynamic and was found to exhibit an inverted-U shape, in the form of a Kuznets' curve (Lantican et al., 1996). The decline in inequality at a certain stage of economic development can be attributed to the narrowing that occurs in such dimensions like labour force participation, paid hours of work (both out of home and at home) or education (Goldin, 2014). Another important process contributing to the decline in

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<sup>1</sup> Correspondence address: Bogucicka 3, 40-228 Katowice; e-mail: julia.wlodarczyk@ue.katowice.pl, tel. +48 32 25 77 255. ORCID: 0000-0001-5689-454X.

gender income inequalities is associated with globalisation. Competition through trade reduces costly discrimination against women in the labour market (Black, Brainerd, 2004). Long run trends in gender income inequality have been discussed much more often than the changes occurring within a business cycle, even though positive and negative shocks to the economy do not have the same impact on different groups of individuals, e.g. those belonging to different income quintiles (Hoover et al., 2009; see also Barlevy, Tsiddon, 2006). For instance, fluctuations in the unemployment rate may translate through different channels to the wages of women and men (O'Neill, 1985; Kandil, Woods, 2002; Razzu, Singleton, 2016; Bonhomme, Hospido, 2017). In particular, Bonhomme and Hospido (2017) demonstrate that male earning inequality is strongly countercyclical and follows the changes in the unemployment rate, while the results for women are different (the evidence for countercyclicality is much weaker). Interestingly, the global financial crisis affected female employment less than male employment; however, the austerity measures had a greater impact on women (Périvier, 2018).

In general, there are two approaches to measuring the gender aspects of income inequalities. The more restrictive form compares hourly wage when performing exactly the same job (preferably controlling for age, education, years of experience etc.) (e.g. Goraus et al., 2017). The less restrictive form is based not only on wages and salaries, but also other sources of income such as investments, pensions and other benefits. This paper adopts the less restrictive approach and analyses gender differences in net individual income. The emphasis is put on whole distributions, because the problem of gender inequalities cannot be reduced to differences in average or median incomes. Income distributions of women and men overlap and are strongly skewed, which precludes the reliance on mean-based methods in the analyses (Costa, 2019).

Naturally, data on individual net monthly income do not illustrate consumption possibilities nor the welfare of a given individual, due to the more or less equal pooling of resources within households or families. However, such an approach may lead to neglecting or underestimating gender income inequalities. Besides, a certain individual level of income can be regarded as a social right (Fritzell, 1999).

The aim of this paper is twofold. Firstly, it attempts to demonstrate structural differences and similarities between income distributions among women and men in Poland. The second objective is to present the evolution of income distributions over time in order to indicate business cycle issues which are still scarcely discussed in the literature on gender income inequality. The analysis is conducted first for whole income distributions, and then its scope is restricted to top income inequality.

The special focus on top income inequality is justified by the fact that it is the upper end of income distribution that is likely to contribute most to the existing inequalities. Furthermore, gender inequality at the top of the income distribution has started to attract the attention of a growing number of researchers (e.g. Boschini et

al., 2017; Atkinson et al., 2018; Piketty et al., 2018; Ravaska, 2018; Bobilev et al., 2020; Yavorsky et al., 2019). However, so far no such analyses have been conducted for Poland.

In this paper income distribution is understood as an ordered vector of individual incomes for the population as a whole or for subpopulations of women and men. The analysis employs the dataset developed under the Social Diagnosis project, which was based on the panel research conducted biannually up to 2015 by the Council for Social Monitoring (2019)<sup>2</sup>. During the years 2003–2015, the survey included a question on individual net monthly income over the past three months. Not all respondents reported their income and in some waves there are no records with zero income in the database. Therefore, the analysis is conducted only for individuals who declared their actual value of income and whose income was greater than zero. Furthermore, in order to reduce differences associated with the age of entering and exiting the labour market on declared income levels (especially pensions), the calculations include only women and men aged 25–60 years.

The added value of the paper lies in the methods adopted and the scope of analysis. Firstly, the analysis goes beyond the standard summary statistics and employs kernel density estimates (for static comparisons) and simultaneous quantile regressions (for dynamic comparisons). This is also the first paper to discuss the gender aspects of top income inequality in Poland.

The paper is organised as follows. The following section presents detailed income distributions for women and men in Poland. In the next section the focus is on the top tail of the income distribution for both women and men. The final section contains conclusions.

## COMPARISON OF INCOME DISTRIBUTIONS OF WOMEN AND MEN FOR THE WHOLE SAMPLE

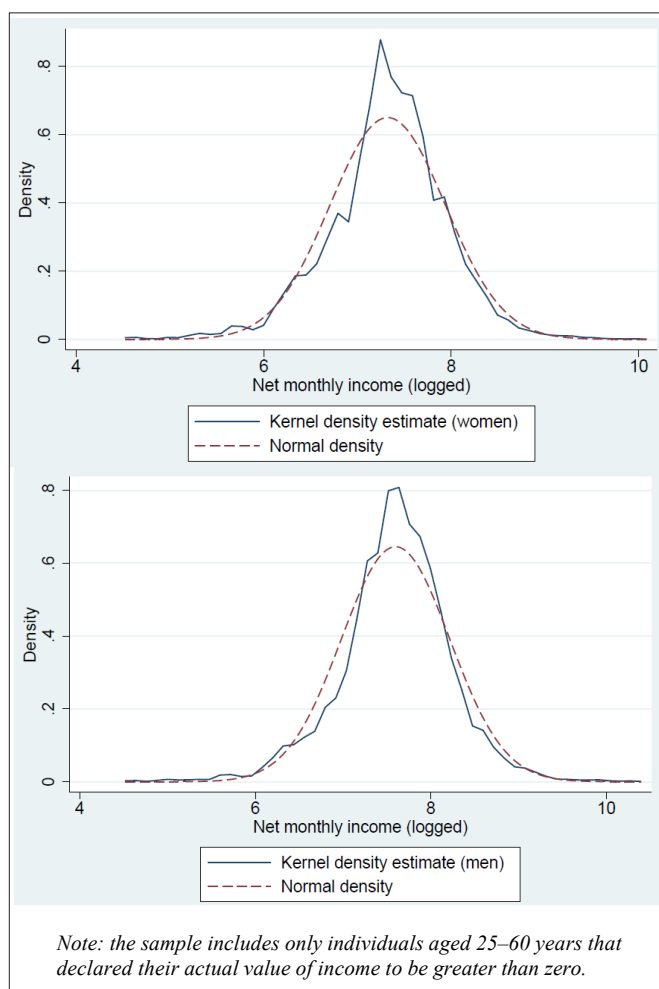
### STATIC PERSPECTIVE

The starting point for the analysis of income distributions of women and men in Poland is based on standard measures such as mean income, median income and related measures, as well as the Gini coefficient, Theil index and entropy index. Their values calculated on the basis of seven waves of the panel research conducted by the Council for Social Monitoring for the whole sample and subsamples of women and men are presented in Appendix 1.

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<sup>2</sup> Even though the data from the Social Diagnosis project were extensively described in a series of reports, the issue of gender differences in income was just mentioned (e.g. Czapiński, 2015) or presented from the point of view of the extent of wage discrimination when controlling for age, occupational status and education (e.g. Panek, Czapiński, 2015).

On average, women in Poland received a lower income than men, and their incomes were characterised by a lower dispersion in absolute and relative terms. This can be illustrated in detail with kernel density estimates (Appendix 2). For both selected years (2003 and 2015), the values of the kernel density for women are concentrated around the lower values of income and exhibit a peak that is higher than that for men. Shaikh *et al.* (2014) noted that despite these significant differences, both distributions are similar and close to exponential (lognormal). Figure 1 presents kernel density estimates for logarithms of net monthly income received by women and men in 2015.



**Figure 1. Kernel density estimates for logarithms of net monthly income received by women (upper panel) and men (lower panel) in Poland in 2015**

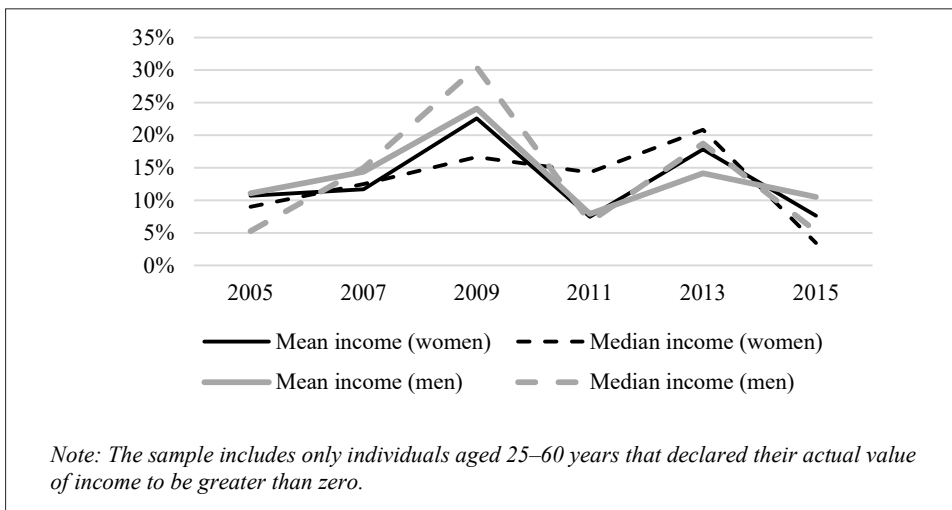
Source: own study based on the Council for Social Monitoring data (2019).

Figure 1 shows that both distributions of logged income seem to be close to normal, but the hypothesis that logged incomes are normally distributed can be rejected on the basis of the Shapiro-Francia test.

Inspecting basic summary statistics of distributions of logged incomes, one can see that in 2015 the greatest difference between women and men referred to the mean (and median), while variance, skewness and kurtosis were on a comparable level. Both distributions were slightly leptokurtic with a negative skewness close to zero.

#### DYNAMIC PERSPECTIVE

The fact that the mean and median incomes are behind the differentiation of the income distributions of women and men motivates the analysis of their dynamics. Over the 2003–2005 period, the mean income increased by 118% and the median income by 110.5% for men, while the mean (median) income increased only by 106.6% (104.4%) for women. However, the pace of growth of these values was not uniform over time (Figure 2).

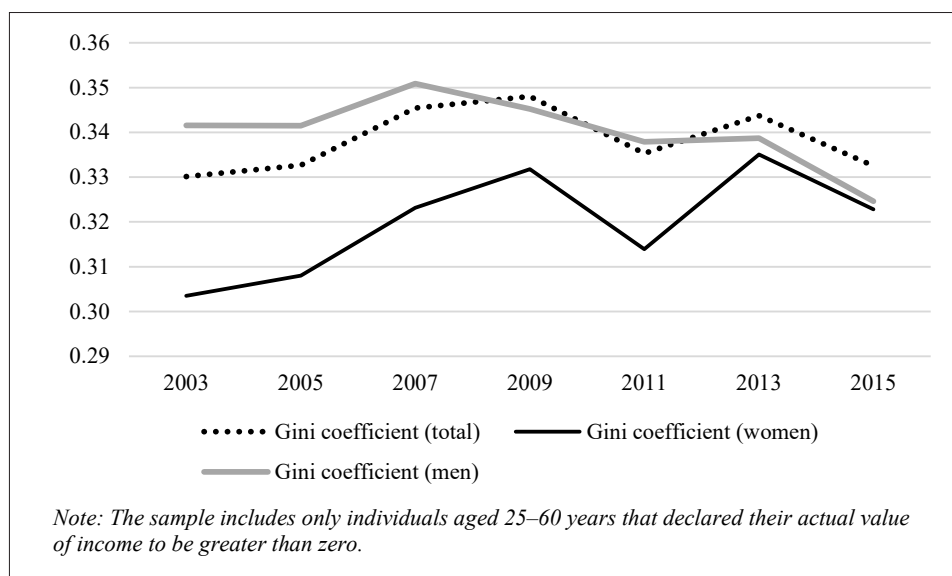


**Figure 2. Dynamics of mean and median incomes of women and men in Poland over 2003–2015 (biannual rate of growth)**

Source: own study based on the Council for Social Monitoring data (2019).

The fastest growth of all measures, except the median income for women, was observed in 2009 with a subsequent slowdown and boost – all consistent with the course of the business cycle.

As far as the inequality measures are concerned, a convergence in terms of all analysed measures could be observed (see Appendix 1 and Figure 3).



**Figure 3. Evolution of the Gini coefficient calculated upon net monthly income in Poland over 2003–2015**

Source: own study based on the Council for Social Monitoring data (2019).

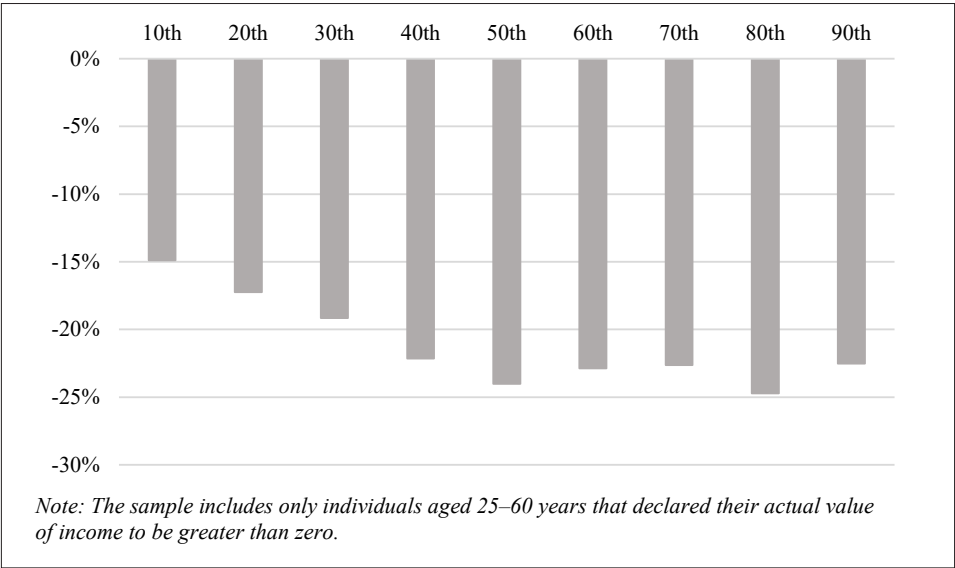
In particular, not only did the values of the Gini coefficient calculated for women converge on those of men (as exhibited in Figure 3), but a convergence of the Lorenz curves also took place (see Appendix 3)<sup>3</sup>.

For the whole sample, the greatest inequality was observed in 2009 (only the entropy index was higher in 2015). The situation was similar for a subsample of women (however, the Gini coefficient and the entropy index were the highest in 2013). Among men, the inequality was the highest in 2007. As a matter of fact, during the years 2003–2007 the inequality among men was significantly higher than in the whole population, and it thus contributed to overall inequality. The differences concerning the timing of the occurrence of greatest inequality among the analysed subsamples provide support for including business cycle considerations in the analysis of income inequalities (even though the period of analysis was relatively short and the frequency of the data was low).

In order to show how the situation of women and men in particular income percentiles changed over time, simultaneous quantile regressions were run (with income as a dependent variable and gender as an independent variable) (see Appendix 4 and Figures 4–5).

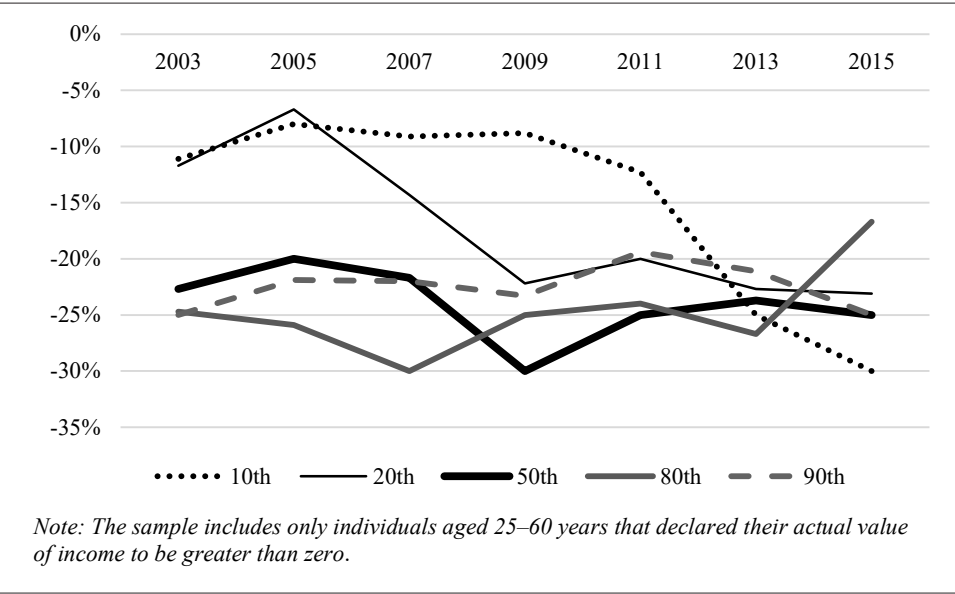
<sup>3</sup> Equality of the Gini coefficients does not imply coincidence of the Lorenz curves (see e.g. Włodarczyk, 2013).





**Figure 4. Average difference between female and male incomes for selected percentiles in Poland over 2003–2015 (in percentage)**

Source: own study based on the Council for Social Monitoring data (2019).



**Figure 5. Relative differences between female and male incomes for selected percentiles in Poland over 2003–2015**

Source: own study based on the Council for Social Monitoring data (2019).

Previous research has shown that the differences between women and men are most pronounced at higher earnings, to the disadvantage of women, and that the gap is usually wider at the 90th percentile than at the median (Gregory, 2009). In general, the results obtained from simultaneous quintile regressions confirm these findings, but not for the whole analysed period. During the years 2003–2007, at the 90<sup>th</sup> percentile, the relative difference between the incomes of women and men was greater than at the median, but during the period of 2009–2013, greater differences were observed around the median. In 2015, the difference was the same for both percentiles. Until 2011 the smallest differences were observed for the lowest income group (or the second in 2005). Since 2009 the difference for the lowest income group has steadily grown, which means that incomes of women did not catch up with those of men. This might have been caused either by the already mentioned not synchronized cyclical changes in income, the exceptional impact of the global financial crisis, or other factors such as different sources of net monthly income.

## GENDER ASPECTS OF TOP INCOME INEQUALITY

### STATIC PERSPECTIVE

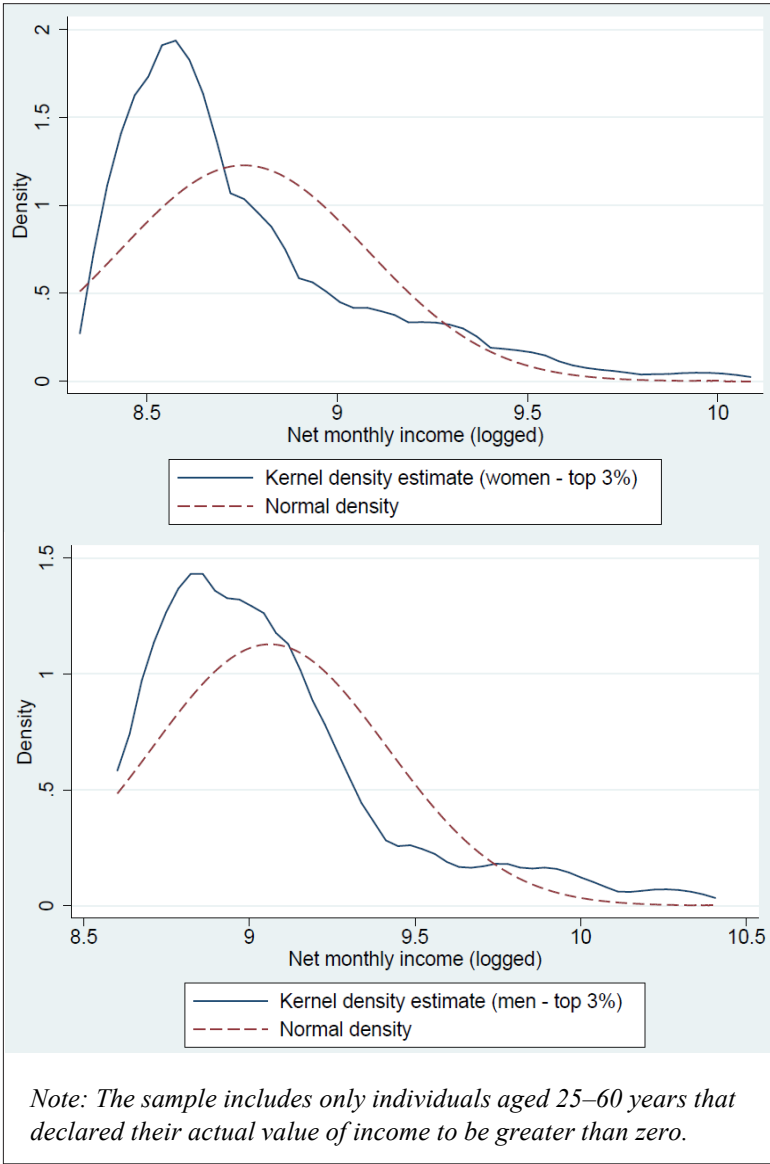
In this paper, top income inequality refers to the top 3% of the income distribution. The selected threshold corresponds to empirical works providing evidence that income distribution can be shown to be a composite of Pareto distribution for the 3% of population with the highest income, and Boltzmann-Gibbs distribution for the rest (for a review, see Włodarczyk, 2013). This mixture of distributions is a result of market incompleteness (Fiaschi, Marsili, 2012) and the coexistence of two distinct processes associated with income generation – one on the labour market (bottom tail) and the other on the capital market (top tail)<sup>4</sup>.

A first look at the standard descriptive statistics calculated for the top 3% of both income distributions (presented in Appendix 5) confirms that at the top women

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<sup>4</sup> Low-income individuals receive income mostly in the form of wages and salaries. As the changes in their income do not depend on their previous income, the process of income generation has an additive character, which results in an exponential (Boltzmann-Gibbs) income distribution. For individuals with the highest income, labour income is not as important as capital gains. Because of the multiplicative character of the generation of their income, the upper tail of income distribution follows the power law (Pareto) distribution (cf. Yakovenko, Rosser, 2009). In fact, Jagielski and Kutner (2013) demonstrated that there is yet another income class in the economy corresponding to a fraction of less than 0.2% of population with the highest income characterised by income distribution following the Zipf law; however, the available dataset precludes such an analysis. Nevertheless, they confirmed that in the European Union countries Boltzmann-Gibbs distribution refers to roughly 97% of the population.

in Poland received lower income than men and their incomes were characterised by a lower absolute dispersion. However, the top tail of both distributions exhibits a greater deviation from lognormal distribution than the income distribution encompassing the whole sample (Figure 6).



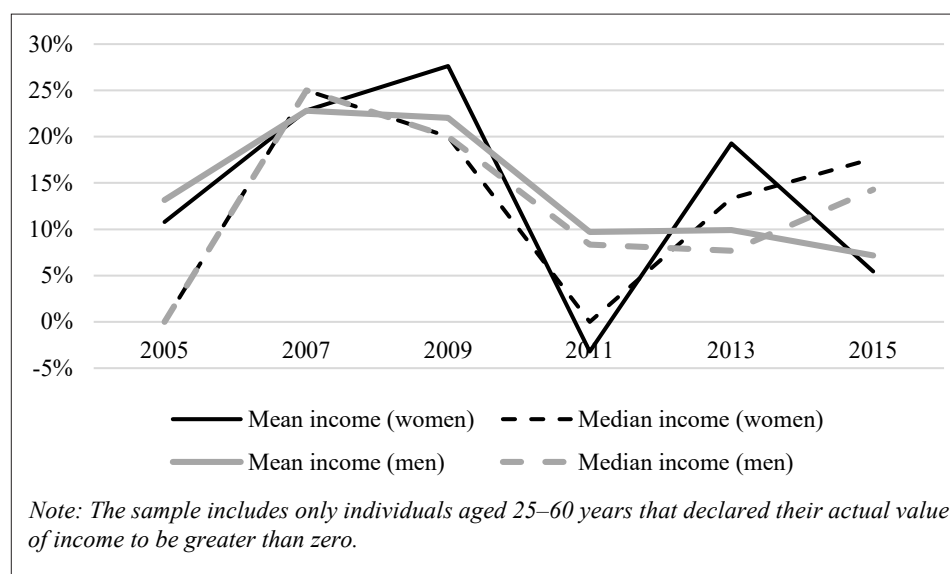
**Figure 6. Kernel density estimates for logarithms of net monthly income received by the top 3% of women (upper panel) and men (lower panel) in Poland in 2015**

Source: own study based on the Council for Social Monitoring data (2019).

Apart from the higher mean, the distributions displayed in Figure 6 are characterised by lower variance, positive skewness and slightly higher kurtosis as compared with the distributions presented in Figure 1.

#### DYNAMIC PERSPECTIVE

Throughout the analysed period, the median income of respondents with an income higher than the 97<sup>th</sup> percentile in each subpopulation rose by 100% both for women and men; however, the mean income rose by 119.2% for men and only 111.5% for women (compound rate of growth in nominal terms). As with the data presented in Figure 2, the pace of growth in these values followed the course of the business cycle (Figure 7).



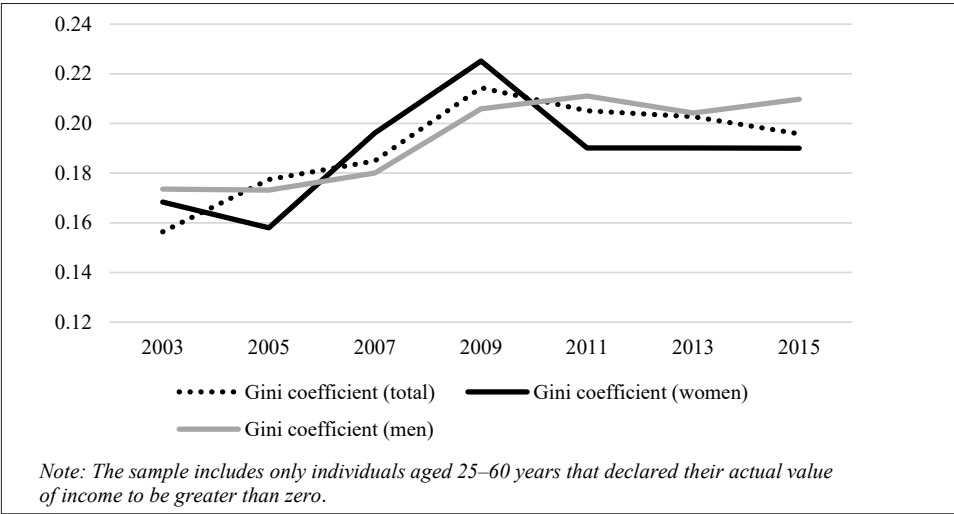
**Figure 7. Dynamics of mean and median income of women and men in Poland from the top 3% over 2003–2015 (biannual rate of growth)**

Source: own study based on the Council for Social Monitoring data (2019).

The most conspicuous feature of the data presented in Figure 7 is the variability of rates of growth of the mean and median incomes received by women, with the greatest collapse occurring between 2009 and 2011.

In terms of income inequality, the year 2009 was characterised by greatest disparities between women and men (see data in Appendix 5 and Figure 8).

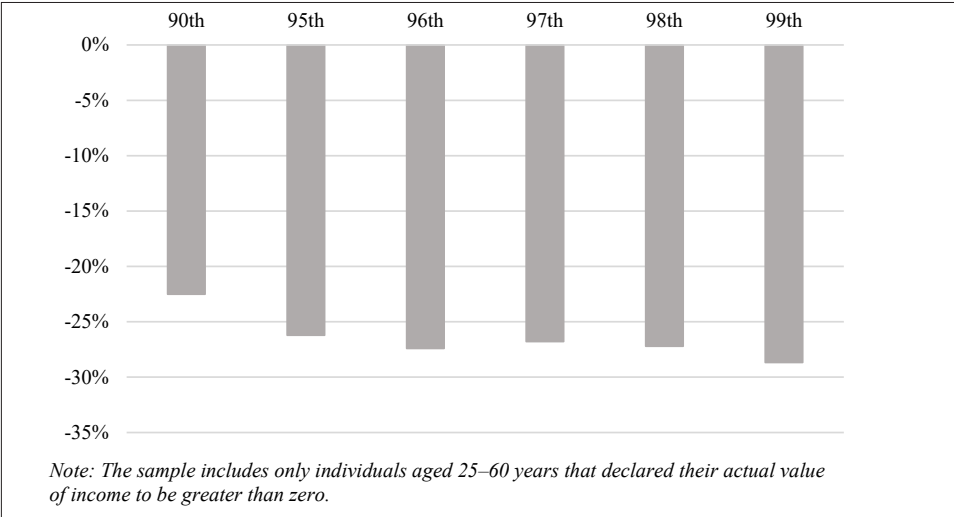
As exhibited in Figure 8 and in Appendix 5, higher inequality was observed among women twice (in 2007 and 2009), while for men it was five times with 2011 characterised by the highest inequality.



**Figure 8. Evolution of the Gini coefficient calculated upon net monthly income of women and men from the top 3% in Poland over 2003–2015**

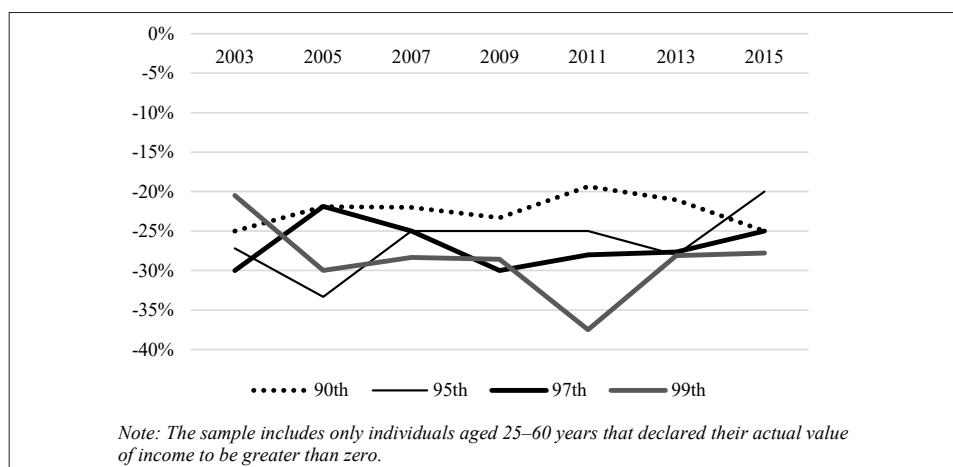
Source: own study based on the Council for Social Monitoring data (2019).

Similarly to the previous section, this analysis is supplemented with simultaneous quantile regressions with income as the dependent variable and gender as the independent variable (see Appendix 6 and Figures 9–10).



**Figure 9. Average difference between incomes for women and men for selected top percentiles in Poland over 2003–2015 (in percentage)**

Source: own study based on the Council for Social Monitoring data (2019).

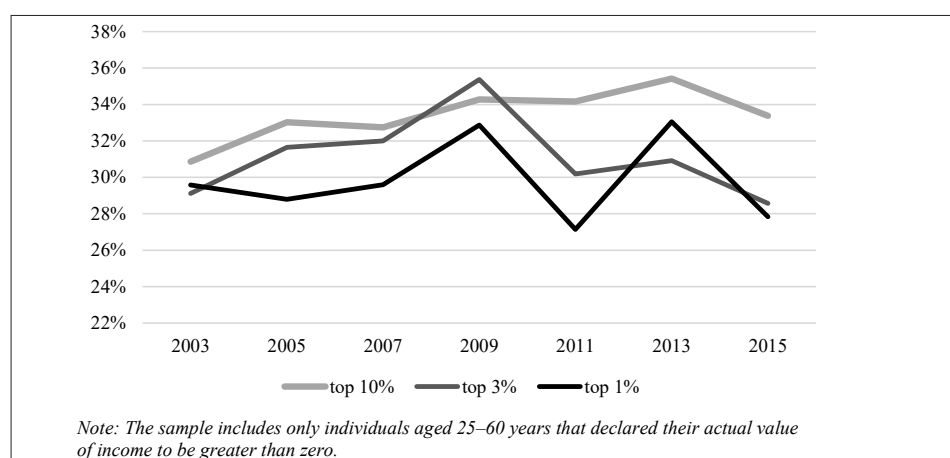


**Figure 10. Relative differences between incomes for women and men for selected top percentiles in Poland over 2003–2015**

Source: own study based on the Council for Social Monitoring data (2019).

On average, the difference between women and men was most pronounced at higher percentiles to the disadvantage of women, and was by several percentage points greater than in case of the percentiles displayed in Figures 4 and 5. This phenomenon partially explains overall gender income inequality.

Finally, an important indicator of gender differences at the top of the distribution (treated as a whole) is the share of women calculated for the top percentiles (see Figure 11).



**Figure 11. Share of women among the top income earners**

Source: own study based on the Council for Social Monitoring data (2019).

The share of women in the top 10% was the highest (with an average of 33.4% in the analysed period), the most stable and it exhibited a gradual increase over the years. The share of women in the top 3% and top 1% was lower (31.1% and 29.8%, respectively), much more variable and without a clear trend.

The observation that the share of women is decreasing for higher income groups is consistent with previous research (e.g. Boschini et al., 2017; Atkinson et al., 2018; Piketty et al., 2018; Ravaska, 2018; Bobilev et al., 2020). Most of these studies documented an increasing share of women among the top percentiles. However, a significant cross-country heterogeneity is observed. For instance, the share of women in the top 10% varies from around 15% in Switzerland to more than 40% in Slovenia (Bobilev et al., 2020).

### CONCLUDING REMARKS

This paper investigated gender differences in income distribution in Poland on the basis of survey data available for the years 2003–2015<sup>5</sup>. The sample included only women and men aged 25–60 years who declared their income to be greater than zero. Despite many shortcomings associated with the quality of the data (e.g. low frequency and possible non-representativeness), the analysis confirmed that the main difference in income distribution between women and men is the lower mean and median income received by women and that at higher percentiles the disadvantage of women is on average greater. Nevertheless, there are many similarities referring to the variance, skewness and kurtosis of the distributions, which imply that both for women and men income distribution is close to a lognormal distribution for all observations or exhibit similar deviations from the lognormal distribution for the top 3% of earners in both subpopulations.

The analysis revealed slightly different dynamics in the incomes of women and men that may result from structural and cyclical aspects of inequality. For instance, the proportion of women and men among different branches is not homogeneous and their situation over the business cycle may fluctuate differently. Also, concentrating on full-time earnings makes it impossible to capture the situation where, due to a recession for example, members of one subpopulation (men or women) are forced to quit full employment and need to resort to part-time jobs, while the other subpopulation is disproportionately less afflicted.

This requires further research, preferably based on longer time series, with data of higher frequency and covering a greater number of individuals (which is especially important when top incomes are investigated). Following the observations by Bakker and Creedy (2000), who found that the unemployment rate has a significant impact on income distribution for men in New Zealand, future research could investigate

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<sup>5</sup> Unfortunately, the Social Diagnosis project ceased to be funded after 2015, which makes it impossible to analyse the impact of programmes like “Family 500+” (introduced in April 2016) on the income distributions of women and men in Poland.



in greater detail the relationships between the parameters characterising income distributions for women and men where the macroeconomic variables change over the business cycle. Such analyses should include both labour and capital market developments and their impact on their male and female participants.

## BIBLIOGRAPHY

- Atkinson, A. B., Casarico, A., Voitchovsky, S. (2018). Top incomes and the gender divide. *The Journal of Economic Inequality*, 16(2), 225–256. DOI: 10.1007/s10888-018-9384-z.
- Bakker, A., Creedy, J. (2000). Macroeconomic variables and income distribution: Conditional modelling with the generalised exponential. *Journal of Income Distribution*, 9(2), 183–197. DOI: 10.1016/S0926-6437(00)00006-8.
- Barlevy, G., Tsiddon, D. (2006). Earnings inequality and the business cycle. *European Economic Review*, 50(1), 55–89. DOI: 10.1016/j.euroecorev.2004.08.001.
- Bertrand, M., Kamenica, E., Pan, J. (2015). Gender Identity and Relative Income within Households. *The Quarterly Journal of Economics*, 130(2), 571–614. DOI: 10.1093/qje/qjv001.
- Black, S. E., Brainerd, E. (2004). Importing Equality? The Impact of Globalization on Gender Discrimination. *Industrial and Labor Relations Review*, 57(4), 540–559. DOI: 10.3386/w9110.
- Bobilev, R., Boschini, A., Roine, J. (2020). Women in the Top of the Income Distribution: What Can We Learn From LIS-Data? *Italian Economic Journal*, 6, 63–107. DOI: 10.1007/s40797-019-00108-w.
- Bonhomme, S., Hospido, L. (2017). The Cycle of Earnings Inequality: Evidence from Spanish Social Security Data. *The Economic Journal*, 127(603), 1244–1278. DOI: 10.1111/eoj.12368.
- Boschini, A., Gunnarsson, K., Roine, J. (2017). Women in top incomes: evidence from Sweden 1974–2013. *Working Paper No. 10979*. Bonn: Institute of Labor Economics.
- Costa, M. (2019). The evaluation of gender income inequality by means of the Gini index decomposition. *Working Paper DSE No. 1130*. Quaderni, Bologna: University of Bologna.
- Council for Social Monitoring (2019). Integrated database. Retrieved from: <http://www.diagnoza.com/> (2019.7.2).
- Czapiński, J. (2015). Indywidualna jakość i styl życia. *Contemporary Economics*, 9(4), 200–331. DOI: 10.5709/ce.1897-9254.190.
- Fiaschi, D., Marsili, M. (2012). Distribution of wealth and incomplete markets: Theory and empirical evidence. *Journal of Economic Behavior & Organization*, 81(1), 243–267. DOI: 10.1016/j.jebo.2011.10.015.
- Fritzell, J. (1999). Incorporating Gender Inequality into Income Distribution Research. *International Journal of Social Welfare*, 8, 56–66. DOI: 10.1111/1468-2397.00062.
- Goldin, C. (2014). A Grand Gender Convergence: Its Last Chapter. *American Economic Review*, 104(4), 1091–1119. DOI: 10.1257/aer.104.4.1091.
- Goraus, K., Tyrowicz, J., van der Velde, L. (2017). Which Gender Wage Gap Estimates to Trust? A Comparative Analysis. *Review of Income and Wealth*, 63, 118–146. DOI: 10.1111/roiw.12209.

- Gregory, M. (2009). Gender and Economic Inequality. In: W. Salverda, B. Nolan, T. M. Smeeding (Eds.), *The Oxford Handbook of Economic Inequality* (pp. 284–312). Oxford – New York: Oxford University Press.
- Hederos Eriksson, K., Stenberg, A. (2015). Gender Identity and Relative Income within Households: Evidence from Sweden. *IZA Discussion Paper No. 9533*. Bonn: The Institute for the Study of Labor (IZA).
- Heinz, M., Normann, H.-T., Rau, H. A. (2016). How competitiveness may cause a gender wage gap: Experimental evidence. *European Economic Review*, 90, 336–349. DOI: 10.1016/j.euroecorev.2016.02.011.
- Hoover, G. A., Giedeman, D. C., Dibooglu, S. (2009). Income inequality and the business cycle: A threshold cointegration approach. *Economic Systems*, 33(3), 278–292. DOI: 10.1016/j.ecosys.2009.04.002.
- Jagielski, M., Kutner, R. (2013). Modelling of income distribution in the European Union with the Fokker–Planck equation. *Physica A*, 392, 2130–2138. DOI: 10.1016/j.physa.2013.01.028.
- Kandil, M., Woods, J. G. (2002). Convergence of the gender gap over the business cycle: a sectoral investigation. *Journal of Economics and Business*, 54(3), 271–292. DOI: 10.1016/S0148-6195(02)00061-9.
- Lantican, C. P., Gladwin, C. H., Seale, Jr., J. L. (1996). Income and gender inequalities in Asia: Testing alternative theories of development. *Economic Development and Cultural Change*, 44(2), 235–263. DOI: 10.1086/452212.
- Litchfield, J.A. (1999). *Inequality: Method and Tools*. Washington D.C.: The World Bank. Retrieved from: <http://www.worldbank.org/poverty/inequal/index.htm> (2019.09.17).
- O'Neill, J. (1985). The Trend in the Male-Female Wage Gap in the United States. *Journal of Labor Economics*, 3(1), S91–S116.
- Panek, T., Czapinski, J. (2015). Wykluczenie społeczne. *Contemporary Economics*, 9(4), 396–432. DOI: 10.5709/ce.1897-9254.193.
- Périvier, H. (2018). Recession, austerity and gender: A comparison of eight European labour markets. *International Labour Review*, 157(1), 1–37. DOI: 10.1111/ilr.12032.
- Piketty, T., Saez, E., Zucman, G. (2018). Distributional national accounts: methods and estimates for the United States, 1913–2013. *The Quarterly Journal of Economics*, 133(2), 553–609. DOI: 10.1093/qje/qjx043.
- Ravaska, T. (2018). Top incomes and income dynamics from a gender perspective: evidence from Finland 1995–2012. *ECINEQ WP Society for the Study of Economy Inequality*, 469, 2–47.
- Razzu, G., Singleton, C. (2016). Gender and the business cycle: An analysis of labour markets in the US and UK. *Journal of Macroeconomics*, 47 (Part B), 131–146. DOI: 10.1016/j.jmacro.2015.12.006.
- Shaikh, A., Papanikolaou, N., Wiener, N. (2014). Race, gender and the econophysics of income distribution in the USA. *Physica A*, 415, 54–60. DOI: 10.1016/j.physa.2014.07.043/.
- Włodarczyk, J. (2013). Nierówności dochodowe w Polsce według rozkładów Pareto i Boltzmann-Gibbsa. *Studia Ekonomiczne*, 130, 76–87.
- Yakovenko, V. M., Rosser, J. B. (2009). Colloquium: Statistical mechanics of money, wealth, and income. *Reviews of Modern Physics*, 81(4), 1703–1725. DOI: 10.1103/RevModPhys.81.1703.

Yavorsky, J. E., Keister, L. A., Qian, Y., Nau, M. (2019). Women in the One Percent: Gender Dynamics in Top Income Positions. *American Sociological Review*, 84(1), 54–81. DOI: 10.1177/0003122418820702.

### *Summary*

The paper presents results of a descriptive analysis of income distributions as well as top income inequality among women and men in Poland. The analysis is based on the dataset provided by the Council for Social Monitoring (2019). Throughout 2003–2015 their panel survey included, for example, a question on individual net monthly income in the past three months. In order to reduce differences associated with the age of entering and exiting the labour market on declared income levels (especially pensions), the calculations include only women and men aged 25–60 years. The analysis of income distributions of women and men in Poland is based on standard measures such as mean income, median income and related measures, as well as the Gini coefficient, Theil index and entropy index. It is supplemented by kernel density estimates and results of simultaneous quantile regressions that demonstrate differences between women and men across income groups. The analysis of top income inequality includes comparisons of subsamples consisting of top 3% earners in each group. The share of women in the top percentiles is then calculated and discussed. The analysis shows different dynamics related to the incomes of women and men, which provides support for including business cycle considerations in the analysis of income inequalities and their gender aspects.

*Keywords:* income inequality, gender inequality.

## **Różnice w rozkładach dochodów kobiet i mężczyzn w Polsce**

### *Streszczenie*

W artykule przedstawiono wyniki analizy opisowej rozkładów dochodów kobiet i mężczyzn w Polsce ze szczególnym uwzględnieniem nierówności w grupie osób o najwyższych dochodach. Analizę oparto o bazę danych opracowaną przez Radę Monitoringu Społecznego (w ramach projektu Diagnostyka Społeczna). W latach 2003–2015 jedno z pytań zadawanych respondentom dotyczyło indywidualnego miesięcznego dochodu netto z ostatnich trzech miesięcy. W celu zmniejszenia wpływu różnic związanych z momentem wchodzenia na rynek pracy i przechodzenia na emeryturę analizę ograniczono do osób w wieku 25–60 lat.

W analizie rozkładów dochodów kobiet i mężczyzn w Polsce wykorzystano m.in. standardowe miary, takie jak średni dochód lub mediana dochodu oraz wskaźniki oparte na tych miarach, jak również współczynniki Giniego, Theila oraz entropii. Poza tym wykorzystano jądrowe estymatory gęstości i przedstawiono wyniki estymacji regresji kwantylowej pokazującej różnice dochodowe między kobietami i mężczyznami w różnych grupach dochodowych. Następnie dokonano porównania między podpróbami kobiet i mężczyzn uzyskujących najwyższe dochody (przyjęto próg 3% dla każdej płci). Przedstawiono również udział kobiet w grupie osób o najwyższych dochodach. Przeprowadzona analiza ujawniła m.in. zróżnicowanie dynamiki dochodów kobiet i mężczyzn, co stanowi argument za uwzględnieniem w analizie nierówności dochodowych także czynników cyklicznych, które mogą odmiennie oddziaływać na obie płci.

*Słowa kluczowe:* nierówności dochodowe, nierówność płci.

JEL: D31, J16.

## APPENDIX 1

Descriptive statistics of income distributions in Poland (2003–2015): a) whole sample, b) women, c) men.

a) Whole sample							
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
Year	2003	2005	2007	2009	2011	2013	2015
N	6987	6498	9701	19635	19777	11653	9612
Mean income	995.3249	1105.211	1245.667	1534.892	1651.672	1924.185	2104.944
Standard deviation	731.4435	819.2094	992.9986	1315.349	1306.365	1541.374	1591.217
Minimum income	41	100	100	100	100	100	100
Maximum income	14500	15000	20000	50000	30000	50000	30000
Median income	800	900	1000	1200	1400	1600	1800
CV	0.73488	0.74122	0.79716	0.85696	0.79094	0.80105	0.75594
Gini coefficient	0.33013	0.33265	0.34541	0.34802	0.33533	0.34376	0.33255
Theil index	0.19626	0.19843	0.21919	0.22610	0.20870	0.21581	0.20203
Entropy index	0.25043	0.23363	0.25260	0.25243	0.24451	0.28211	0.25986
GIG based on mean income	21.5%	21.8%	23.6%	24.5%	24.9%	22.4%	24.4%
GIG based on median income	22.7%	20.0%	21.7%	30.0%	25.0%	23.7%	20.0%
b) Women							
Year	2003	2005	2007	2009	2011	2013	2015
N	3672	3381	5188	10596	10734	6085	4956
Mean income	880.7372	975.0799	1088.98	1334.943	1434.648	1690.513	1819.939
Standard deviation	600.6849	674.6011	823.9445	1143.372	1026.723	1274.5	1301.496
Minimum income	41	100	100	100	100	100	100
Maximum income	13500	15000	16000	44000	16000	30000	22000
Median income	734	800	900	1050	1200	1450	1500
CV	0.68203	0.69184	0.75662	0.85649	0.71566	0.75391	0.71513
Gini coefficient	0.30350	0.30803	0.32313	0.33180	0.31389	0.33506	0.32284
Theil index	0.16827	0.17256	0.19584	0.21266	0.18098	0.20216	0.18820
Entropy index	0.20207	0.19690	0.21605	0.22108	0.20685	0.26837	0.24145
c) Men							
Year	2003	2005	2007	2009	2011	2013	2015
N	3315	3117	4513	9039	9043	5568	4656
Mean income	1122.253	1246.363	1425.789	1769.283	1909.278	2179.554	2408.312
Standard deviation	835.1396	931.3078	1130.795	1457.465	1535.885	1752.89	1801.686
Minimum income	43	100	100	100	100	100	100

1	2	3	4	5	6	7	8
Maximum income	14500	15000	20000	50000	30000	50000	30000
Median income	950	1000	1150	1500	1600	1900	2000
CV	0.74416	0.74722	0.79310	0.82376	0.80443	0.80424	0.74811
Gini coefficient	0.34153	0.34152	0.35088	0.34519	0.33790	0.33868	0.32462
Theil index	0.20690	0.20650	0.22266	0.21933	0.21413	0.21250	0.19555
Entropy index	0.29246	0.25849	0.27395	0.26377	0.26559	0.27145	0.25039

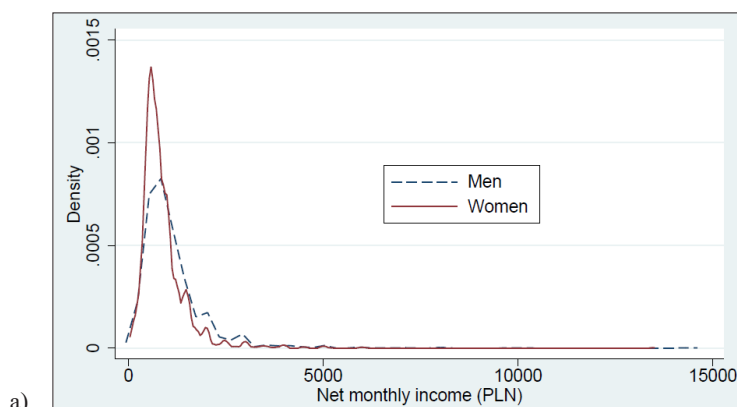
Note:  $N$  represents the number of individuals aged 25–60 years that declared their actual value of income to be greater than zero. Income is expressed in current prices in PLN and is not corrected for inflation.  $CV$  stands for the coefficient of variation. Theil index and entropy index belong to the groups of generalised entropy indices<sup>6</sup>. GIG (gender income gap) is calculated as a difference between mean (median) income of women and men expressed as a percentage of men's mean (median) income.

Source: own study based on the Council for Social Monitoring data (2019).

## APPENDIX 2

Kernel density estimates for income distributions of women and men in Poland:

a) 2003, b) 2015.



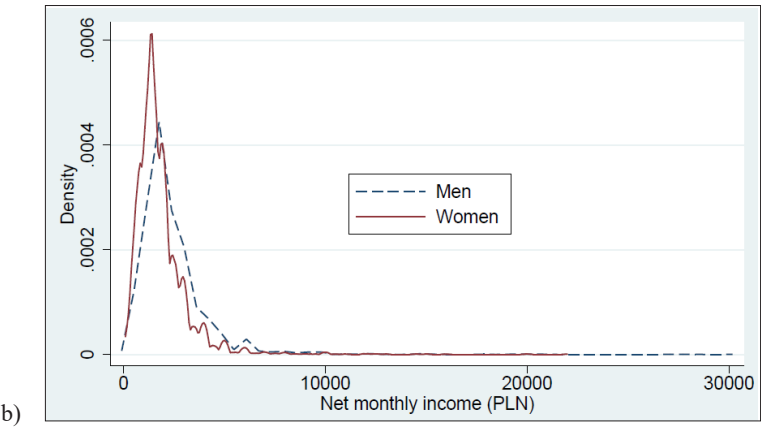
<sup>6</sup> Generalised entropy indices are calculated according to the following formula:

$$GE(\alpha) = \frac{1}{\alpha(\alpha-1)} \left[ \frac{1}{N} \sum_{i=1}^N \left( \frac{y_i}{\bar{y}} \right)^\alpha - 1 \right], \alpha \neq 0, \alpha \neq 1, \quad (1)$$

where  $N$  represents the number of individuals,  $y_i$  is the income of the individual  $i$ ,  $\bar{y}$  is the mean income, and  $\alpha$  is the parameter depicting sensitivity of the index to changes in particular segments of the distribution. Generalised entropy indices are more sensitive to changes in the lower tail of the income distribution for lower values of  $\alpha$ , while for higher values of  $\alpha$  they are more sensitive to changes in the upper tail (Litchfield, 1999).

The entropy index is calculated with the formula above for  $\alpha = -1$ , while for Theil index  $\alpha = 1$ , so it is calculated as:

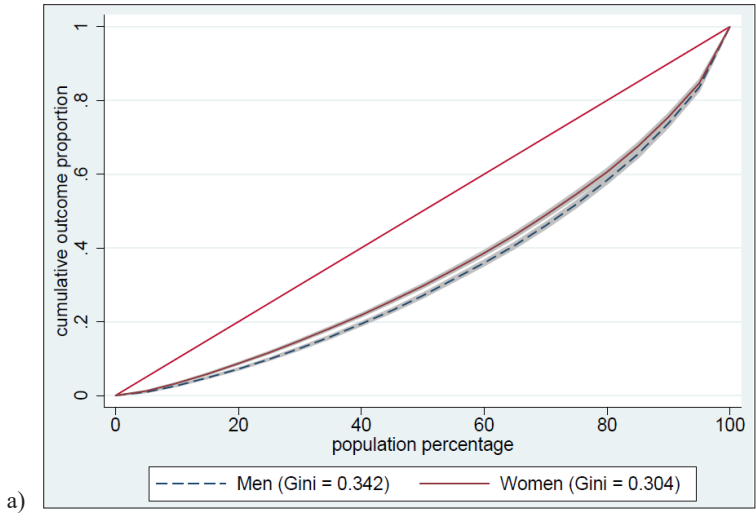
$$Theil\ index = GE(1) = \frac{1}{N} \sum_{i=1}^N \left( \frac{y_i}{\bar{y}} \right) \ln \left( \frac{y_i}{\bar{y}} \right) \quad (2)$$

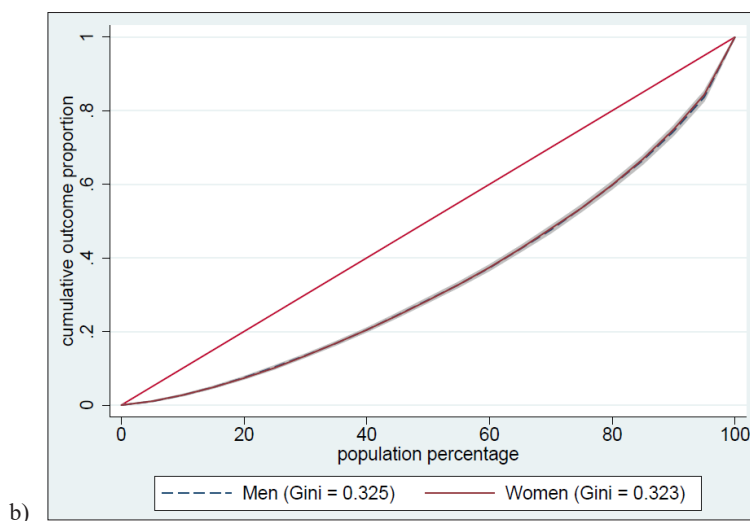


Source: own study based on the Council for Social Monitoring data (2019).

APPENDIX 3

Lorenz curves for income distributions of women and men in Poland: a) 2003, b) 2015.





Source: own study based on the Council for Social Monitoring data (2019).

## APPENDIX 4

Gender differences in income across selected percentiles. Results of simultaneous quantile regressions.

P	10th	20th	30th	40th	50th	60th	70th	80th	90th
2003									
F	-50*** (13.14)	-66*** (15.77)	-100*** (6.054)	-150*** (7.701)	-216*** (35.04)	-200*** (26.30)	-200*** (28.01)	-370*** (41.83)	-500*** (0)
Const.	450*** (12.74)	566*** (15.77)	700*** (4.994)	800*** (0)	950*** (29.01)	1000*** (19.36)	1200*** (27.09)	1500*** (0)	2000*** (0)
Diff.	11.1%	11.7%	14.3%	18.8%	22.7%	20.0%	16.7%	24.7%	25.0%
2005									
F	-40** (15.96)	-40*** (11.81)	-160*** (32.09)	-200*** (13.59)	-200*** (2.227)	-284*** (23.73)	-400*** (45.72)	-440*** (57.53)	-460*** (89.35)
Const.	500*** (5.340)	600*** (6.931)	780*** (27.58)	900*** (11.77)	1000*** (0)	1200*** (9.361)	1400*** (42.55)	1700*** (42.12)	2100*** (73.85)
Diff.	8.0%	6.7%	20.5%	22.2%	20.0%	23.7%	28.6%	25.9%	21.9%
2007									
F	-50*** (13.24)	-100*** (0.600)	-160*** (24.25)	-200*** (0)	-250*** (44.65)	-300*** (23.53)	-300*** (36.21)	-600*** (50.19)	-550*** (51.81)
Const.	550*** (12.86)	700*** (0.600)	860*** (24.25)	1000*** (0)	1150*** (44.58)	1300*** (23.53)	1500*** (30.56)	2000*** (34.28)	2500*** (0)
Diff.	9.1%	14.3%	18.6%	20.0%	21.7%	23.1%	20.0%	30.0%	22.0%



2009									
F	-56*** (14.54)	-200*** (3.561)	-210*** (34.60)	-240*** (31.84)	-450*** (22.54)	-500*** (24.33)	-500*** (26.98)	-600*** (53.19)	-700*** (61.05)
Const.	636*** (10.70)	900*** (3.433)	1050*** (32.39)	1240*** (31.08)	1500*** (0)	1700*** (24.33)	2000*** (0)	2400*** (45.33)	3000*** (0)
Diff.	8.8%	22.2%	20.0%	19.4%	30.0%	29.4%	25.0%	25.0%	23.3%
2011									
F	-86*** (12.97)	-200*** (0)	-232*** (11.82)	-364*** (22.18)	-400*** (30.25)	-400*** (25.52)	-500*** (21.58)	-600*** (31.67)	-600*** (92.58)
Const.	700*** (8.741)	1000*** (0)	1200*** (0)	1400*** (13.08)	1600*** (30.25)	1800*** (15.91)	2000*** (0)	2500*** (0)	3100*** (93.17)
Diff.	12.3%	20.0%	19.3%	26.0%	25.0%	22.2%	25.0%	24.0%	19.4%
2013									
F	-200*** (8.056)	-250*** (40.26)	-300*** (29.45)	-400*** (27.74)	-450*** (63.61)	-400*** (9.443)	-500*** (36.71)	-800*** (47.00)	-800*** (149.2)
Const.	800*** (7.929)	1100*** (22.78)	1400*** (16.72)	1600*** (23.64)	1900*** (46.32)	2000*** (0)	2500*** (27.14)	3000*** (0)	3800*** (149.2)
Diff.	25.0%	22.7%	21.4%	25.0%	23.7%	20.0%	20.0%	26.7%	21.1%
2015									
F	-300*** (31.08)	-300*** (14.07)	-300*** (11.49)	-424*** (36.10)	-500*** (6.305)	-500*** (59.60)	-600*** (51.10)	-500*** (29.30)	-1000*** (14.95)
Const.	1000*** (30.43)	1300*** (8.572)	1500*** (11.49)	1800*** (17.28)	2000*** (0)	2300*** (55.54)	2600*** (51.10)	3000*** (0)	4000*** (0)
Diff.	30.0%	23.1%	20.0%	23.6%	25.0%	21.7%	23.1%	16.7%	25.0%

Note: Standard errors in parentheses (estimated with 100 bootstrap replications). \*\*\* denotes that all coefficients are statistically significant ( $p < 0.01$ ). *P* stands for percentile. Constant represents the median for group coded zero (men), while the coefficient of the variable *F* (female) depicts the absolute difference in medians between women and men. *Diff.* denotes the relative difference between women and men for selected percentiles.

Source: own study based on the Council for Social Monitoring data (2019).

## APPENDIX 5

Descriptive statistics for the top 3% of earners in Poland (2003–2015): a) whole subsample, b) women, c) men.

a) Total							
year	2003	2005	2007	2009	2011	2013	2015
N	210	195	291	589	593	350	288
Mean income	3811.976	4189.487	5195.601	6422.711	6703.997	7608.434	8201.76
Standard deviation	1480.335	1737.712	2101.537	3782.318	3270.388	4079.668	3713.083
Minimum income	2800	3000	3500	4000	4350	5000	5500
Maximum income	14500	15000	20000	50000	30000	50000	30000
Median income	3200	3600	4500	5000	5800	6200	7000
CV	0.38834	0.41478	0.40448	0.58890	0.48783	0.53620	0.45272
Gini coefficient	0.15636	0.17747	0.18489	0.21438	0.20512	0.20274	0.19581
Theil index	0.05613	0.06540	0.06556	0.10884	0.08793	0.09463	0.07902
Entropy index	0.04071	0.04950	0.05262	0.07216	0.06517	0.06449	0.05997
GIG based on mean income	24.7%	26.3%	26.2%	22.9%	31.9%	26.2%	27.3%
GIG based on median income	25.0%	25.0%	25.0%	25.0%	30.8%	27.1%	25.0%
b) Women							
year	2003	2005	2007	2009	2011	2013	2015
N	110	101	156	318	322	183	149
Mean income	3188.755	3532.832	4340.256	5539.585	5362.062	6395.055	6743.94
Standard deviation	1311.671	1471.606	1864.082	3566.512	2364.916	3095.309	2854.352
Minimum income	2100	2500	3000	3500	3600	4340	4500
Maximum income	13500	15000	16000	44000	16000	30000	22000
Median income	3000	3000	3750	4500	4500	5100	6000
CV	0.41134	0.41655	0.42949	0.64382	0.44105	0.48402	0.42325
Gini coefficient	0.16838	0.15797	0.19609	0.22515	0.19016	0.19009	0.19004
Theil index	0.06058	0.05970	0.07351	0.12500	0.07579	0.08184	0.07138
Entropy index	0.04481	0.04119	0.05912	0.07947	0.05707	0.05738	0.05619
c) Men							
year	2003	2005	2007	2009	2011	2013	2015
N	99	94	135	271	271	167	140
Mean income	4234.495	4792.021	5884.815	7181.103	7877.166	8659.563	9280.714
Standard deviation	1666.983	1850.186	2298.542	3995.798	3903.826	4810.747	4351.546
Minimum income	3000	3200	4000	5000	5000	6000	6000
Maximum income	14500	15000	20000	50000	30000	50000	30000
Median income	4000	4000	5000	6000	6500	7000	8000
CV	0.39367	0.38610	0.39059	0.55643	0.49559	0.55554	0.46888
Gini coefficient	0.17358	0.17315	0.18007	0.20589	0.21107	0.20421	0.20971
Theil index	0.06038	0.05912	0.06154	0.09859	0.09129	0.09983	0.08603
Entropy index	0.04731	0.04669	0.05007	0.06666	0.06861	0.06609	0.06742

Note: see the note below table in Appendix 1.

Source: own study based on the Council for Social Monitoring data (2019).

## APPENDIX 6

Gender differences in income across selected top percentiles. Results of simultaneous quantile regressions.

P	90th	95th	96th	97th	98th	99th
2003						
F	-500*** (0)	-680*** (130.0)	-1000*** (91.79)	-900*** (125.4)	-1000*** (264.7)	-820** (341.0)
Const.	2000*** (0)	2500*** (119.0)	3000*** (90.53)	3000*** (0)	3500*** (236.5)	4000*** (284.4)
Diff.	-25.0%	-27.2%	-33.3%	-30.0%	-28.6%	-20.5%
2005						
F	-460*** (90.44)	-1000*** (96.74)	-800*** (104.5)	-700*** (228.1)	-1000*** (239.1)	-1500*** (325.6)
Const.	2100*** (71.72)	3000*** (85.82)	3000*** (0)	3200*** (200.4)	4000*** (220.8)	5000*** (232.8)
Diff.	-21.9%	-33.3%	-26.7%	-21.9%	-25.0%	-30.0%
2007						
F	-550*** (63.22)	-800*** (182.2)	-940*** (142.7)	-1000*** (131.0)	-1300*** (336.8)	-1700*** (460.9)
Const.	2500*** (14.07)	3200*** (164.7)	3500*** (106.1)	4000*** (83.33)	4500*** (229.9)	6000*** (303.8)
Diff.	-22.0%	-25.0%	-26.9%	-25.0%	-28.9%	-28.3%
2009						
F	-700*** (61.46)	-1000*** (6.37e-11)	-1000*** (187.7)	-1500*** (128.1)	-1200*** (289.4)	-2000*** (240.2)
Const.	3000*** (10.70)	4000*** (3.433)	4000*** (32.39)	5000*** (31.08)	5200*** (0)	7000*** (24.33)
Diff.	-23.3%	-25.0%	-25.0%	-30.0%	-23.1%	-28.6%
2011						
F	-600*** (90.73)	-1000*** (95.95)	-1200*** (210.7)	-1400*** (94.62)	-2000*** (61.38)	-3000*** (311.4)
Const.	3100*** (92.23)	4000*** (95.95)	4500*** (178.1)	5000*** (10)	6000*** (53.66)	8000*** (271.0)
Diff.	-19.4%	-25.0%	-26.7%	-28.0%	-33.3%	-37.5%
2013						
F	-800*** (139.7)	-1400*** (148.7)	-1000*** (143.6)	-1660*** (241.2)	-1500*** (327.6)	-2347*** (559.4)
Const.	3800*** (139.7)	5000*** (94.38)	5000*** (143.0)	6000*** (151.9)	6500*** (334.2)	8347*** (462.5)
Diff.	-21.1%	-28.0%	-20.0%	-27.7%	-23.1%	-28.1%
2015						
F	-1000*** (16.09)	-1000*** (136.8)	-2000*** (221.4)	-1500*** (182.2)	-2000*** (413.9)	-2500*** (622.6)
Const.	4000*** (0)	5000*** (134.3)	6000*** (221.3)	6000*** (42.21)	7000*** (418.0)	9000*** (512.4)
Diff.	-25.0%	-20.0%	-33.3%	-25.0%	-28.6%	-27.8%

Note: see the note below table in Appendix 4.

Source: own study based on the Council for Social Monitoring data (2019).

Magdalena Tusińska, dr<sup>1</sup> 

Department of Economics  
University of Economics in Katowice

## **Inequality of opportunity – gender bias in education in Pakistan**

### INTRODUCTION

The subject matter of this study is inequality of opportunity (IO) through the lens of unequal access to education. The Universal Declaration of Human Rights (Article 26) states that “Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages” (United Nations, 1948). Access to schooling is an opportunity which should be available to all – girls and boys. Gender equality and education are bonded to each other. Advancing gender equality is critical to all areas of a healthy society and economy, including education. While the world has made progress towards achieving gender equality, there are still places where girls and women continue to suffer discrimination (UN, 2019), among which is Pakistan. The disadvantages in education translate into a lack of access to skills and limited opportunities in the labour market. The relegation of females to an inferior position, thereby depriving the country of the talents and energies of a significant part of its people, may hamper economic growth and development.

The goal of this paper is to demonstrate the premise and potential consequences of unequal access to education for Pakistan and to bring closer the specifics of the country concerning the issues discussed. The impact of IO on economic growth and development means there is need for research. The problem of access to schooling of Pakistani girls is high-profile thanks to the youngest Nobel Prize laureate, Malali Yousufzai. The paper concerns access to education in general, although the emphasis is placed on the primary and secondary levels. The thesis set out in the present study is that gender bias in education in Pakistan is determined by various and deeply rooted factors. Their nature puts equal access to education in the realm of a distant goal, constraining the growth and development of the country.

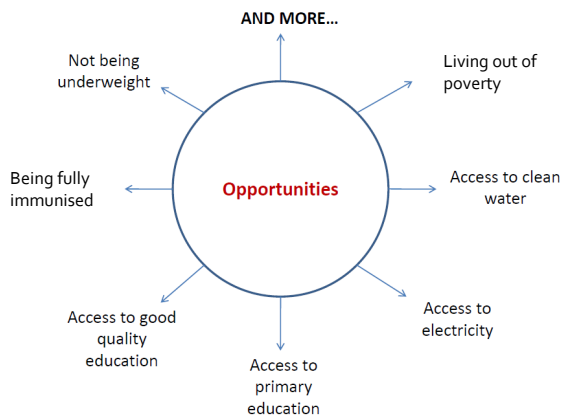
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<sup>1</sup> Correspondence address: 40-287 Katowice, 1 Maja 50; e-mail: magdalena.tusinska@ue.katowice.pl. ORCID 0000-0001-9646-9628.

The plan of the paper is as follows. After the introduction, the first section explains the notion of IO and presents theoretical premises concerning the relation between IO and economic growth and development. The emphasis is on unequal access to education due to gender. A data set on education in Pakistan and the reasons for gender bias in this area are presented in the subsequent parts. The last section highlights the policy recommendations to reduce IO. The main conclusions are reported in the final part. The research methods used are a critique of the literature, analysis of statistical data, documents and online sources, and elements of case study.

### THE CONCEPT AND IMPORTANCE OF INEQUALITY OF OPPORTUNITY (WITH EMPHASIS ON ACCESS TO EDUCATION)

Every outcome (wages, educational attainment, employment) is affected by the effort of individuals, various circumstances, and sometimes even by random factors – such as luck (Lefranc *et al.*, 2009). Effort refers to the variables that are within the realm of the individual's control (e.g. schooling choices), while circumstances are individual, household, geographic characteristics for which the individual cannot be held responsible (Roemer, 1998). Based on the literature review provided by Brzeziński and Magda (2016) and Shaheen *et al.* (2016), some important circumstances can be enumerated: parental education, gender, race, language, family background and parental social status, ethnicity, place of birth, caste, tribe, number of siblings, parental occupation, and exposure to financial difficulties during childhood. Both the presence and the significance of these factors vary depending on the country, but commonly held is the view that these circumstances should not determine the individual's access to goods or services, which every society usually accepts should be universal (Figure 1).



**Figure 1. Opportunities**

Source: World Bank, [www1](http://www1).

Depending on the country, the set of opportunities might be modified (Figure 1). The World Bank created the Human Opportunity Index to measure how circumstances beyond the control of children and youth affect their access to goods and basic services like education, water, electricity, sanitation and the Internet (World Bank, <https://>).

Some publications concerning IO (Marrero, Rodríguez 2010; Ayiar, Ebeke, 2019) postulate that it retards economic growth, whereas other works (Ferreira et al., 2014; 2018) which do not contain robust conclusions as to whether IO is bad for growth can also be cited. The ambiguity of the findings can be due to the indistinct conceptual understanding of the phenomenon and to the usage of various indices or methods; however, it is impossible to find a research study which proves a positive impact of IO on growth. This may suggest that the relationship between IO and economic growth is less controversial than the relationship between income inequality and growth (Tusińska, 2016). From a normative perspective, IO seems to be morally unjustified. As most authors would agree, the principle of equality of opportunity requires that individuals with similar effort face “the same prospects of success regardless of their initial place in the social system. In all sectors of society there should be roughly equal prospects of culture and achievement for everyone similarly motivated and endowed” (Rawls, 1999, p. 63).

As part of IO, gender bias in education is most likely to be a constraint for growth and development in developing countries. First of all, untapped “female potential” in the form of lower than average levels of education, then of employment, remuneration and access to production resources, leads to the allocation of resources in the economy not being optimal (Korinek, 2005). Narrowing the considerations to the Muslim world, B. Lewis (2002) claims that the lack of economic progress in most of these countries is due in large part to the relegation of women to an inferior position in society, thereby depriving the Islamic world of the talents and energies of almost half of its people. Secondly, in developing countries the diversity of education bears consequences in the diversity of fertility. Fertility falls with a rise in education because the more educated women are, the higher the market wages they command, and the higher the opportunity costs of time spent rearing children. If substitution effects outweigh income effects, then educated women have fewer descendants. Assuming children of educated women are more likely to become educated, this fertility differential increases the proportion of unskilled workers, reducing their wages, and thus their opportunity cost of having children, creating a vicious cycle (Kremer, Chen, 2002). Uneven distribution of human capital leads to a reduction in the level of average human capital in society in the next generation, which has a negative impact on economic growth. Moreover, women with schooling are more likely to have more power over the home budget, and invest more not only in education, but also in the health and wellbeing of their families as well (Korinek, 2005). As a result, physical and mental health can be nurtured, which can also be included among the factors that impact economic growth through absence from work,

work performance, life expectancy, learning ability, school attendance, creativity or mental resilience (Howitt, 2005). If education is acquired most commonly by single women who usually do not have children, accumulation of human capital in the next generations cannot take place.

Educated women usually marry later. Child marriage, which takes place in some developing countries, has devastating consequences for human capital. Children who marry do not only find their childhood cut short and their education abandoned, but if they become parents too soon, girls face serious health risks, including death, due to early pregnancy. Married girls are also at a higher risk of domestic violence (Central Asia Institute, 2016).

Beyond the evidence that common education is a driver of economic growth, which has been extensively studied and is well accepted (UNICEF, 2015, pp. 6–8), education also improves quality of life and is crucial to fostering tolerance between people. This contributes to creating more peaceful societies. Moreover, it enables upward socioeconomic mobility and is essential to achieving other goals as a break from the cycle of poverty. Education helps to reduce income inequalities: one extra year of education is associated with a reduction in the Gini coefficient by 1.4 percentage points (UN, 2017). Schooling, in particular for young women, can improve not only individual life and family outcomes, but community outcomes as well. Access to education can help equip locals with the tools required to develop innovative solutions to their problems. A pool of women with middle or high school education in a community is likely to attract resources in the form of interventions, such as in health and education, when investors know that human resources are available. Education is also linked to empowerment for women individually – those with education are much more likely than uneducated women to be able to make their own choices in life concerning their spouses, number of children, working outside the home and making important household decisions (Zaidi, Farooq et al., 2018, p. 18).

#### REVIEW OF STATISTICAL DATA – EDUCATION IN PAKISTAN

Policy documents in Pakistan, notably the Five Year Plans since the early 1960's, have paid heed to improving the system of education, ensuring adult literacy and providing a network of state schools. Article 25-A of the Constitution recognises free and compulsory education until the age of 16 for all citizens. Education as an end and a right is also well recognised in the many UN conferences and Resolutions. The Sustainable Development Goals (SDGs) have prioritised education through Goal 4: *Ensure inclusive and quality education for all and promote lifelong learning* (Zaidi, Farooq et al., 2018, p. 7). The data presented in Table 1 juxtapose these expectations and the real state of affairs.



**Table 1. Statistics on education in Pakistan**

Speci- fication	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017
1) Expected years of schooling												
Female	3.0	3.9	4.8	5.7	6.8	6.8	7.0	7.0	7.4	7.4	7.8	7.8
Male	6.2	6.6	7.0	7.4	8.2	8.3	8.4	8.5	8.7	8.9	9.3	9.3
2) Mean years of schooling												
Female	1.0	1.3	1.4	1.5	3.0	3.1	3.6	3.7	3.7	3.7	3.8	3.8
Male	2.7	3.5	3.7	4.0	6.1	6.2	6.4	6.5	6.5	6.5	6.5	6.5
3) Population with at least some secondary education (% of population aged 25 and older)												
Female	6.9	9.8	12.8	19.9	20.7	19.3	24.4	25.2	26.5	26.5	26.6	27.0
Male	19.2	21.4	24.0	32.1	44.9	46.1	45.1	45.2	47.3	47.3	47.3	47.3
4) Literacy rate, adult (% of population aged 15 and above)												
Female	:	:	:	:	41.02	41.98	43.07	41.97	44.28	:	:	:
Male	:	:	:	:	68.90	66.99	69.86	68.63	69.07	:	:	:
5) Literacy rate, youth (% of population aged 15–24)												
Female	:	:	:	:	62.30	63.14	64.47	63.44	65.55	:	:	:
Male	:	:	:	:	79.50	78.04	80.29	79.40	79.77	:	:	:

Source: 1–3 UNDP, 2018a; 4 and 5: World Bank, data from database: World Development Indicators.

The number of years of schooling that a girl of entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout her life amounted to 3 in 1990 and almost tripled during the period considered. The analogous indicator for boys increased from 6.2 to 9.3. The average number of years of education received by people aged 25 and older grew from 1 to 3.8 (female) and from 2.7 to 6.5 (men). The percentage of the population aged 25 and older that has reached (but not necessarily completed) a secondary level of education increased respectively from 6.9% to 27% and from 19.2% to 47.3%. At first glance, these statistics may look optimistic because the changes are relatively quicker for females, which means that the gender gap in education is decreasing. The country has also made some good progress on the educational attainment sub-index according to the “Global Gender Gap Report 2018” by the World Economic Forum (WEF). However, this progress was insufficiently quick to avoid the country being overtaken by a number of faster-improving countries at the lower end of the index rankings (WEF, 2018). Pakistan still has very large segments of the population who are illiterate – more than 50% of the women over the age of 15 years and 30% of men cannot read and/or write. The statistics look better for the younger population, but still more than one third of young women and 20% of men are illiterate (Table 1). Pakistan also does not fare well in the context of a regional comparison – according to the various educational indicators only Afghanistan lags behind Pakistan (Pakistan Economic Survey 2018–19, p. 158). Moreover, there is a rural-urban divide: the literacy level

for rural women aged 15–64 years old is 35% and 69% for their urban counterparts and literacy for rural males is 63%. Older women, whether in urban or rural areas, tend to have lower literacy levels – only 16% of women aged 45–49 years old are literate, dropping to a low of 7% for those aged 60–64 years. Young women aged 15–24 have better literacy rates: 54% of rural and 84% of urban young women are literate (Zaidi, Farooq et al., 2018, pp. 5, 10–11). The spatial and gender divide is compounded by class and ethnicity (UNESCO, 2016). The most disadvantaged group oscillates between Sindhi, Saraiki and Pashtun, where 98.8% of women from a rural background and 29.3% of the richest urban dwellers lack access to education (Dagia, Ismail, 2018).

#### REASONS FOR THE EXCLUSION OF PAKISTANI GIRLS FROM THE EDUCATION PROCESS

In total, Pakistan has relatively large numbers of children who never enter school because of the size of their school-age population (UNICEF, 2015), but there are also multiple, often interrelated reasons for low enrollments and dropout rates from schools, specifically concerning girls. The first one is the Islamisation of the state. Before this process took place, the practice of coeducation was common. Following the Second World War, the teaching of girls had to be carried out by women in separate schools, which became problematic in the face of a lack of infrastructure and female teachers. Some conservative residents of Muslim Pakistan also believe that girls cannot study. The low social status of women and the belief that their education leads to neglecting the duties assigned to them by culture excludes girls from the education process (World Bank, 2005, p. 43). The view that girls should contribute to care work at home has long existed in their education system. Textbooks contained few illustrations depicting women, which suggested that females were associated with the private part of life, whereas social, political and scientific activities were reserved for men. It should be noted that in the private sphere most women were presented in their domestic roles, whereas fathers were presented as responsible for moral education. Other mentions of women (mainly important figures such as Chadidža or Fatima) appeared while teaching history and religion. Occupations suitable for a given gender were also presented: men were associated with intellectual or physically strenuous work, while women with helping others and other non-prestigious jobs that were unrelated to economic benefits. Women were described as emotional and dependent on men, men as courageous and intelligent (Waleczek, 2013, pp. 198–201). The content of textbooks is evolving towards gender equality; however, to remove such enduring stereotypes is extremely difficult.

Another factor affecting gender bias is poverty. Parents perceive both sons and daughters through the prism of their ability to work, regardless of access to free

public education – especially since they have to pay for exams and uniforms. In poor families sons are sent to school while daughters stay at home. A poor welfare system prompts parents to invest in boys' education, predicting they will be dependent on their sons in the future (Waleczek, 2013, pp. 198–205). Investing in the education of sons brings greater benefits also due to the gender pay gap. Another issue associated both with culture and poverty is child marriage, which also affects the cessation of education. When there is a lot of unpaid labour to be done, education is a luxury, especially for a young daughter in law. The percentage of Pakistani women aged 20–24 who were first married or in a union before the age of 18 is 21% (2003–2017) and for the age under 15 the figure is 3% (UNDP, 2018b).

This comes as no surprise since the number of institutions for girls at each level of schooling varies significantly, and more so in rural areas where access to private education is limited to primary schooling, if at all. Thus, rural girls do not have recourse to private education, available to urban girls if public schools do not suffice or are not perceived to be of adequate quality. In extreme cases, rural schools are still one room institutions with several age groups and classes sitting in an overcrowded space or under the open sky (weather permitting), with inadequate water and sanitation facilities, and electricity. Since the quality of education is poor, it may appear to parents as pointless. In rural areas women contribute the bulk of their labour as unpaid family workers in agriculture, meaning that attendance of girls at school plummets during the harvest season (Zaidi, Farooq et al., 2018; World Bank, 2005, p. 43). In some places children cannot reach a school on foot safely in a reasonable amount of time. The number and quality of the roads in Pakistan generally (and in rural areas especially) is not coupled with reasonable transportation services and results in limited mobility of girls and women in rural areas.

Another issue involves location, culture and mobility. When a girl becomes an adult (at the time of the first menstruation) parents often start seeking a spouse for her, and fear the distance to school due to the potential threats of harassment and unwanted pregnancy. To avoid a violation of honor, which would make a future marriage impossible, the girl is allowed to travel, if at all, only with an appropriate man as her guardian (Waleczek, 2013, pp. 203–204).

Natural conditions do not help either. For example, after the flood in 2010 women who previously worked as teachers were forced to change their place of residence. Moreover, the flood destroyed a significant number of schools and interrupted the learning process of many girls, whose reintegration into the education system has been extremely difficult.

Last, but not least, there is no enforced government expectation that children should study. Various problems, such as political instability, the disproportionate influence on governance by security forces or escalating ethnic and religious tensions, distract those in power from the obligation to deliver essential services like education – and girls lose out the most. In some places influential local people forcibly occupy the land and school buildings for their personal use, with little

fear of consequences. Beyond this, corruption exists in the government school system. One of the most pervasive forms is nepotism or bribery in the recruitment of staff. Some people simply purchase teaching positions or obtain their jobs through connections. They may not be qualified or motivated to teach, and they may not be expected to. Especially in rural areas, some schools sit empty because corruption has redirected the teacher's salary to someone who does not teach. Moreover, there have been hundreds of attacks on schools in Pakistan, on teachers and students, giving parents still more reasons to keep girls at home, especially in regions dominated by the Taliban or other rebel groups (Human Rights Watch – HRW, 2018b).

In 2017, paradoxically on the International Day of the Girl Child, Pakistan's Senate rejected a bill that would have raised the minimum age for girls to marry from 16 to 18 (Ijazz, 2017).

The government has consistently left the education system severely underfunded, spending less than 2.8% of its GDP on education (2017) – far below the UN recommended standard of 4% to 6%. Government schools are in short supply in Pakistan's major cities, even more so in rural areas (HRW, 2018a). While allocations for education have shown a consistent percentage increase in provincial budgets, through amendments that delegated power to the provinces, the reality is that most of the funds are for recurring expenditures (salaries and infrastructure maintenance). This has not translated into improvements on the ground, while improvements in the quality of education have been dismal (Zaidi, Farooq et al., 2018, pp. 11, 14 and 184). In response to the abdication by the government of their responsibility to provide free education, there has been an explosion of private schools, largely unregulated. These schools may be compromised by poorly qualified and badly paid teachers, idiosyncratic curricula, and a lack of supervision. There has also been an increase in the provision of religious education, ranging from formal madrasas to informal arrangements where children study the Quran (HRW, 2018a).

#### GENDER EQUITY IN EDUCATION – RECOMMENDATIONS

The awareness of the need for a national categorisation of the mentioned SDGs and enforcement of monitoring mechanisms resulted in the “Pakistan 2025: One Nation, One Vision” measure. In terms of the study topic, the first pillar mentions “(...) improving the human skill base of the population, (...) a rapid scaling-up of investments in education, (...), gender equality and women's development (...)”. Under this, primary school enrollment and completion rates should increase to 100% and the literacy rate to 90%. Concurrently, the target is to improve the Primary and Secondary Gender Parity Index to 1 (Ministry of Planning, Development & Reform – MoPDR, 2014, pp. 8, 13). To improve the situation it would be necessary to:

- 1) modify cultural patterns; most of all, end child marriage and enforce anti-child labour laws. The UN explains that investing in education programmes for girls and increasing the age at which they are legally allowed to marry can return \$5 for every dollar spent, and investing in programmes improving income-generating activities for women can return \$7 dollars for every dollar spent (UN, 2016);
- 2) increase expenditure on education and abolish any fees at government schools, and provide poor students with all needed items such as uniforms, bags, textbooks, etc.; increase the number of schools for girls in rural areas and provide safe (and free or affordable) transport for students to go to their educational institutions;
- 3) endorse and implement the Safe Schools Declaration, an international political agreement to protect schools, teachers, and students during armed conflicts (GCPEA, 2019);
- 4) expand adult literacy outreach programmes for women; tap into the innovative models (the distance learning literacy programmes) available within Pakistan (through the Allama Iqbal Open University) that have learner centred curricula and teaching methodologies, teacher training and incentives (Zaidi, Farooq et al., 2018, pp. 11, 14, 184);
- 5) provide a united and supportive framework for the education foundations that have been set up and draw on public and private initiatives for rural areas; link tax incentives for the private sector and for-profit companies to invest in non-profit rural schools and colleges (Zaidi, Farooq et al., 2018, p. 185);
- 6) improve the quality of education to make it useful and related to people's lives, and cut the corruption;
- 7) decrease bureaucracy, especially at the provincial level; strengthen supervision of provincial education system progress toward achieving parity between girls and boys and universal primary and secondary education for all children, by requiring provinces to provide accurate data on girls' education, monitoring enrollment and girls' attendance, and setting targets in each province;
- 8) be more transparent about the terms and conditions of all foreign cash injections – aid packages must be partially redirected to boost education budgets across the board; especially for women (Daily Times, 2018).

The tasks presented above are challenging, especially for a developing country like Pakistan. The weak implementation of the Millennium Development Goals (the foregoers of SDGs) and of SDGs (Table 1) makes one skeptical of success before 2025 or at best 2030. To implement these recommendations, the determination of central authorities is primarily demanded. Cooperation with both international organizations and provincial authorities is also important. Modification of law could be relatively easily done on the country level (if there were a desire to change), but it is much harder to change the mentality of society. This does not mean that it is not worth trying to change it – paradoxically, through education.

## CONCLUSIONS

There are many goals concerning education and gender equality to achieve according to Pakistani and supranational declarations. Despite them and some improvements, there remain substantial challenges ahead. Actions for equity of opportunity seem both economically and morally justified, but Pakistani girls still face barriers to entering schools precluding the full participation of women in the labour force, which would probably add percentage points to most national growth rates. It seems that no sufficient steps have been taken to eliminate these barriers. The Pakistan government simply has not established an education system adequate to meet the needs of the country's children, especially girls. Under-investment, lack of schools and/or infrastructure, education costs (including alternative ones), corruption and the poor quality of the existing education are the main culprits. Apart from this, it is hard to alter stereotypes that favour keeping girls at home to help in household work instead of educating them. Cultural patterns endure and are extremely difficult to change within one generation, if at all. Beyond the stereotypes, poverty itself encourages parents to educate their sons. The trend is evident in rural areas, where gender disparities are high.

While enrollment rates remain an important measure, these do not quite bring about progress for girls, indicating issues with quality as well as their dropout rates – whether due to inadequate infrastructure, school insecurity or due to social norms (i.e. restrictions on mobility, early marriage). Therefore, educational frameworks and policies need to focus on learning outcomes, and not just primary enrollment. For unless and until girls and women are mainstreamed, the country will have no hope of bridging the gender gap that remains a constraint on growth and development.

## BIBLIOGRAPHY

- Ayar, S., Ebeke, CH. H. (2019). Inequality of Opportunity, Inequality of Income and Economic Growth. *IMF Working Paper, WP/19/34*, 1–22. DOI: 10.5089/9781484396988.001.
- Brzeziński, M., Magda, I. (2016). Inequality of opportunity in Central and Eastern Europe: accounting for changes over time. *IBS Working Paper, 5/2016*, 1–48.
- Dagia, N., Ismail, Z. (2018). *UN Women report shows worrying degree of gender inequality in Pakistan*. Retrieved from: <https://tribune.com.pk/story/1634815/1-un-women-report-shows-worrying-degree-gender-inequality-pakistan/> (2019.08.25).
- Central Asia Institute (2016). Retrieved from: <https://centralasiainstitute.org/education-can-end-child-marriage/> (2019.08.10).
- Daily Times (2018). Retrieved from: <https://dailytimes.com.pk/335869/gender-gap-index/> (2019.07.15).
- Ferreira, F. H. G., Lakner, Ch., Lugo, M. A., Özler, B. (2014). Inequality of opportunity and economic growth: a cross-country analysis. *Policy Research Working Paper 6915*, 1–38. DOI: 10.1596/1813-9450-6915.



- Ferreira, F. H. G., Lakner, Ch., Lugo, M. A., Özler, B. (2018). Inequality of opportunity and economic growth: how much can cross-country regressions really tell us? *Review of Income and Wealth*, 64(4), 800–827. DOI: 10.1111/roiw.12311.
- GCPEA (2009). Retrieved from: <http://www.protectingeducation.org/safeschoolsdeclaration> (10.09.2019).
- Howitt, P. (2005). *Health, Human Capital and Economic Growth: A Schumpeterian Perspective*. Brown University, February 9. Retrieved from: [https://www.brown.edu/Departments/Economics/Faculty/Peter\\_Howitt/publication/PAHO.pdf](https://www.brown.edu/Departments/Economics/Faculty/Peter_Howitt/publication/PAHO.pdf) (2019.08.10).
- Human Rights Watch (2018a). *Pakistan: Girls Deprived of Education*. Retrieved from: <https://www.hrw.org/news/2018/11/12/pakistan-girls-deprived-education> (2019.09.10).
- Human Rights Watch (2018b). *Shall I Feed My Daughter, or Educate Her? Barriers to Girls' Education in Pakistan*. Retrieved from: <https://www.hrw.org/report/2018/11/12/shall-i-feed-my-daughter-or-educate-her/barriers-girls-education-pakistan> (2019.09.10).
- Ijaz, S. (2017). *Pakistan Should End Child Marriage*. Retrieved from: <https://www.hrw.org/news/2017/10/12/pakistan-should-end-child-marriage> (2019.09.15).
- Korinek, J. (2005). Trade and gender: issues and interactions. *OECD Trade Policy Working Paper*, 24, Paris, 1–22.
- Kremer, M., Chen, D. (2002). Income-Distribution Dynamics with Endogenous Fertility. *Journal of Economic Growth*, 7, 227–258. DOI: 10.1257/aer.89.2.155.
- Lefranc, A., Pistolesi, N., Trannoy, A. (2009). Equality of opportunity and luck: Definitions and testable conditions, with an application to income in France. *Journal of Public Economics*, 93, 1189–1207. DOI: 10.1016/j.jpubeco.2009.07.008.
- Lewis, B. (2002). *What went wrong?* Retrieved from: <https://www.theatlantic.com/magazine/archive/2002/01/what-went-wrong/302387/> (2019.08.20).
- Marrero, G. A., Rodríguez, J. G. (2010). Inequality of opportunity and growth. *Working Paper Series. Society for the Study of Economic Equality*. ECINEQ WP, 154, 1–42.
- Ministry of Planning, Development & Reform Government of Pakistan (2014). *Pakistan 2025. One Nation – One Vision. Executive Summary*. Planning Commission.
- Pakistan Economic Survey 2018–2019. Economic Adviser's Wing, Finance Division Government of Pakistan, Islamabad.
- Rawls, J. (1999). *A Theory of Justice. Revised edition*. Massachusetts: The Belknap Press of Harvard, University Press Cambridge.
- Roemer, J. E. (1998). A pragmatic theory of responsibility for the egalitarian planner. *Philosophy and Public Affairs*, 22(2), 146–166.
- Shaheen, S., Awan, M. S., Cheema, A. R. (2016). Measuring inequality of opportunity in Pakistan: parametric and non-parametric analysis. *Pakistan Economic and Social Review*, 54(2), 165–190.
- Tusińska, M. (2016). Finding pro-growth income inequality: mission impossible? In: D. Mihanovic, A. Hunjet, Z. Primorac (Eds.), *Book of Proceedings. 18th International Scientific Conference on Economic and Social Development – “Building Resilient Society”* (pp. 742–749). Zagreb, Croatia, 9–10 December 2016.
- UN (1948). Retrieved from: <https://www.un.org/en/universal-declaration-human-rights/> (2019.08.20).
- UN (2016). Retrieved from: <https://www.un.org/sustainabledevelopment/wp-content/uploads/2016/08/5.pdf> (2019.07.15).



- UN (2017). Retrieved from: <https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/02/4.pdf> (2019.07.15).
- UN (2019). Retrieved from: <https://www.un.org/sustainabledevelopment/gender-equality/> (2020.01.02).
- UNDP (2018a). Retrieved from <http://hdr.undp.org/en/countries/profiles/PAK> (2019.08.05).
- UNDP (2018b). Retrieved from: <http://hdr.undp.org/en/indicators/181406> (2019.08.16).
- UNESCO (2016). *Girls' and Women's Literacy with A Lifelong Learning Perspective: Issues, Trends and Implications for the Sustainable Development Goals*. Paris: UNESCO.
- UNICEF (2015). *The investment case for education and equity*.
- Waleczek, M. (2013). Nierówny dostęp do edukacji wczesnoszkolnej ze względu na płeć w Islamskiej Republice Pakistanu. *Cieszyński Almanach Pedagogiczny* 2, 196–213.
- WEF (2018). <https://www.weforum.org/reports/the-global-gender-gap-report-2018> (15.07.2019).
- World Bank (2005). *Pakistan – Country gender assessment – Bridging the gender gap: opportunities and challenges*. Washington: The World Bank. Retrieved from: <http://siteresources.worldbank.org/PAKISTANEXTN/Resources/293051-1146639350561/Cover&Preliminaries.pdf> (2019.08.10).
- World Bank, World Development Indicators. Retrieved from: <https://databank.worldbank.org/reports.aspx?source=2&series=SE.ADT.1524.LT.FM.ZS&country=PAK#> (2019.07.22).
- World Bank, [www1.worldbank.org/poverty/visualizeinequality/Files/Documentation/HOI-Methodology.pdf](http://www1.worldbank.org/poverty/visualizeinequality/Files/Documentation/HOI-Methodology.pdf) (2019.07.10).
- World Bank, <https://www.worldbank.org/en/topic/poverty/lac-equity-lab1/equality-of-opportunities/hoi> (2019.07.10).
- Zaidi, Y., Farooq, S. (2018). *Rural Women in Pakistan. Status Report 2018 UN Women Pakistan*. Islamabad: Center of Gender and Policy Studies.

### Summary

The subject matter of the paper is inequality of opportunity (IO). Contemporarily, as part of IO, gender bias in education is most likely to be a constraint for growth and development in developing countries. The focus is on gender bias in education in Pakistan, which is a widely discussed problem thanks to the Nobel Prize laureate Malali Yousufzai. The goal is to present the premise and potential consequences of unequal access to education for Pakistanis, and to bring the specifics of the country into clearer focus. The thesis is that gender bias in education in Pakistan is determined by various and deeply rooted factors that place equal access to education in the realm of a distant goal, hampering the growth and development of the economy. The research methods used were a critique of the literature, analysis of statistical data, documents and online sources as well as elements of case study. Plans concerning education have been sketched in SDG-4 and in the document “Pakistan 2025”, but despite some improvements, Pakistan is still a country where one’s future depends on whether one is male or female. A lack of access to education for girls is part of a broader landscape of gender and spatial inequality. The findings suggest that the main circumstances for the exclusion of girls from education are culture, poverty and the state. If recommendations for these areas are not implemented, gender bias will remain one of the barriers to the growth and development of Pakistan.

**Keywords:** gender inequality, inequality of opportunity, education, economic growth, economic development, Pakistan.

**Nierówności szans  
– dyskryminacja dziewcząt w dostępie do edukacji w Pakistanie**

*Streszczenie*

Przedmiotem rozważań w niniejszym artykule są nierówności szans. Jeden z rodzajów nierówności szans, nierówny dostęp do edukacji ze względu na płeć, jest współcześnie uważany za barierę wzrostu i rozwoju gospodarczego w krajach rozwijających się. Problem nierówności płci w kontekście edukacji został nagłośniony przez laureatkę pokojowej Nagrody Nobla – Pakistankę Malali Yousufzai. Celem artykułu jest prezentacja przesłanek oraz potencjalnych skutków nierównego dostępu do edukacji ze szczególnym uwzględnieniem specyfiki Pakistanu. Postawiono tezę, iż dyskryminacja pakistańskich dziewcząt w dostępie do edukacji jest determinowana zróżnicowanymi i głęboko zakorzenionymi czynnikami, co czyni realizację celu eliminacji tego zjawiska niezwykle trudną i odległą w czasie, hamując wzrost i rozwój gospodarczy tego kraju. Zastosowane w artykule metody badawcze to: krytyczna analiza literatury, analiza danych statystycznych, dokumentów i źródeł internetowych oraz elementy studium przypadku. Ambitne plany dotyczące zmiany sytuacji dziewcząt i kobiet zostały zarysowane w Celach Zrównoważonego Rozwoju (SDG-4) oraz w strategii „Pakistan 2025”, jednakże – mimo obserwowanych postępów – Pakistan nadal pozostaje krajem, gdzie sukces jednostki jest zależny od jej płci (szczególnie na obszarach wiejskich). Utrudniony dostęp dziewcząt do edukacji jest tylko jednym z rodzajów nierówności występujących w różnych wymiarach w Pakistanie. Wnioski, jakie można wyciągnąć na podstawie badań, wskazują, że najważniejszymi czynnikami decydującymi o wykluczeniu dziewcząt z procesu kształcenia są uwarunkowania kulturowe, ubóstwo oraz słabości państwa. Rekomendacje wskazane w artykule dotyczą zatem przede wszystkim tych obszarów.

*Słowa kluczowe:* edukacja, nierówności szans, nierówności ze względu na płeć, rozwój gospodarczy, wzrost gospodarczy, Pakistan.

JEL: I24, I25, O00.

*Izabela Ostoj, dr hab. prof. UE<sup>1</sup>* 

Department of Economics

University of Economics in Katowice

## **Digital technological platforms – an opportunity or a threat to quality work?<sup>2</sup>**

### INTRODUCTION

Over the last decade, digital technological platforms (DTP) have transformed the modern labour market. The business model adopted by enterprises using this innovative solution has created a variety of new opportunities offering access to services for customers and potential income for contractors. It has also developed a new quality of conditions for providing work. Within just a few years of beginning this universal use of DTP, the providers of platform-mediated services have become part of the gig economy and the cybertariat, categories revealing the deepening of economic inequality that had already been known before, but which had definitely been less frequently used prior to the emergence of digital platforms. The paper discusses the relationship between technological innovations and human work. The author aims to identify the characteristics of work performed through DTP, and uses her own methodology to assess them through the prism of the main dimensions of quality work. This assessment is based on the criteria developed by the European Anti-Poverty Network (EAPN), which form the core of the contemporary approach to the problem in the European Union. The results of the evaluation verified the hypothesis concerning insufficient conditions for quality work in a significant part of this segment.

The paper is divided into four parts. The first discusses the significance of DTP for the labour market; the second proposes a classification of service providers in order to help assess the diversity of their working conditions and systematise

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<sup>1</sup> Correspondence address: University of Economics in Katowice, 1 Maja 50, 40-287 Katowice; e-mail: [izabela.ostoj@ue.katowice.pl](mailto:izabela.ostoj@ue.katowice.pl). ORCID: 0000-0003-2997-280X.

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the knowledge about the segment under examination; the third presents research methodology, and the fourth develops the results of the evaluation concerning quality work standards for DTP. The paper quotes the latest global scientific journals, books and research reports published in the field.

## THE SIGNIFICANCE OF DTP FOR THE LABOUR MARKET — LITERATURE REVIEW

The 2009 launch of the first DTP (Uber), enabling instantaneous coordination of demand for the services and their supply, has led, within a few years, to the transformation of a significant part of the labour market. Services ordered via platforms through dedicated smartphone apps have been expanding rapidly. In consequence, work has become fragmented into separate tasks carried out by individual contractors, and people have begun to be identified with the services (Prassl, 2018).

Work performed as short-term tasks and based on different types of contract that enable such work have long been known and treated as a way to reduce unemployment. This intensified in the initial period of the 2007+ crisis, when an increasing number of people, left with no other choice, became involved in unstable project-based or task-related work. This segment of the labour market has been labelled as the gig economy (Minter, 2017). However, it was only the emergence of digital communication platforms that made it possible for customers to express demand for services on such a massive scale and for platforms to direct them to the “crowd” of service providers awaiting further orders. Commissioning work via the Internet had begun a few years earlier (e.g. Amazon Mechanical Turk, since 2005), but DTPs completely changed its character. It can be assumed that DTPs are a manifestation of digitisation defined in a broad sense and also in the education process (Bejinaru, 2019; Bratianu et al., 2020).

The gig economy is now associated with that part of the economy where the offer of many independently operating service providers is coordinated with the demand for a given service through a dedicated DTP (Stewart, Stanford, 2017). One of the few comprehensive studies on the subject, carried out in the UK in 2017, proposed the definition of the gig economy as a part of the economy that involves the provision of labour services for fixed remuneration by individuals or businesses using DTPs, which allows the creation of an effective match between supply and consumer demand (Lepanjuuri et al., 2018). In 2019, about 30 platforms were recorded as operational, including 11 on a global scale (Schwellnus et al., 2019).

The creators of DTP saw the new business model as a chance to achieve high profits by hiring service providers on terms that ensured low average costs of providing universal services and, as a result, contributed to developing competitive advantage over service providers operating based on the traditional model (Neamtju et al., 2019). Growing competition in the global economy and a short-term-result

driven orientation caused by the need to respond to volatile demand in a flexible manner imply a relatively low level of remuneration for services rendered (Spreitzer et al., 2017). The gig economy also embraces crowdsourcing, which consists in transferring the tasks previously performed in-company to a wide, undefined group as an open order via DTP. According to Kessler (2018), large projects that could be implemented by teams of employees are increasingly divided into small tasks with very low remuneration and outsourced to independent subcontractors. The source of low average service provision costs in the gig economy is the shift of the burden of securing factors of production to service providers (a car, a bicycle, a phone, a computer, etc.), self-organisation of the workplace, responsibility for the adequate level of qualifications, payment methods (payment only for the performed service, with the service being as fragmented as possible), no guarantee of continuity, and absence of regulation on the minimum rate or social security. However, the main factor of production is the technology owned by the platform developer. Despite these shortcomings, service providers would not be able to operate without digital technological platforms. DTPs give access to orders as well as ensure minimum standards for buyers and service providers through the so-called platform culture (Kuhn, 2016; Stanford, 2017; Minter, 2017). Joining DTP involves accepting its terms, while “dismissal” is conducted through the deactivation of a service provider if he violates the terms required by the platform, usually based on customer feedback (Todoli-Signes, 2017).

Running a DTP-based business creates the need for operations on a massive scale, hence the pursuit of global expansion can be considered natural. Growing economies of scale are conducive to the expansion of companies and the monopolisation or oligopolisation of subsidiaries in a given area, which leads to further consequences. The platform owner, on the other hand, takes the risk associated with the legal environment of operations conducted in various countries and its potential changes (Todoli-Signes, 2017). Work is considered to be the main product of the gig economy (Prassl, 2018). This segment of the economy generates a huge demand for the contractors whom the platform needs to offer particular services to its users.

### SERVICE PROVIDERS IN THE DTP SEGMENT

The gig economy includes several groups of actors: the originators and organisers setting up operations, who are usually platform owners, and their employees, contractors performing tasks (service providers) via DTP, which actively enables the provision of services and determines the amount of remuneration for contractors and profits for owners (Lepanjuuri et al., 2018), as well as customers who order and consume services. The issue that raises the most controversy is the status of the service providers, which is often unclear, or the formal arrangement does not correspond to the actual situation (e.g. some Uber drivers who provide transport

services to passengers, formally operating as volunteers engaged by another organisation, and offering city sightseeing services in exchange for pocket money). Therefore, it is particularly important to examine the supply side of services in this segment. So far, no precise and comprehensive classifications have been created of the service providers in the gig economy, which would reflect the complexity of this new group. Accordingly, the paper presents a number of preliminary classifications based on the reference literature.

Based on the way they perform their tasks, service providers in the gig economy can be divided into two groups (Bogenhold et al., 2017; Graham et al., 2017; De Stefano, 2016; Prassl, 2018):

- 1) operating online – working in the cloud (crowd work; digital labour platforms); highly qualified specialists (freelancers): programmers, analysts, translators, designers, or contractors of simple work, e.g. labelling goods for online stores,
- 2) operating offline – working on orders placed through mobile apps (on-demand work via apps or gig work) – performing traditional tasks, mainly simple work: passenger transport, courier services, cleaning, delivery of meals.

Service providers operating offline are beginning to form a majority in the gig economy, due to the low entry barriers and the growing demand for this type of work. They are admitted to work in this segment on condition that they accept the regulations, use their own factors of production, and agree to be subjected to the testimonial and control system of the platform. It is expected that in the future the provision of services to order by DTP will embrace many other services, including the following areas: care, education, medicine, law, finance, and accounting (Minter, 2017).

Based on the freedom of choice to work within the gig economy, two groups that cover the four categories of service providers can be distinguished (Prassl, 2018, pp. 28–29):

1) working in the gig economy by choice – free agents, or “remote talents”, for whom gig work is the main source of income, and casual earners, for whom it is a source of additional income,

2) forced to work in the gig economy – financially strapped, forced to accept gig work (as primary or additional) to make ends meet, some of them being reluctant, preferring traditional employment, which is currently unavailable to them.

According to Prassl (2018), until now the majority of service providers have worked in the gig economy by choice.

Further to the classification above, the following categories can be distinguished based on the degree of dependence on income from gig work:

- 1) non-dependent, having other opportunities to earn income (freelancers, some of those who make extra money from gig work),
- 2) partially dependent (those for whom gig work is an important additional source of income, e.g. people paying off loans),
- 3) fully dependent (those who have no chance to make a living from other sources).

This group is most susceptible to microwages and the growth of the cybertariat.

The above classifications will also determine the level of satisfaction with gig work and may be a source of conflicting opinions, from praise for the modernity to extreme criticism of the working conditions and remuneration.

Based on their formal status, service providers can operate as:

- 1) self-employed (registered economic activity, so-called independent subcontractors),
- 2) contractors (civil law contract, so-called independent employees),
- 3) contractors (subcontractors) operating through the agency of another enterprise,
- 4) having another status (often unlawful and not reflected in the actual situation; e.g. a volunteer or renting a production factor for a fee – for example a bicycle, in the case of meal deliveries).

This classification reveals that in the gig economy the employment contract is absent, although the nature of tasks and the degree of dependence of the service provider on the platform would fully justify the use of employment regulations. The nature of the tasks, their fragmentation and identification difficulties are conducive to informal, unregulated solutions. New categories of workers, e.g. an independent worker or a dependent entrepreneur, are discussed (Steward, Stanford, 2017; De Stefano, 2016). The informal nature of the tasks performed by free contractors is considered to be a prerequisite for precarisation (Merkel, 2019).

Based on the number of digital platforms that a particular service provider can use, service providers can be divided into those using:

- 1) one platform,
- 2) two or more platforms.

This classification determines the choice and acceptance of platform terms by service providers. The possibility of cooperation with more platforms eliminates the risk of income loss if the contractor is excluded from the app, for example due to negative consumer feedback, and potentially increases his bargaining power.

## RESEARCH METHODOLOGY

In order for the quality work standards in the gig economy to be assessed, the criteria has to be clearly defined, which was achieved through the synthetic review of the approaches to gig work represented by organisations whose mandate is to protect labour rights.

Quality work is an ambiguous and vague concept, usually related to working conditions. In some cases, the quality of employment is referred to, but this raises associations with the status of the employed person, while, as previously emphasised, the problem involves precisely the unspecified status of the service provider – the contractor performing commissioned jobs, so the category of quality work is more relevant, as long as it refers to the conditions created by the demand side of the labour market and the institutional framework in which



work is performed. The evaluation of quality work is sometimes perceived as unnecessary, especially by employers. This is due to the focus on quantitative employment parameters.

In 2008, the European Trade Union Institute developed the job quality index. It consists of six components: wages, non-standard forms of employment, working time and work-life balance, working conditions and job security, skills and career development, and collective interest representation (Leschke, Watt, 2008, p. 5; ETUI, [http](http://)). Quality work is often replaced by the concept of decent work. ILO uses it in such a context, assuming that “... it involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organise and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men” (ILO, [http](http://)). The above examples referring to quality work determinants can be considered similar.

Given the importance of social cohesion, criteria that define quality work formulated by EAPN gain in significance. The organisation formulated 10 principles (EAPN, [http](http://)) which specify that standards defining quality work are met if the work:

- 1) provides adequate/living wages – which requires that a minimum income be defined as sufficient to prevent poverty in the working population,
- 2) provides a sustainable contract and adequate employment rights – which means that it provides protection against unfair dismissal, adequate severance pay, as well as counteracting precarisation and segmentation of the labour market,
- 3) entitles the worker to appropriate social security protection – including the right to health insurance, paid holidays, unemployment benefits and pension rights having cross-border portability,
- 4) ensures quality working conditions and environment, including: health and safety provisions, working environments and rational working time, especially for low-skilled workers,
- 5) allows for the reconciliation of private and professional life – assumes reasonable conditions for flexible working time,
- 6) respects the right to participate in collective bargaining and social dialogue – ensures the right to vote on matters concerning employees as well as participation and transparency in governance,
- 7) protects the worker against discrimination on all grounds – protects against pay inequalities based on sex, nationality and any other forms of discrimination, in the process of recruitment and work performance,
- 8) guarantees access to training and personal development – creates conditions for updating and enhancing qualifications, as well as for the development of professional competences and soft skills,
- 9) allows for progression in work – gives professional advancement opportunities,
- 10) nurtures job satisfaction – an essential component of well-being.

EAPN adopts the above criteria as relevant to the assessment of all types of activities, regardless of the type of contract, form of employment, job agency, organisational forms, and activity sectors. Therefore, it gives them a universal character, as they relate to the assessment of the characteristics of the job that a person performs, and not to the type of contract he has concluded. They can be seen as a coherent set of contemporary criteria defining quality work, so the evaluation presented in the paper was based on them. It uses critical analysis of the latest research results published in global journals, supplemented by logical deduction and comparative analysis of quality work opportunities for the selected groups of service providers in the gig economy.

## RESULTS

The results of the assessment of quality work standards for tasks generated through DTP are presented below. The evaluation was carried out according to EAPN criteria and based on the reference literature, including the results of empirical research and case studies.

**1) Adequate/living wages** – this criterion is fulfilled only for those working via the platform by choice, i.e. those with other earning options; the universal problem of microwages, numerous cases of under-payment or non-payment; threat of cybertariat (Kuhn, 2016);

**2) Sustainable contract and adequate employment rights** – no group has a sustainable contract; separate tasks are offered to contractors who remain in constant competition with each other; no equivalence to employee rights (Minter, 2017; Ostoj, 2019); irregularity and unpredictability identified as the greatest disadvantages of work in the gig economy (Lepanjuuri et al., 2018); task performance assessment is often delegated to customers (reputation-based system) or permanent online monitoring is in place; easy deactivation of the service provider and the selection of a group of contractors; oversupply of unregulated labour services, easy replacement (Kessler 2018; Wood et al., 2019);

**3) Appropriate social security protection** – none due to the absence of employment contracts; service providers are protected as much as they arrange for such protection themselves, which is difficult with low earnings (Minter, 2017); in practice, insurance is available to those who only do extra work in the gig economy, thanks to another job outside this sector (Berg et al., 2018);

**4) Quality working conditions and working environment** – service providers need to provide the basic factors of production themselves; the platform ensures basic standards of operation through the regulations it adopts and requires contractors to comply with; work is often very intensive and performed in unlimited time (Berg et al., 2018; Wood et al., 2019); operating costs are often indicated as an element that service providers would like to change (Lepanjuuri et al., 2018);

**5) Reconciliation of private and professional life** – relative autonomy of service providers; they specify the number of days and hours that they are ready to work, as well as the tasks they will undertake, which is good for those who only do extra work; in practice, the irregularity of tasks and income causes the need for constant (often 24-hour) readiness to accept an offer while payment only covers the particular service rendered, which is extremely harsh when the service provider depends on one platform only, analyses quotes for an hourly rate for actual work and another taking into account the waiting time, which is usually 1/3–1/4 lower (Wood et al., 2019; Kessler, 2018);

**6) Right to participate in collective bargaining and social dialogue** – the absence of corresponding channels for representation and collective bargaining; attempts at self-organisation in order to fight for the status of workers are known (e.g. Foodora meal deliverers in Italy); the need for support from traditional trade unions; it is almost impossible to protect the interests of service providers in this way (Tassinari, Maccarrone, 2017);

**7) Protection of the worker against discrimination on all grounds** – theoretically, the position of providers waiting for orders is equal; online work makes the opportunities of people with disabilities equal; in practice, no protection against discrimination is guaranteed when tasks or remuneration are given; discrimination may take place based, for example, on the service provider's name being associated with nationality, gender or country of origin (online services); women are three times as likely as men to be at risk of non-payment and work anti-social hours (Graham et al., 2017; Hunt, Samman, 2019);

**8) Guaranteed access to training and personal development** – complete absence of any guarantees; professional development remains the responsibility of the service provider, who has to incur the costs involved (Todoli-Signes 2017);

**9) Progression in work** – no guarantees of professional development, since most microtasks involve simple and repetitive work; highly qualified specialists (mainly men) can enhance their CV with the ability to solve non-standard problems, based on the history of completed orders (Wood et al., 2019);

**10) Job satisfaction** – common among freelancers; job satisfaction is very low with other groups; income and other work-related benefits are indicated as the least satisfactory (Lepanjuuri et al., 2018).

The EAPN quality work criteria can be considered so demanding that today they are fulfilled by just a few paid jobs. However, in the case of digitally mediated work, these criteria are not satisfied or are met conditionally, or only for selected groups. The greatest benefits seem to be achieved by highly qualified specialists, operating online as freelancers, who work via platforms by choice. Another group that is less affected by the shortcomings of the gig economy includes the service providers who earn extra income, supplementing their more regular remuneration. However, their work also does not meet the relevant criteria of quality work (time, task schedule, etc.). Paradoxically, working time flexibility, often identified as

an advantage, turns out to be excessive in the case of gig work, as it threatens work-life balance. It also negatively affects health and job satisfaction because of its instability and unpredictability. The situation is further complicated by a significant level of monopolisation, especially in offline work, which restricts the freedom of choice for service providers and increases the bargaining power of platforms. It can be assumed that platform-enabled gig work does not meet the majority of the EAPN criteria for quality work in relation to all the groups.

## CONCLUSIONS

A few years ago, the World Bank and the United Nations Organization considered platform-enabled work as a way to increase employment and fight poverty, but little was known then about quality work related issues in this segment (Wood et al., 2019). This paper argues that although DTPs create new income-earning opportunities and represent innovation in the economy, they pose a genuine threat to the quality of work in all relevant dimensions and may exacerbate the existing economic and social inequalities and lead to new ones. Therefore, based on the EAPN criteria, the research hypothesis on the low quality of work in the gig economy was verified positively. The implementation of new DTP-operated business models should be accompanied by the improved awareness of their impact on quality work. Additionally, new legal solutions should be adopted to protect the rights of service providers in their relations with DTP enterprises. The view that in low and middle income countries, the absence of quality work standards in the gig economy is not acutely experienced, because labour rights are not universally respected there, should not be seen as an adequate justification (Wood et al., 2019). The research methodology proposed in this paper has its limitations stemming from the lack of quantitative data on the scale of the problems. In the light of intense discussion and numerous cases being analysed, however, it was assumed that the issue had significant importance. Enterprises operating as DTPs and the conditions they offer to service providers should, in the years to come, become the focus of in-depth research aimed at reducing the threats to quality work.

## BIBLIOGRAPHY

- Bejinaru, R. (2019). Impact of Digitalization on Education in the Knowledge Economy. *Management Dynamics in the Knowledge Economy*, 7(3), 367–380. DOI: 10.25019/MDKE/7.3.06.
- Berg, J., Furrer, M., Harmon, E., Rani, U., Silberman, M. (2018). *Digital labour platforms and the future of work. Toward decent work in the online world*. Geneva: ILO.
- Bogenhold, D., Klinglmair, R., Kandutsch, F. (2017). Solo-Self-Employment, human capital and hybrid labour in the gig economy. *Foresight and STI Governance*, 4, 23–32.

- Bratianu, C., Hadad, S., Bejinaru, R. (2020). Paradigm shift in business education: a competence-based approach. *Sustainability*, 12(4), 1348. DOI: 10.3390/su12041348.
- De Stefano, V. (2016). *The rise of the “just-in-time workforce”: On demand work and the labor protection in the” gig economy*. Geneva: ILO.
- EAPN (2011). *10 principles on quality work*. Retrieved from: <https://www.eapn.eu/quality-work-for-quality-life-eapn-s-10-principles/> (2019.07.20).
- ETUI. Job Quality Index. Retrieved from: <https://www.etui.org/Topics/Labour-market-employment-social-policy/Job-quality-index-JQI> (2019.07.19).
- Graham, M., Hjorth, I., Lehdonvirta, V. (2017). Digital labour and development: impacts of global digital labour platforms and the gig economy on worker livelihoods. *Transfer*, 23(2), 135–162. DOI: 10.1177/1024258916687250.
- Hunt, A., Samman, E. (2019). Gender and the gig economy. Critical steps for evidence-based policy. *ODI Working Paper 546*.
- ILO. Decent work. Retrieved from: <https://www.ilo.org/global/topics/decent-work/lang--en/index.htm> (2019.07.19).
- Kessler, S. (2018). *Gigged: the end of the job and the future of work*. New York: St. Martin's Press.
- Kuhn, K. M. (2016). The Rise of the “Gig Economy” and Implications for Understanding Work and Workers. *Industrial and Organizational Psychology*, 9(1), 157–162. DOI: 10.1017/iop.2015.129.
- Lepanjuuri, K., Wishart, R., Cornick, P. (2018). *The characteristics of Those in the gig economy*. Department for Business, Energy & Industrial Strategy. Final report.
- Leschke, J., Watt, A. (2008). *Job quality in Europe*. Brussels: European Trade Union Institute for Research, Education and Health and Safety.
- Merkel, J. (2019). Freelance isn't free. Co-working as a critical urban practice to cope with informality in creative labour markets. *Urban Studies*, 56(3), 526–547. DOI: 10.1177/0042098018782374.
- Minter, K. (2017). Negotiating labour standards in the gig economy: Airtasker and Unions New South Wales. *The Economic and Labor Relations Review*, 28(3), 438–454. DOI: 10.1177/1035304617724305.
- Neamtu, D., Hapenciuc, V., Bejinaru, R. (2019). *The Impact of Digitalization on Business Sector Development in the Knowledge Economy*. Proceedings of the International Conference on Business Excellence 2019, Bucharest, Romania, 13(1), 479–491. DOI: 10.2478/picbe-2019-0042.
- Ostoj, I. (2019). *The growth of the gig economy – benefits and treats to labor. Economic and Social Development*. 41st International Scientific Conference on Economic and Social Development Book of Proceedings, 23–24 May 2019, Belgrade, 386–394.
- Prassl, J. (2018). *Humans as a service*. Oxford: Oxford University Press.
- Schwellnus, C., Geva, A., Pak, M., Veil, R. (2019). *Gig economy platforms: boon or bane?* Economic Department Working Papers No. 1550. Geneva: OECD.
- Spreitzer, G. M., Cameron, L., Garrett, L. (2017). Alternative Work Arrangements: Two Images of the New World of Work. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 473–499. DOI: 10.1146/annurev-orgpsych-032516-113332.
- Stanford, J. (2017). The resurgence of gig work: Historical and theoretical perspective. *The Economic and Labor Relations Review*, 28(3), 382–401. DOI: 10.1177/1035304617724303.
- Stewart, A., Stanford, J. (2017). Regulating work in the gig economy: What are the options? *The Economic and Labor Relations Review*, 28(3), 420–437. DOI: 10.1177/1035304617722461.

- Tassinari, A., Maccarrone, V. (2017). The mobilization of gig economy couriers in Italy: some lessons for the trade union movement. *Transfer*, 23(3), 353–357. DOI: 10.1177/1024258917713846.
- Todoli-Signes, A. (2017). The „gig economy”: employee, self-employed or the need for a special employment regulation? *Transfer*, 23(2), 1–13. DOI: 10.1177/1024258917701381.
- Wood, A. J., Graham, G., Lehdonvirta, V., Hjorth, I. (2019). Good Gig, Bad Gig: Autonomy and Algorithmic Control in the Global Gig Economy. *Work, Employment and Society*, 33(1), 56–75. DOI: 10.1177/0950017018785616.

### Summary

Digital technological platforms that facilitate the provision of many services are a relatively new development in the economy, especially in the labour market. As they are becoming increasingly prevalent, the characteristics of this business model are gradually revealed. The model creates many novel ways to make goods available and generate income, but it also translates into a new quality of work. In the discussion of the labour market segment operating based on technological platforms, the world literature tends to employ the concepts of the gig economy and cybertariat, which are unequivocally negative in their connotations.

The paper discusses the relationship between technological innovations and work. It aims to determine the characteristics of work carried out through digital technological platforms in the cross-section of the major dimensions of quality work. The paper presents the verification of the research hypothesis assuming that the business model adopted by digital technological platforms threatens the standards of quality work. The analysis uses the methodology designed by the author and employs the criteria developed by the European Anti-Poverty Network, constituting the quintessence of the contemporary approach to the issue in the European Union. Its main conclusion is that the gig economy segment is highly heterogeneous, which makes it difficult to assess and discuss the problems arising in this segment and their solutions. In consequence, it requires a clarification through adequate classifications and identification of problem groups. However, the research results reveal that a significant part of the gig economy generates very low quality work.

*Keywords:* gig economy, cybertariat, work.

## Cyfrowe platformy technologiczne – szansa czy zagrożenie dla jakości pracy?

### Streszczenie

Cyfrowe platformy technologiczne pośredniczące w świadczeniu wielu usług są relatywnie nowym zjawiskiem w gospodarce, szczególnie na rynku pracy. Wraz z poszerzaniem się zakresu ich wykorzystania, stopniowo ujawniają się właściwości tego modelu biznesowego. Tworzy on wiele nieznanych wcześniej możliwości dostępu do dóbr i osiągania dochodów, ale kształtuje też nową jakość pracy. W opisach segmentu rynku pracy rozwijającego się w oparciu o platformy technologiczne w światowej literaturze przedmiotu coraz częściej pojawiają się pojęcia gospodarki fuch (*gig economy*) i cybertariatu, czyli kategorii o zdecydowanie negatywnym wydźwięku.


Artykuł odnosi się do relacji pomiędzy innowacjami technologicznymi a światem pracy. Jego celem jest diagnoza cech pracy realizowanej za pośrednictwem cyfrowych platform technologicznych w przekroju głównych wymiarów jakości pracy. W artykule, przy wykorzystaniu autorskiej

metody, poddano weryfikacji hipotezę badawczą stanowiącą, że model biznesowy realizowany przez cyfrowe platformy technologiczne zagraża standardom jakości pracy. Do analizy jakości pracy zastosowano kryteria wypracowane przez European Anti-Poverty Network, stanowiące kwintesencję współczesnego podejścia do tego problemu w Unii Europejskiej. Badanie prowadzi do wniosku, że segment *gig economy* jest dalece niejednorodny, co utrudnia ocenę i dyskusję nad rodzącymi się problemami i ich rozwiązaniami. Wymaga zatem doprecyzowania za pomocą odpowiednich klasyfikacji i wyodrębnienia grup problemowych. Wyniki badań wskazują jednak na to, że znaczna część *gig economy* generuje pracę bardzo niskiej jakości.

*Słowa kluczowe:* gig economy, cybertariat, praca.

JEL: J81, J83, O33.



*Irena Łącka, dr hab. inż. prof. ZUT<sup>1</sup>* 

Department of Economics and Accounting  
West Pomeranian University of Technology in Szczecin

*Łukasz Brzezicki, dr<sup>2</sup>* 

Department of Microeconomics  
University of Gdańsk

## Efficiency of the research and development activities of technical universities in Poland

### INTRODUCTION

In the modern globalised knowledge-based economy, economic growth and development have been determined for more than thirty years now by knowledge creation and diffusion, and by use of research results and research and development efforts (R&D). Together with human capital, these have become the most important production factors. These have also been expressed in endogenous models of economic growth based on R&D activity and human capital. Such models were authored by Romer (1990a; 1990b), Jones (1995), Eicher and Turnovsky (1999) and Aghion and Howitt (1992; 1999). Despite certain differences, the models suggest that technical and organisational progress, and consequently innovation-based economic growth, arise from the accumulation of knowledge in the economy (created by human capital and R&D capital). This is confirmed by study results not only for highly developed countries but also for countries characterised by a low level of innovation (Cioacă, Nedelcu, 2015).

As Czerniak (2013) points out, R&D expenditure, along with its size and structure by entity and type, represents one of the most important factors determining the innovativeness of an economy. It makes it possible to reduce the

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<sup>1</sup> Correspondence address: West Pomeranian University of Technology in Szczecin, Faculty of Economics, Żołnierska 47, 71-210 Szczecin; e-mail: Irena.Lacka@zut.edu.pl. ORCID: 0000-0003-0762-8856.

<sup>2</sup> Correspondence address: e-mail: lukasz.brzezicki@ug.edu.pl. ORCID: 0000-0002-0761-1109.

technology gap in respect of the most innovative countries (innovation leaders) and to maintain a strong position in terms of R&D in the knowledge-based economy. Research and development is an essential element for the creation of innovation, and it additionally makes it possible to acquire and use new knowledge from the outside at the micro- and macroeconomic levels (Prodan, 2005).

Knowledge is gathered, developed and used as society increases spending on science, the R&D sector and education. This is fostered by proper socioeconomic policy, cultural and social mentality (including tolerance and openness to new ideas) oriented towards entrepreneurship and innovation, as well as by cooperation using well-developed intellectual and social capital (Florczak, 2009; 2013). In line with those assumptions, the basis for innovative and competitive achievements and economies are: research and development, technology transfer, technology diffusion, and creation of new solutions (with secured permanent acceleration of the economic growth dynamic due to non-decreasing capital productivity). The results of studies by Spencer (2001), Mok (2005), Kodama (2008) and Khalozadeh *et al.* (2011) confirm that in order to support these processes, universities must be engaged in the creation of strong multilateral ties between science and business and in knowledge and technology transfer from scientific and R&D institutions to the industry.

According to Kuna-Marszałek and Lisowska (2013), “social and economic growth largely depends on the level and quality of research and development activity and on the extent to which the results of this activity are used to drive the economy” (Kuna-Marszałek, Lisowska, 2013, p. 31). In this context, important drivers include not only public and private spending on research and development in the economy but also the ability of the economy to effectively utilise such spending to create knowledge and technology, and to transfer such knowledge and technology to the economy. Analysis of innovation rankings for various countries and the details of the created synthetic measures of innovation (e.g. the summary innovation indices (SII) in the ranking of European Innovation Scoreboard (EIS)) reveal the importance of the size and structure of R&D expenditure, having attractive open R&D systems and ties between science and industry for the values of the respective measures and for the position of each country in the ranking (*European Innovation Scoreboard*, 2019).

In Poland, R&D activity is pursued by various entities from the R&D sector. These include technical state universities, which formed the subject of the studies for this paper. The 21st century assumption is that they should act as third-generation universities (entrepreneurial universities) and, in addition to their basic tasks connected with education and research, they should also commercialise knowledge, i.e. reduce specific technical or organisational knowledge and the related know-how to practice. At the same time they are expected to build strong ties with business entities, including industrial enterprises (Wissema, 2005; Szmaj, 2012; Nowacki, 2013). Their R&D activity may take the form of basic research (experimental or theoretical work), industrial research (former applied research) and, within academic

entrepreneurship, in a way also developmental research. The use of the work results of scientists from technical universities is, in addition to accumulating new knowledge, also in developing innovations (process, product or service innovations), either on their own or in collaboration with enterprises, or in substantial modernising of the existing solutions. The R&D spending of these universities (coming primarily from public funds but also increasingly subsidised by the private sector) should lead to results evaluated based on the measures of the effect and impact of the technology transfer processes (Seppo, Lilles, 2012; Wunsch-Vincent, 2012). The efficiency of the R&D activity of universities may show how far they have implemented the concept of an entrepreneurial university. This efficiency is measured using various methods (Rutkowska, 2013). One of them is Data Envelopment Analysis (DEA) – a non-parametric method for assessing relative efficiency.

The purpose of the paper is to use the DEA method to measure the R&D efficiency of technical state universities. The added value of the paper is the application of an output-oriented dynamic SBM model for that purpose, with variable returns to scale (Tone, Tsutsui, 2010).

## LITERATURE OVERVIEW

The research overview performed by De Witte and López-Torres (2017) suggests that the educational sphere, in a broad sense of the term, including universities, is usually analysed using the non-parametric DEA method. Liu *et al.* (2013) claim that education is one of the five most often analysed research areas within the DEA methodology. It must be noted that the studies focus mainly on the teaching activity of universities rather than their R&D activity. Even analyses of the R&D activity focus mostly on the theoretical aspect of it, i.e. scientific publications or the awarded research grants, and much less on practical results having the potential to be implemented in economic practice, such as patents for example.

Anderson, Daim and Lavoie (2007) examined the efficiency of technology transfer to economic practice by adopting the following as data: income and number of licences, number of start-ups, patent applications and registrations, and total spending on research. Similar studies regarding knowledge transfer and research were conducted by Berbegal-Mirabent (2018), who analysed R&D spending and the number of employees, research projects and publications. Some authors simultaneously use data from various areas of university activities. One example of such an approach includes research by Chuanyi, Xiaohong, and Shikui (2016), who analysed the number of conferred master's degrees, doctoral degrees, the number of publications and patents. Flegg *et al.* (2004) focused on the income from research activity and the number of conferred bachelor's, master's and doctoral degrees. Leitner *et al.* (2007) used the following data: the number of publications and monographs, patents and income from external sources. Yang,

Fukuyama and Song (2018) analysed the value of the funds allocated for R&D, the value of the public funding for universities, the number of patents, publications, students, people working on R&D projects and the value of revenue from the sale of patents. So far in Poland only Wolszczak-Derlacz (2013) have analysed the implementation efficiency of universities, based on the following variables: number of patent applications and registrations, number of university professors and total revenue. The analysis by Wolszczak-Derlacz (2013) covered the 2001–2008 period. Several system changes have been introduced to the higher education and science sector since then, which is why the R&D activity of universities should be studied based on more recent data.

## RESEARCH METHODOLOGY

In order to properly conduct the empirical study, first the scope of the R&D activities of universities as regulated in legislation was characterised. The Polish Higher Education Act (*Obwieszczenie Marszałka...*, 2017) states, first, that a university has the right to conduct scientific research and development work and to define their directions, and, second, that a university's basic tasks are to conduct research and development works, provide research services and transfer knowledge to the economy.

Research and development activity is defined in the Polish Act on Science Financing Rules (*Obwieszczenie Marszałka...*, 2018), after Fascarti Manual 2015 (2018), as a creative activity that includes research or development works undertaken systematically in order to increase knowledge transfers and use knowledge resources for new applications. The act (*Obwieszczenie Marszałka...*, 2018) defines research and divides it into:

- a) basic research – original research, experimental or theoretical works undertaken primarily in order to gain new knowledge about the bases of certain phenomena and observable facts without focusing on direct commercial applications,
- b) applied research – research works undertaken to gain new knowledge, oriented primarily towards practical applications,
- c) industrial research – research to gain new knowledge and skills in order to develop new products, processes and services or make significant improvements to the products, processes and services; the research takes into account the creation of new components of complex systems, construction of prototypes in a laboratory environment or in an environment simulating the existing systems, especially to assess the usefulness of particular types of technology, and construction of the pilot lines necessary for those studies, also in order to obtain evidence in the case of generic technologies.

Furthermore, the aforesaid Act also defines the scope of development works, which is: acquiring, merging, shaping and using the currently available knowledge

and skills in the area of science, technology and business activity as well as other knowledge and skills to plan production and create and design new, modified or improved products, processes and services, except for works that involve routine and periodic changes in products, production lines, manufacturing processes, existing services and other operations in progress, even if such changes have the nature of improvements.

The study focuses on the practical aspects of R&D activity that influence the economic sphere and the innovation level of the country. As a result, the studied entities were selected through purposive sampling to make sure they best reflect the R&D activity of universities. Two main criteria were taken into account. In the first place, the DEA method requires a relatively homogeneous set of entities. In the second place, the nature and scope of the R&D activity must be considered – it needs to be continuous, which should show that this type of activity is important for the university and allows it to regularly derive effects from the R&D activity. Furthermore, it has to be possible to present the research results for more than one year. The study encompasses a homogeneous group of 14 out of 18 technical universities (Table 1), excluding Gdańsk University of Technology, Częstochowa University of Technology, Kielce University of Technology and Koszalin University of Technology, due to a lack of data.

**Table 1. Technical universities covered by the study**

DMU	Name of university
U1	West Pomeranian University of Technology in Szczecin
U2	Warsaw University of Technology
U3	Białystok University of Technology
U4	University of Bielsko-Biała
U5	Silesian University of Technology
U6	Tadeusz Kościuszko University of Technology
U7	AGH University of Science and Technology
U8	Lublin University of Technology
U9	Łódź University of Technology
U10	Opole University of Technology
U11	Poznań University of Technology
U12	Kazimierz Pułaski University of Technology and Humanities
U13	Rzeszów University of Technology
U14	Wrocław University of Technology

Source: own study.

The universities used for the study were assigned the following variables: U1–U14. In order to analyse only the practical dimension of the R&D activity, the basic research pursued by the technical universities was left out.

Note that the process of securing legal protection for a new solution (invention, utility model etc.) consists of two main stages. During the first one, the entity files an application for the new solution to the Patent Office, and then, following a positive verification by the Patent Office, it receives a patent. In view of the above, the analysis encompasses the R&D activity of universities in these two areas. This is why two corresponding empirical models were adopted. The first model (M1) applies to the activity of universities in the registration of new solutions, while the second one (M2) includes only patent-secured solutions that can be used in business practice.

The output adopted for M1 is the total number of patent applications (number of applications filed by the university with the Polish patent office and the number of invention applications filed with foreign patent offices) –  $Y_1$ . The output for M2 is the total number of patent registrations (number of patents secured with the Polish patent office and the number of patents secured with foreign patent offices) –  $Y_2$ . The data used in the empirical study comes from reports on the R&D activities of universities (PNT-01/s) obtained as a result of applying to state universities for access to public information. In order to preserve data consistency in the years under analysis, data for the period from 2015 to 2017 were used. The adopted research period is directly connected with the EU funds available within the current 2014–2020 Financial Framework. At this point it should be noted that, according to the data provided by the Polish Ministry of Science and Higher Education (RAD-on, 2020), the share of EU funds in the total funds awarded to and used by universities for scientific projects differed for particular years. The largest share, of over 35% was recorded in 2015, in the next year it was only 10%, and in 2017 more than 15%. Nonetheless, such funds represent one of the four main sources of financing for scientific projects. Furthermore, the selection of the years 2015–2017 as the studied period makes it possible to illustrate the situation following the system transformations implemented in 2011 and 2014 but preceding the current higher education and science reform enacted in 2018.

Data for several years permit the analysis of the changes taking place in time based on the DEA methodology, which offers several measurement approaches, such as window analysis or the Malmquist index. Yet, all the models have their limitations. First of all, they fail to take into account inter-period data which may be transferred between periods or which may affect subsequent periods. Secondly, they focus on separate efficiency estimations for periods which are independent of each other (Tone, Tsutsui, 2010). It must also be noted that the process of investment planning and implementation within the R&D activity often extends beyond one specific year, which results in resources being carried forward over the whole investment period and thus changing the figures for subsequent years. This is why the standard models available within the DEA methodology, which involve measurement in one period on a statistical basis (e.g. CCR, BCC, SBM and other), and the two already mentioned models are not suitable for the R&D

activity. These shortcomings are addressed by dynamic DEA models, which take into consideration both inter-period variables and long-term measurements, and account for the interdependencies between particular years. Tone and Tsutsui (2010) suggested a dynamic SBM model (Figure 1) which meets the above criteria, and this was the model chosen for the present empirical study.

The advantage of a dynamic SBM model is the possibility of estimating efficiency for specific years, as well the general, total efficiency in the whole period under analysis, which is crucial from the perspective of long-term planning of innovative investments.

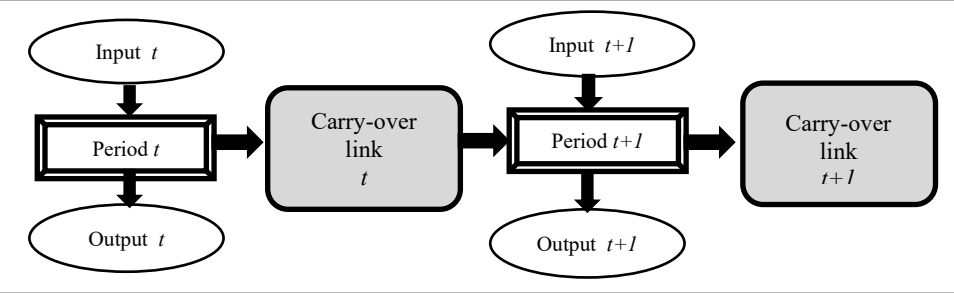


Figure 1. Structure of the dynamic SBM model

Source: Tone and Tsutsui (2010).

Individual years of an R&D investment are linked through the financial resources allocated for that purpose, which is why the current and investment outlays for applied research, industrial research and development works have been adopted as the carry-over links ( $C-OL_t$ ) for the subsequent years covered by the study. In the case of outlays, the number of people engaged in the university's R&D activity ( $X_t$ ) has been captured in two empirical models (M1, M2). This resource represents the intellectual potential of the entity without which it is impossible to create new solutions. Table 2 presents the variables assigned to particular empirical models. Table 3 presents selected descriptive characteristics of the variables.

Table 2. Variables adopted for efficiency testing in empirical models

Variable	Model of activity M1	Model of implementation M2
$X_t$ – number of people engaged in the R&D activity	+	+
$C-OL_t$ – total current and investment expenditure on applied research, industrial research and development works	+	+
$Y_1$ – total number of patent applications	+	–
$Y_2$ – total number of patent registrations	–	+

Source: own study.



**Table 3. Descriptive characteristics of the variables adopted for the study**

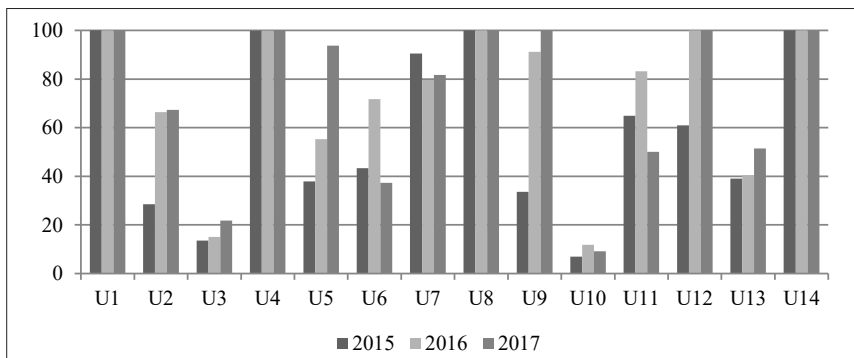
Years	Characteristic	Variables			
		$X_1$	$C-OL_1$	$Y_1$	$Y_2$
2015	Min.	262	1563	1	1
	Mean	1135	59237	81	39
	Max.	2431	237626	232	88
	SD	712	76252	71	33
2016	Min.	270	1433	1	2
	Mean	1156	35032	63	58
	Max.	2548	110153	118	145
	SD	748	36017	39	44
2017	Min.	281	1382	1	2
	Mean	1169	38220	59	50
	Max.	2547	129519	108	116
	SD	770	40302	39	38

Source: own study.

The DEA model is used to establish technical efficiency. It means either achieving as high a production level as possible with the current expenditure or a specific level of production with expenditure as low as possible (Prędko, 2012). Its estimation requires defining the model orientation and the returns to scale. The purpose of universities within their R&D activity is to maximise outputs (generate the largest number of applications and patents) rather than to minimise the resources. This is why the DEA model is output-oriented, with maximisation of the activity outputs for specific expenditure. The relevant literature (Cooper et al., 2007) notes that if diverse, non-ratio data are used, a model with variable returns to scale should be implemented. In connection with the above, the empirical study was ultimately conducted based on an output-oriented dynamic SBM model with variable returns to scale (Dynamic SBM-V-O).

## STUDY RESULTS AND THEIR INTERPRETATION

The average level of total efficiency (2015–2017 period) in M1 regarding the patent application activity was 65%, and in M2 for patent registration it was 55%. In turn, average efficiencies in particular years of the analysis were higher than the average total efficiencies (except for the 2015 efficiency calculated with M1 data). In the subsequent years (2015–2017) they were 58%, 72% and 72% respectively for M1 and 58%, 59% and 61% for M2. The results point to the low R&D efficiency of universities. Figure 2 presents the efficiency results for M1. Only four universities achieved a 100% efficiency in the analysed period. These were the following: West Pomeranian University of Technology in Szczecin (U1), University of Bielsko-Biała (U4), Lublin University of Technology (U8) and Wrocław University of Science and Technology (U14).

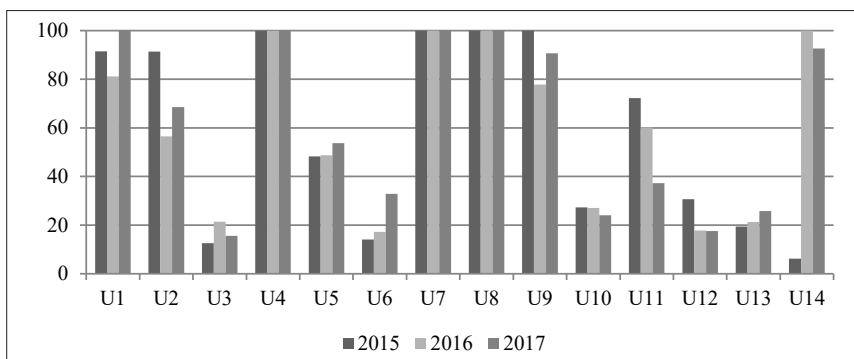


**Figure 2. Efficiency in M1**

Source: own study.

This shows that the universities are committed to continuing the registration of new solutions and that the situation of the entities is stable, regardless of changes in the environment and in other entities. The lowest efficiencies in the 2015–2017 period were achieved by Opole University of Technology (U10) and Białystok University of Technology (U3). For six universities, the efficiency continued to increase in 2016 and 2017 versus 2015. For three universities, the efficiency dropped in 2017 versus 2015. For two universities the ratio grew in 2017 versus 2015 to the full efficiency level (100%). These were Łódź University of Technology (U9) and Pułaski University of Technology and Humanities (U2). This shows that these technical universities improved their R&D efficiency in terms of patent applications.

A different picture of university efficiency was obtained in M2, with the results presented in Figure 3. Only three universities achieved a full 100% efficiency in the period, i.e.: University of Bielsko-Biała (U4), AGH University of Science and Technology (U7) and Lublin University of Technology (U8).



**Figure 3. Efficiency in M2**

Source: own study.

As many as five universities had low efficiency (below 50%) in the 2015–2017 period. Two universities achieved a 100% efficiency in one of the periods but then recorded an efficiency drop in the subsequent year. These were: Łódź University of Technology (U9) and Wrocław University of Science and Technology (U14). For three universities, i.e. West Pomeranian University of Technology in Szczecin (U1), Warsaw University of Technology (U2) and Łódź University of Technology (U9), an interesting phenomenon was observed – an abrupt drop in efficiency in 2016 with higher efficiency in the remaining years. The situation was opposite for Białystok University of Technology (U3), with an abrupt efficiency increase in 2016 versus 2015 and 2017. A constant efficiency growth trend was observed in the period for the Silesian University of Technology (U5), Cracow University of Technology (U6) and Rzeszów University of Technology (U13). A constant R&D efficiency drop was recorded for Opole University of Technology (U10) and Poznań University of Technology (U11).

Efficiency evaluation requires considering the activity of the universities in the long term due to the extended (often longer than one calendar year) creative process within R&D and the lengthy process of legally securing new solutions. Figure 4 presents benchmarking between total efficiency ratios from the 2015–2017 period in M1 and M2. The correlation coefficient between total efficiency in the M1 and M2 models was moderate – 0.56. This means that the R&D efficiency of universities in terms of patent applications only partially translates to patent registration efficiency. The total efficiency results presented in Figure 4 point to the presence of three efficiency groups, differing from one another.

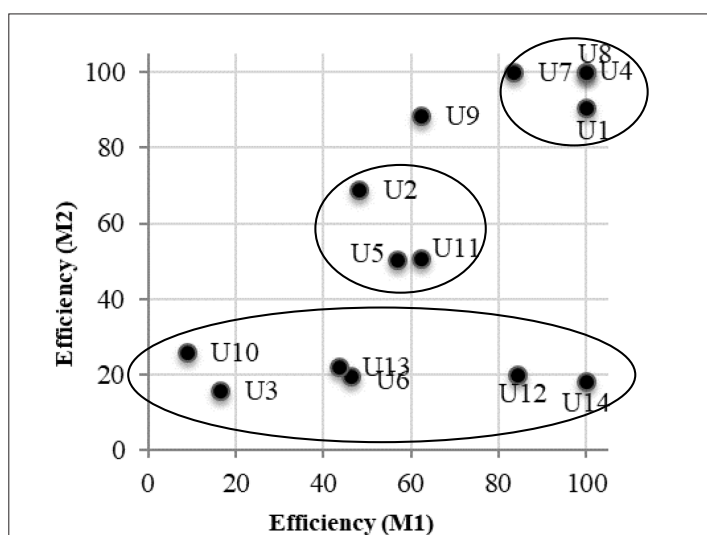


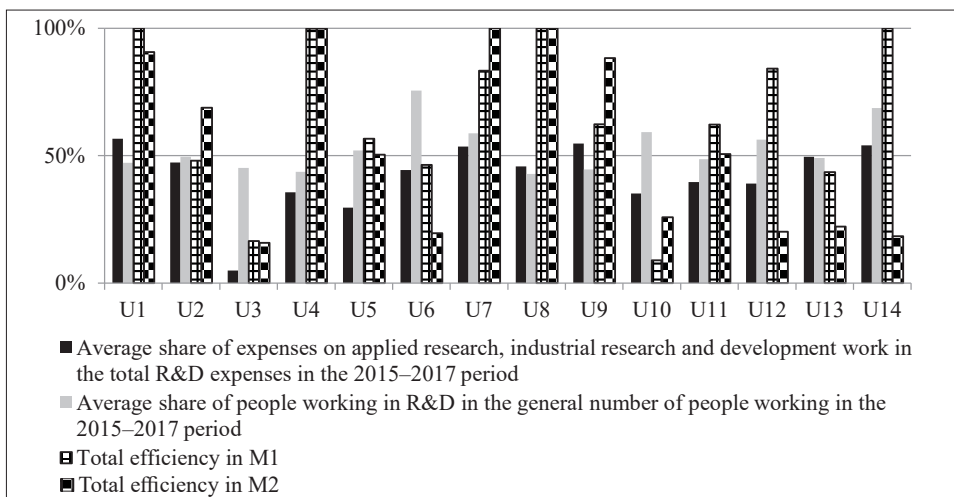
Figure 4. Benchmarking of total efficiency in M1 and M2

Source: own study.

Group one is characterised by the lowest efficiency in M2 but by dispersed efficiency in M1. Group two has similar figures for both empirical models. Group three includes the highest efficiency levels in M1 and M2, with slight deviations in these two units. The latter means that these universities both file more patent applications, with higher expenditure for that purpose, and they secure more patent registrations than other universities. This also shows that the R&D activity of the universities is stable and that they have prepared the right conditions for the continuous creation of new solutions.

The lowest total R&D efficiency for both models was achieved by Białystok University of Technology (U3) and the highest concurrently by the University of Bielsko-Biała (U4) and Lublin University of Technology (U8). Notably, the efficiency ratio of Łódź University of Technology (U9) is between the groups with the medium and the highest efficiency, which may suggest that the entity is committed to achieving better R&D results and joining the top group. Two pairs of universities, i.e. the Silesian University of Technology (U5) plus Poznań University of Technology (U11) and Cracow University of Technology (U6) plus Rzeszów University of Technology (U13), were observed to have highly similar results, at least for one empirical model. This may suggest that the entities treat each other as reference points for R&D resources and research.

At the end of the study, the DEA efficiency results were cross-referenced with the average level of expenditure of particular units (Figure 5). After all, entities may be efficient whether their potential is high or low. Such an approach makes it possible to identify “strong” entities, i.e. ones that are characterised by a high R&D potential and are efficient at the same time.



**Figure 5. Benchmarking of total efficiency in M1 and M2 with average levels of expenditure**

Source: own study.

The study results show that the following entities are efficient at least in one model and are characterised by an above-average R&D potential: AGH University of Science and Technology (U7) and Wrocław University of Science and Technology (U14). In the 2015–2017 period, the average share of those working in R&D in the total number of employees was 53%, and the share of expenditure on applied research, industrial research and development works in the total R&D expenditure was 42%. However, one must not forget that the study only applied to the analysis of applied research, industrial research and development works, which represented a minor part of the total expenditure allocated by universities for R&D in the 2015–2017 period. This was on average 47% (2015), 43% (2016) and 36% (2017). It must be noted that total R&D expenditure was characterised by abrupt variability, their mean value for the years in question being: PLN 188,593,800 (2015), PLN 121,273,700 (2016) and PLN 167,268,000 (2017). The average share of current expenditure in total R&D expenditure grew year-on-year, at 66% (2015), 84% (2016) and 90% (2017).

The types of R&D activity analysed in this paper are significant due to the results of the expenditure in the form of patent applications and patent registrations. They undoubtedly represent the contribution of technical universities to improving the innovativeness not only for higher education schools but for the whole economy as well. They may also be used by industrial and service enterprises as ready product or process innovations; once launched in the market, they may be used by enterprises in a given sector to prepare new solutions and, through diffusion of innovation, they may stimulate the emergence of inter-sectoral innovations. A technical university may benefit from a higher R&D efficiency by selling its intellectual property rights (e.g. a patent, know-how). Such efficiency has a positive impact on the competitive position of such an entity on the market of research universities, and it improves its teaching possibilities. Considering the presented advantages of a high R&D efficiency for universities, it is rather disconcerting that the share of expenditure for that purpose in the total structure of R&D expenditure was reduced in the period under study.

## CONCLUSIONS

The paper measures the R&D efficiency of 14 of the 18 state universities of technology in Poland for the 2015–2017 period. The study used data from GUS (Statistics Poland) reports on the R&D activities of universities. The efficiency was measured using the DEA method, with a dynamic SBM model. The model made it possible to simultaneously define the R&D efficiency for particular years and the total efficiency for the whole analysed period. The results of that assessment in the case of the activity model (M1) indicate low R&D efficiency of technical universities as measured by the maximisation of their patent applications for a specific level of

expenditure (people working in R&D and total current and investment expenditure on applied research, industrial research and development works). Only four universities achieved the maximum efficiency of 100% in the period under study (U1, U4, U8 and U14). The efficiency of the remaining studied entities was lower, with particularly low efficiency levels (10–20%) identified for two universities (U3 and U10). It can also be noticed that the 2015–2017 period witnessed a positive growth trend for average efficiency measures in the M1 model – with efficiency increasing from 58% to 72%. This was a result of improved values for that ratio for the majority of the studied universities in that period.

Considering another aspect of the R&D activity, i.e. successful registration of patents for inventions in the M2 efficiency assessment model, it can be noticed that only three universities achieved a 100% efficiency in terms of implementations (patent registrations) in the whole period under study (U4, U7, U8). Two of them were from the group of universities with the highest efficiency in M1. This points to a moderate correlation between patent application efficiency and patent registration efficiency. For this measure of efficiency, the average results for particular years exhibited a growth trend, at 58%, 59% and 61% respectively.

Assessment of total efficiency in M1 and M2 leads to the conclusion that only four technical universities achieved the highest efficiency in the 2015–2017 period in terms of both models (activity and implementations), and one university exhibited a commitment to achieving the best results possible and joining the top universities. Unfortunately, a major part of the studied universities (U3, U6, U10, U12, U13, U14) had very low total efficiency. The situation differed for particular universities – some had low efficiency in patent applications and in patent registrations, others were quite successful in applications, but their patent registration efficiency was very low.

The presented study results show that technical state universities have to face many challenges if they want to improve their R&D efficiency. Expenditure for that purpose should increase both total and partial efficiency in terms of activities and implementations in the majority of the studied entities. The number of technical universities with lower efficiency should continue to drop. The relevant literature and the experience of highly developed countries show that improving the R&D efficiency of universities is conducive to establishing powerful and lasting relations between R&D units and enterprises. This is why future directions of study should include an efficiency assessment of the ties between the R&D units of Polish universities and industry in terms of joint patents, joint publications, and membership in industrial clusters. Collaboration between science and the economy in this area should help improve the efficiency of R&D expenditure, increase the innovation ratios of the country, address Poland's limitations in achieving better results in the EIS rankings and also eliminate the technology gap and accelerate economic growth and development.

## BIBLIOGRAPHY

- Aghion, Ph., Howitt, P. (1992). A Model of Growth through Creative Destruction. *Econometrica*, 60/2, 323–351. DOI:10.2307/2951599.
- Aghion, Ph., Howitt, P. (1999). *Endogenous Growth Theory*. London: MIT Press.
- Anderson, T. R., Daim, T. U., Lavoie, F. F. (2007). Measuring the efficiency of university technology transfer. *Technovation*, 27, 306–318. DOI: 10.1016/j.technovation.2006.10.003.
- Berbegal-Mirabent, J. (2018). The influence of regulatory frameworks on research and knowledge transfer outputs: An efficiency analysis of Spanish public universities. *Journal of Engineering and Technology Management*, 47, 68–80. DOI: 10.1016/j.jengtecman.2018.01.003.
- Chuanyi, W., Xiaohong, L., Shikui, Z. (2016). The Relative Efficiencies of Research Universities of Science and Technology in China: Based on the Data Envelopment Analysis and Stochastic Frontier Analysis. *Eurasia Journal of Mathematics, Science and Technology Education*, 12(10), 2753–2770. DOI: 10.12973/eurasia.2016.02302a.
- Cioacă, S., Nedelcu, A. C. (2015). R&D activities' impact on economic growth: case study on Romania. *International Journal of Education and Research*, 3(3), 569–578.
- Cooper, W. W., Seiford, L. M., Tone, K. (2007). *Data Envelopment Analysis. A Comprehensive Text with Models, Applications, References and DEA-Solver Software*. New York: Springer. DOI: 10.1007/978-0-387-45283-8.
- Czerniak, J. (2013). *Polityka innowacyjna w Polsce. Analiza i proponowane kierunki zmian*. Warszawa: Difin.
- De Witte, K., López-Torres, L. (2017). Efficiency in education: a review of literature and a way forward. *Journal of the Operational Research Society*, 68(4), 339–363. DOI: 10.1057/jors.2015.92.
- Eicher, T. S., Turnovsky, S. J. (1999). Non-scale models of economic growth. *Economic Journal*, 109, 349–415. DOI: 10.1111/1468-0297.00454.
- European Innovation Scoreboard (2019). Luxembourg: European Commission. Retrieved from: <https://ec.europa.eu/docsroom/documents/38781> (2020.11.04).
- Flegg, A. T., Allen, D. O., Field, K., Thurlow, T. W. (2004). Measuring the efficiency of British universities: a multi-period data envelopment analysis. *Education Economics*, 12, 231–249. DOI: 10.1080/0904529042000258590.
- Florczak, W. (2009). Koncepcja wzrostu endogenicznego i gospodarki opartej na wiedzy w naukach ekonomicznych. *Studia Prawno-Ekonomiczne*, LXXX, 215–239.
- Florczak, W. (2013). Modelowanie zrównoważonego rozwoju w makroekonomicznych modelach gospodarki Polski. *Acta Universitatis Lodzianis Folia Oeconomica*, 294, 319–369.
- Jones, C. (1995). R&D Based Models of Economic Growth. *Journal of Political Economy*, 103(4), 759–784. DOI: 10.1086/262002.
- Khalozadeh, F., Kazemi, S. A., Movahedi, M., Jandaghi, G. (2011). Reengineering University – Industry Interactions: Knowledge-based Technology Transfer Model. *European Journal of Economics, Finance and Administrative Sciences*, 40, 47–58.
- Kodama, T. (2008). The role of intermediation and absorptive capacity in facilitating University-industry linkages an empirical study of TAMA in Japan. *Research Policy*, 37(8), 1224–1240. DOI: 10.1016/j.respol.2008.04.014.



- Kuna-Marszałek, A., Lisowska, R. (2013). Działalność badawczo-rozwojowa jednostek naukowych i badawczo-rozwojowych w regionie łódzkim. *Studia Prawno-Ekonomiczne*, t. LC, 29–46.
- Leitner, K.-H., Priksosovits, J., Schaffhauser-Linzatti, M., Stowasser, R., Wagner, K. (2007). The impact of size and specialisation on universities' department performance: a DEA analysis applied to Austrian universities. *Higher Education*, 53, 517–538. DOI: 10.1007/s10734-006-0002-9.
- Liu, J. S., Lu, L. Y. Y., Lu, W.-M., Lin, B. J. Y. (2013). A survey of DEA applications. *Omega*, 41, 893–902. DOI: 10.1016/j.omega.2012.11.004.
- Mok, K. H. (2005). Globalization and educational restructuring. University merging and changing governance in China. *Higher University*, 50, 57–88. DOI: 10.1007/s10734-004-6347-z.
- Nowacki, F. (2013). Aktywność przedsiębiorcza uniwersytetu trzeciej generacji – uniwersytet czy przedsiębiorstwo. In: D. Burawski (Ed.), *Uniwersytet trzeciej generacji. Stan i perspektywy rozwoju* (pp. 25–38). Poznań: Europejskie Centrum Wspierania Przedsiębiorczości.
- Obwieszczenie Marszałka Sejmu Rzeczypospolitej Polskiej z dnia 30 października 2017 r. w sprawie ogłoszenia jednolitego tekstu ustawy – Prawo o szkolnictwie wyższym (DzU 2017 poz. 2183).
- Obwieszczenie Marszałka Sejmu Rzeczypospolitej Polskiej z dnia 8 grudnia 2017 r. w sprawie ogłoszenia jednolitego tekstu ustawy o zasadach finansowania nauki (DzU 2018 poz. 87).
- Podręcznik Frascati 2015. Zalecenia dotyczące pozyskiwania i prezentowania danych z zakresu działalności badawczo-rozwojowej.* (2018). Warszawa: GUS.
- RAD-on (2020). Projekty naukowe w wybranym roku. Retrieved from: <https://radon.nauka.gov.pl/raporty/szkolnictwo-wyzsze-i-nauka> (2020.11.04).
- Prędkie, A. (2012). Geneza zbiorów możliwości produkcyjnych wykorzystywanych w DEA. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Poznaniu*, 241, 126–137.
- Prodan, I. (2005). Influence of Research and Development Expenditures on Number of Patent Applications: Selected Case Studies in OECD Countries and Central Europe, 1981–2001. *Applied Econometrics and International Development*, 5–4, 5–20.
- Romer, P. (1990a). Endogenous technological change. *Journal of Political Economy*, 98(5), 71–102.
- Romer, P. M. (1990b). Human capital and growth: theory and evidence. *Carnegie Rochester Conference Series on Public Policy*, 32, 251–286. DOI: 10.1016/0167-2231(90)90028-J.
- Rutkowska, A. (2013). Teoretyczne aspekty efektywności – pojęcie i metody pomiaru. *Zarządzanie i Finanse*, 11(1, 4), 439–453.
- Seppo, M., Lilles, A. (2012). Indicators measuring university-industry cooperation. *Discussion on Estonian Policy*, 20(1), 204–225. DOI: 10.1515/tpet.v20i1.782.
- Spencer, J. W. (2001). How relevant is university-based scientific research to private high-technology firms? A United States – Japan comparison. *Academy of Management Journal*, 44, 432–440. DOI: 10.2307/3069465.
- Szmal, A. (2012). Identyfikacja dóbr intelektualnych podlegających komercjalizacji. *Zeszyty Naukowe Politechniki Śląskiej. Seria: Organizacja i Zarządzanie*, 60, 321–333.

- Tone, K., Tsutsui, M. (2010). Dynamic DEA: A slacks-based measure approach. *Omega*, 38, 145–156. DOI:10.1016/j.omega.2009.07.003.
- Wissema, J. G. (2005). *Technostarterzy dlaczego i jak?* Warszawa: PARP.
- Wolszczak-Derlacz, J. (2013). *Efektywność naukowa, dydaktyczna i wdrożeniowa publicznych szkół wyższych w Polsce – analiza nieparametryczna*. Gdańsk: Wydawnictwo Politechniki Gdańskiej.
- Wunsch-Vincent, S. (2012). Accounting for science–industry collaboration in innovation: existing metrics and related challenges. In: S. Dutta (Ed.), *The Global Innovation Index 2012. Stronger innovation linkages for global world* (pp. 97–108). Fontainebleau: WIPO.
- Yang, G.-L., Fukuyama, H., Song, Y.-Y. (2018). Measuring the inefficiency of Chinese research universities based on a two-stage network DEA model. *Journal of Informetrics*, 12(1), 10–30. DOI: 10.1016/j.joi.2017.11.002.

### Summary

In the 21st century knowledge-based economy, long-term economic growth and development depend on the ability to use the knowledge and technology so as to create product, process, organisational, marketing and even social innovations. The knowledge and technology, human resources and social capital (facilitating the transfer of technology from the world of science to the economy), comprise the most important production factors today. Research and development (R&D) activities are among the diverse determinants affecting the economy's ability to innovate. They are carried out by public technical universities. One of the tasks that these entities face is to conduct basic, industrial (applied) research and development works. Their results can then be transferred to industrial and service enterprises as novel solutions. Research and development activities of universities are financed mainly from public sources, which suggests the need to assess the efficiency of this task. This can be done with the use of various methods, e.g. the non-parametric DEA method.

The purpose of the paper is to measure the efficiency of research and development activities of public technical universities in Poland with the aid of the DEA method. The fourteen universities which in the years 2015–2017 reported to the Ministry of Science and Higher Education (MNiSW) were included in the study. The efficiency of the universities in filing new patent solutions and being granted patents was analysed. The results acquired indicate very low and low efficiency of most Polish technical universities. This is due both to a small number of patent applications and a small number of patents granted. In the examined period, the group of most efficient technical universities in both aspects comprised 4 to 5 universities.

*Keywords:* R&D, efficiency, universities, DEA.

## Efektywność działalności badawczo-rozwojowej uczelni technicznych w Polsce

### Streszczenie

W gospodarce XXI w. opartej na wiedzy, długookresowy wzrost i rozwój gospodarczy zależą od umiejętności wykorzystywania wiedzy i technologii do tworzenia innowacji produktowych, procesowych, organizacyjnych, marketingowych, a nawet społecznych. Wiedza i technologia, kapitał ludzki oraz społeczny (umożliwiający transfer technologii ze świata nauki do gospodarki), stanowią

dziś najważniejsze czynniki wytwórcze. Wśród różnych determinant wpływających na zdolność gospodarki do innowacji znajduje się działalność badawczo-rozwojowa (B+R) realizowana przez publiczne szkoły wyższe, m.in. uczelnie techniczne. Jednym z zadań tych podmiotów jest prowadzenie badań podstawowych, przemysłowych (stosowanych) i prac rozwojowych. Ich rezultaty powinny trafiać do przedsiębiorstw przemysłowych i usługowych jako możliwe do wykorzystania nowe rozwiązania. Działalność badawczo-rozwojowa szkół wyższych jest finansowana głównie ze źródeł publicznych, co skłania do próby oceny efektywności wykonywania tego zadania. Można to zrealizować za pomocą różnych metod, np. nieparametrycznej metody DEA.

Celem artykułu jest pomiar za pomocą metody DEA efektywności działalności badawczo-rozwojowej publicznych uczelni technicznych w Polsce. Do badania przyjęto 14 uczelni, które podlegały w latach 2015–2017 Ministerstwu Nauki i Szkolnictwa Wyższego (MNiSW). Przeanalizowano efektywność szkół wyższych odnośnie do zgłaszania nowych rozwiązań patentowych oraz uzyskanych patentów. Uzyskane wyniki wskazują na bardzo niską i niską efektywność większości polskich szkół technicznych. Wynika to zarówno z małej liczby zgłoszeń patentowych, jak i małej liczby uzyskiwanych patentów. W badanym okresie grupa najbardziej efektywnych uczelni technicznych w obu aspektach liczyła jedynie 4–5 jednostek.

*Słowa kluczowe:* B+R, efektywność, szkoły wyższe, DEA.

JEL: O31, I21, I22, C14.

*Jordan Klimek, mgr*<sup>1</sup> 

Department of Organisation and Management  
Institute of Management  
University of Szczecin

*Katarzyna Łobacz, dr*<sup>2</sup> 

Department of Business Management  
Institute of Management  
University of Szczecin

## **Knowledge spillovers and innovation: analysis of the relationships between service centres and MSMEs from the regional perspective<sup>3</sup>**

### INTRODUCTION

The innovativeness of micro, small and medium-sized enterprises (MSMEs) is of a great importance from the regional perspective. Due to their strong regional impact, innovative activities being implemented by MSMEs affect the quality of life of the local community. In turn, these innovative activities allow them to expand into markets with a larger geographical coverage, so that the whole region also benefits from the scale of operations or high profit margins being invested in the region.

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<sup>1</sup> Correspondence address: University of Szczecin, Institute of Management, Department of Organisation and Management, Cukrowa 8, 71-004 Szczecin; e-mail: jordan.klimek@usz.edu.pl. ORCID: 0000-0002-9824-143X.

<sup>2</sup> Correspondence address: University of Szczecin, Institute of Management, Department of Business Management, Cukrowa 8, 71-004 Szczecin; e-mail: katarzyna.lobacz@usz.edu.pl. ORCID: 0000-0001-5038-1022.

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Innovation can be understood as the implementation of new improved offers for the market, which arise as a consequence of the creation or discovery of new knowledge that is embedded in a specific product of service (Łobacz, 2018). The creation or discovery of new knowledge is usually a result of informed investments made by economic agents. However, as knowledge demonstrates a natural susceptibility to spreading processes, other entities, apart from those that have invested in the development of new knowledge, may benefit from the results of those investments. Therefore, the flow of knowledge between entities is an important factor influencing innovation. As the spread of knowledge has geographical limits, smaller local companies can benefit from being located close to international corporations – in the service sector these include service centres in particular.

Thus, it is supposed that the innovativeness of service companies, which dominate in the regional perspective, may be stimulated when international service centres are located nearby. Hence, the purpose of the considerations presented in this paper is to assess the effects of exposure of MSMEs to knowledge transfer from multinational corporations and service centres in terms of their innovativeness. The analysis uses a regional perspective, based on the Zachodniopomorskie Voivodeship in Poland, in which the density of service centre locations is moderate compared to other regions in central and eastern Europe. The analysis is based on a quantitative research conducted in 2016 on a sample of 1,100 MSMEs located in the Zachodniopomorskie Voivodeship.

### SERVICE CENTRES AND THEIR IMPACT ON MSMEs

The impact of service centres, representing a group of multinational corporations in the service sector, on local MSMEs is perceived as diverse and depending on the nature of their behaviour in regional economies. Generally, the three types of effects mentioned in the literature (Navaretti, Venables, 2004; Sass, 2011) are those related to:

- product market;
- factors of production;
- inflow of knowledge (knowledge spillovers).

Previous research indicates that both greenfield and brownfield type investments positively influence economic growth by raising the accumulation of capital, productivity, and transfer of knowledge and technology (Bayar, 2017). However, given the nature of investments made by foreign entities and the specific characteristics of the regions in which they locate, these effects have different strength and thus impact on the development of regions and locally operating MSMEs.

One of the often disputed aspects concerning the influence of foreign investors on local economies is the injection of investment capital, which increases the purchasing power in the region and, at the same time, translates into an increase in employment rate and wage expectations (MacDougall, 1960). Moreover, the

location of service centres, as with other multinational corporations, may sharpen competition at the local market level, leading to lower prices and the introduction of better products (Navaretti, Venables, 2004). As the latter can be perceived as a negative for local MSMEs, the positive impact of multinational corporations should also be observed.

Additionally, it is argued that investment usually passes from more to less developed countries, which entails a transfer of new technologies, knowledge and skills. By using their financial and organisational powers, service-oriented multinational corporations contribute to the development of the infrastructure necessary to provide high quality professional services (Niedzielski, Łobacz, 2017). Moreover, service centres, like other multinational corporations, with their specific personnel policy, contribute to the qualitative development of local human resources, e.g. through an employee training system (Sass, 2011).

The presence of service centres in a region, as with multinational corporations in general, may potentially generate positive externalities resulting from knowledge spillovers (Blomström, Kokko, 1997). As Arrow (1962) pointed out, knowledge is fundamentally different from other factors of production. The specific character results from its inherent features, including its intangibility, which implies its relatively easy replication and, to a large extent, non-exclusion, which in turn leads to a rapid increase in the amount of general knowledge locally and its transferability between economic units (Romer, 1986). Knowledge is the basis for development, being an impulse to develop innovation, initially radical and then incremental (Schumpeter, 1939). New knowledge creates new business opportunities that are used in different ways by enterprises (Arrow, 1962; Acs et al., 2009). Thus, it is argued that an inflow of new knowledge stimulates the development of business operations and market offers. However, the creation of new knowledge requires proportional investments, and thus benefiting from knowledge spillovers is always favourable.

It was demonstrated that the scale and intensity of knowledge spillovers depends on the size of the knowledge gap between the incoming and the local companies, including technology-related capabilities, human capital development and business practices (Rugraff, Hansen, 2011). The reason for this is the natural advantage of the incoming over the local companies (Dunning, 1988), as well as the ability or willingness of the incoming companies to protect their knowledge resources from spreading. Thus, the difference in impact of foreign investments on local economies is reportedly subject to high-tech versus low-tech sectors represented by incoming companies or knowledge-intensive versus regular enterprises.

The occurrence of knowledge spillovers from multinational corporations is to a large extent determined by the presence of the relationships between large enterprises and MSMEs. Research has demonstrated the joint immersion of small and big enterprises in the business environment and the opportunities resulting from that by observing how they affect the development of local small entities (Rugraff, Hansen,

2011). Moreover, direct connections between large incoming companies and small local companies can significantly contribute to strengthening the effects of knowledge spillovers. The strength of the relations translates into a positive impact on the growth of MSMEs (Hirschman, 1958). It is additionally argued that the stronger the relations that exist between local small firms and incoming multinational corporations, the greater the impact on local MSME development is (Altenburg, 2000; Scott-Kennel, Enderwick, 2005; Hansen, Schaumburg-Müller, 2006). However, even though the transfer of tacit knowledge is limited, as it requires time and favourable conditions to be ensured (Baruk, 2016), it requires more direct interactions to be transmitted effectively, such as through involvement in joint practices.

Direct relationships between small company owners and multinational corporation employees often brings new dynamics to the development of local companies. As with the business connections between local small and large companies, these may result in gaining access to new markets or in the creation of new market opportunities. Good practices, learnt and suitably adopted by the MSMEs, include work organisation, use of new production technologies, marketing and business management practices, etc., and these may result in enhancing their competitive advantage on the supra-regional, national or even international markets.

This means that MSMEs may benefit from the existence of service centres in their local business environment. These benefits result directly from the inflow of new knowledge, which brings new incentives that can translate into an intensification of innovative activities. The dependence between new knowledge inflows and MSME innovativeness will be further investigated in this paper.

## METHODOLOGY

The theoretical considerations outlined above prompted the authors to investigate the effects of knowledge flows being a result of interactions between multinational service centres and local MSMEs in the regional context. MSME innovativeness, measured as the introduction of new enhanced solutions to the market, was here particularly considered. Innovativeness was analysed in conjunction with direct exposition to knowledge flows from service centres, regarded as a sub-group of the general group of multinational corporations.

The study directly investigated two channels of knowledge flow: (1) direct immersion in the knowledge-specific environment, and (2) direct interactions with knowledge transmitters. The first channel was operationalised as performing work in environments rich in specific knowledge (with people in multinational corporations /service centres or with technologies/physical objects used in/by multinational corporations/service centres and under an umbrella of inbound processes and procedures), in which tacit knowledge is transferred and specific experience is gained. The second channel was considered as being in the area of influence of people or



technologies/physical objects directly related to multinational corporations/service centres, allowing the gaining of new knowledge through listening and/or observing.

For this purpose, empirical data were used from quantitative research carried out in 2016 on a representative sample of 1,100 MSMEs located in the Zachodniopomorskie Voivodeship in Poland. The sampling process was probabilistic and took into account the following parameters: size of the enterprise (82.3% micro, 12.9% small, 4.8% medium), location of the enterprise (according to GUS data for sub-regions), sector of the enterprise's operations (industrial processing 7.9%; architecture 12.6%; trade and repair of motor vehicles 22.9%; transport and storage 6.5%; real estate 7.3%; professional, scientific and technical activities 8.0%; other services 6.3%; other sections 28.5%). Considering the given parameters, the structure of enterprises participating in the survey matched the structure of the general population of the MSMEs in the Zachodniopomorskie Voivodeship, which means that the sample may be considered as representative, and that the conclusions from the analysis can be generalised to the entire population in the regional perspective.

The collected data were analysed with the support of IBM SPSS. In particular, the focus was on variance analysis, i.e. comparing average values in group clusters directed towards confirming the correlations between the variables and determining the significance of differences between the groups.

#### SERVICE CENTRES KNOWLEDGE SPILLOVERS AND MSME INNOVATIVENESS: EMPIRICAL ANALYSIS

The results obtained in the present study suggest a positive impact of knowledge transfer from incoming multinational service centres to local MSMEs, resulting in the intensification of innovative activities for those companies whose owners or employees were exposed to any kind of collaboration. Based on those results, it can be concluded that the more intensive the exposition is, the more significant the results that are achieved.

Table 1 presents data that summarise the relations between variables representing the exposure of MSME owners and employees to knowledge transmitted by humans associated with multinational corporations/service centres and the innovativeness of those MSMEs after this exposure.

Analysis of the data suggests that companies whose owners have an experience of working in a service centre(s) or more general multinational corporation(s) launch new products on the market more often than those whose owners do not have this kind of experience (Chi square test = 11.097). Although the relationship between variables should be classified as weak (Pearson's  $r = -0.104$ ), the data doubtfully indicate that the number of new products introduced to the market is greater when people have experience related to work at a multinational corporation(s) (35.4%), and it grows when experience is associated more specifically with a service centre(s) –

50%. Statistical tests (analysis of variance) confirm the significant difference between results achieved by MSME owners with employment experience in service centres or multinational corporations and owners without such experience:  $F(2,227) = 3.097$ ,  $p < 0.05$ .

**Table 1. Impact of MSMEs exposure to knowledge transfer from multinational corporations and service centres on their innovativeness in the context of human capital**

Specification		MSMEs which have introduced innovations to the market (%)	
		yes	no
MSMEs whose OWNERS have experience of working for a <u>multinational corporation(s)</u>	yes	35.4	64.6
	no	21.6	78.4
MSMEs whose OWNERS have experience of working in a <u>service centre(s)</u>	yes	50.0	50.0
	no	22.4	77.6
Total		22.6	77.4
MSMEs whose EMPLOYEES have experience of working for a <u>multinational corporation(s)</u>	yes	37.5	62.5
	no	21.2	78.8
MSMEs whose EMPLOYEES have experience of working in a <u>service centre(s)</u>	yes	100.0	0.0
	no	—	—
Total		23.0	77.0
MSMEs whose OWNER(S) or EMPLOYEE(S) has/had direct relations with an employee(s) of a <u>multinational corporation(s) or service centre(s)</u>	yes	39.6	60.4
	no	19.5	80.5
Total		22.6	77.4

Source: own study.

The research results also indicate that MSMEs which employed people with knowledge and experience gained when working for service centre(s), introduced new innovative offers to the market much more often (100% of such companies) than entities that either employed former workers of multinational corporation(s) (37.5%) or which lacked this type of human resource in their team. This relationship is confirmed statistically (Chi square = 11.148).

It was also observed that direct interactions with new knowledge transmitters enhance the probability of intensified innovative actions. According to the results, the regional MSMEs whose owners or employees were in constant interpersonal relations with representatives of multinational corporations, and more specifically service centre associates, introduced new products to the market more often (39.6%) than entities whose staff did not maintain such relations (19.5%). Although the

statistical relationship (Chi square = 31.693) can be generally perceived as weak (Pearson's  $r = -0.119$ ), in the context of the total number of surveyed enterprises that have introduced new products to the market (22.6%) it seems to be significant.

Direct interactions with physical capital used for the product development and delivery by multinational corporations also seems to be an important source of new knowledge, contributing to the implementation of new innovative offers by MSMEs. This relates both to direct immersion in work processes supported by particular technologies, machines or devices and short term interaction with them, involving observation rather than practice. It is also demonstrated that interactions with multinational corporations enhance the purchasing power of MSMEs contributing to new technology acquisitions and thus extending their power to generate and implement innovative offers to the local and inter-regional market.

Very similar results are achieved when MSMEs are exposed to knowledge transfer from multinational corporations and service centres in the context of physical capital, but only here has a weaker impact been observed. The data presented in Table 2 demonstrate that those MSMEs which have acquired technologies, machines or devices previously owned by service centres introduced new products to the market much more often (100%) than those which had similar relationships with multinational corporations in general (57.1%). The significant difference between the groups is confirmed by the statistical relationship (Chi square = 25.496, Pearson's  $r = -0.132$ ). This finding seems to be supported by the fact that the number of MSMEs which lacked such interactions and introduced a new product to the market did not exceed 22.6%. A significant difference between those two groups of MSMEs confirms the analysis of variance:  $F(3,36) = 1.624$ ,  $p < 0.05$ , where Pearson's  $r$  equals 0.201.

Similarly, MSMEs that used technologies, machines or devices previously owned by a service centre(s) in order to perform their operations introduced new products to the market more often (100%) than those companies that experienced similar collaboration with other multinational corporations (48.4%). In turn, the share of MSMEs that lacked collaborative interactions with any multinational corporation, including service centres, leading to the use of equipment from large companies and which were innovative in the referenced period, did not exceed 22.6%. Also, the statistical difference between the above mentioned groups is significant, as confirmed by the analysis of variance:  $F(3,36) = 3.276$ ,  $p < 0.05$ , with a Pearson's  $r$  of 0.032.

In addition, the data in Table 2 indicate that MSMEs which have acquired technologies, machines or devices in collaboration with a service centre(s) introduced new products to the market significantly more often (100%) than those without such an interaction (22.6%). The calculation of variance confirms the statistical differences between the groups:  $F(3,36) = 8.147$ ,  $p < 0.05$ .

**Table 2. Impact of MSMEs exposure to knowledge transfer from multinational corporations and service centres on their innovativeness in the context of physical capital**

Specification		MSMEs which have introduced innovations to the market (%)	
		yes	no
MSMEs which have acquired technologies, machines or devices previously owned by a <u>multinational corporation(s)</u>	yes	57.1	42.9
	no	22.3	77.7
MSMEs which have acquired technologies, machines or devices previously owned by a <u>service centre(s)</u>	yes	100.0	0.0
	no	22.5	77.5
Total		22.6	77.4
MSMEs which have used technologies, machines or devices owned by a <u>multinational corporation(s)</u> in order to perform their operations	yes	48.4	51.6
	no	22.1	77.9
MSMEs which have used technologies, machines or devices owned by a <u>service centre(s)</u> in order to perform their operations	yes	100.0	0.0
	no	22.6	77.4
Total		22.6	77.4
MSMEs which have acquired technologies, machines or devices in collaboration with a <u>multinational corporation(s)</u>	yes	72.2	27.8
	no	21.8	78.2
MSMEs which have acquired technologies, machines or devices in collaboration with a <u>service centre(s)</u>	yes	100.0	0.0
	no	22.6	77.4
Total		22.6	77.4

Source: own study.

## CONCLUSIONS

This analysis suggests that service centres may have a positive impact on MSMEs operating in the regional economies in which they deliberately locate. It supports the observations that small local companies may effectively use knowledge transmitted from service centres and translate it into new innovative market offers, thus contributing to regional development and local well-being. This knowledge transmission is possible when business relationships between local companies and incoming corporations exists, but also when inter-sectoral transfer of human capital takes place. This supports the results of previous studies indicating that links between international corporations and local companies have a positive impact on growth, and that the deeper and stronger the relationships between the companies, the greater the impact (Scott-Kennel, Enderwick, 2005).

In addition, it was indicated that tacit knowledge in particular, regardless of the human or physical capital transmission channel used, is transferred from service centres to local MSMEs when these are closely located and when more opportunities for collaboration are available. In particular, direct immersion in a knowledge-specific environment seems to be of great importance in the process and contributes to more significant results as far as new market offer development. It seems that direct exposure to knowledge flows by performing business activities with close interactions involving the human or physical capital accumulated in multinational corporations (and especially service centres) allows specific experience to be gained, which is then used for new market opportunity capture and in employing appropriate processes to enforce the opportunities within the organisation and in interactions with customers. In this regard, an intensive process of organisational socialisation can be observed (Piłat, 2016), which enables benefits to be gained from active participation in the development and exchange of new knowledge.

An interesting conclusion can be formulated from the observation of the regional impact of service centres in contrast with generally grouped multinational corporations. Regardless of the channel and intensity of knowledge transfer, the research results demonstrated that knowledge flows from service centres contribute more significantly to the innovativeness of local companies than that of other multinational corporations. As the group of MSMEs addressed in this research may be regarded as representative, this remark leads to an important confirmation of the vital role of service centres in regional economies, and thus gives some arguments to regional authorities making political decisions about encouraging this kind of foreign investment, an issue being quite extensively disputed.

## BIBLIOGRAPHY

- Acs, Z. J., Braunerhjelm, P., Audretsch, D. B., Carlsson, B. (2009). The knowledge spillover theory of entrepreneurship. *Small Business Economy*, 32, 15–30. DOI: 10.1007/s11187-008-9157-3.
- Arrow, K. (1962). The economic implications of learning by doing. *The Review of Economic Studies*, 29(3), 155–173. DOI: 10.2307/2295952.
- Altenburg, T. (2000). Linkages and spillovers between Transnational Corporations and Small and Medium-Sized Enterprises in Developing Countries – Opportunities and Policies. The UNCTAD (Ed.) MNC-SME Linkages for Development. Issues – experiences – best practices. Proceedings of the Special Round on MNCs, SMEs and Development. February 15, 3–61, Bangkok, United Nations. Geneva: UNCTAD X.
- Baruk, J. (2016). The Role of Knowledge in the Processes of Creating and Implementing Innovations. *Marketing Instytucji Naukowych i Badawczych*, 21(3), 79–104. DOI: 10.14611/minib.21.09.2016.10.
- Bayar, Y. (2017). Greenfield and Brownfield Investments and Economic Growth: Evidence from Central and Eastern European Union Countries. *Naše Gospodarstvo / Our Economy*, 63(3), 19–26. DOI: 10.1515/ngoe-2017-0015.

- Blomstrom, M., Kokko, A. (1997). The Impact of Foreign Investment on Host Countries: A Review of the Empirical Evidence. *World Bank Policy Research Working Paper No. 1745*. New York: World Bank.
- Dunning, J. H. (1988). The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions. *Journal of International Business Studies*, 19(1), 1–31. DOI: 10.1057/palgrave.jibs.8490372.
- Hansen, M. W., Schaumburg-Müller, H. (Eds.) (2006). *Transnational Corporations and Local Firms in Developing Countries – Linkages and Upgrading*. Copenhagen: Copenhagen Business School Press.
- Hirschman, A. O. (1958). *The Strategy of Economic Development*. New Haven: Yale University Press.
- Łobacz, K. (2018). Innovating and growing service-based entrepreneurial businesses – development model based on European and Asian case studies. *European Journal of Service Management*, 4(28/2), 231–238. DOI: 10.18276/ejsm.2018.28/2-29.
- MacDougall, G. D. A. (1960). The Benefits and Costs of Private Investment from Abroad: A Theoretical Approach. *Economic Record*, 36(73), 13–35. DOI: 10.1111/j.1475-4932.1960.tb00491.x.
- Navaretti, G. B., Venables, A. J. (2004). *Multinational Firms in the World Economy*. Princeton: Princeton University Press.
- Niedzielski, P., Łobacz, K. (Eds.). (2017). *Centra Usług w układach regionalnych*. Szczecin: Wydawnictwo Naukowe Uniwersytetu Szczecińskiego.
- Piłat, M. (2016). How Organizational Culture Influences Building a Learning Organization. *Forum Scientiae Oeconomia*, 4(1), 83–92.
- Romer, P. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, 94(5), 1002–1037.
- Rugraff, E., Hansen, M. W. (2011). Multinational corporations and local firms in emerging economies. An Introduction. In: E. Rugraff, M. W. Hansen (Eds.), *Multinational Corporations and Local Firms in Emerging Economies* (pp. 13–37). Amsterdam: University Press.
- Sass, M. (2011). The impact of foreign direct investment in business services on the local economy. The case of Hungary. In: E. Rugraff, M. W. Hansen (Eds.), *Multinational Corporations and Local Firms in Emerging Economies* (pp. 51–69). Amsterdam: University Press.
- Scott-Kennel, J., Enderwick, P. (2005). FDI and Inter-Firm Linkages: Exploring the Black Box of the Investment Development Path. *Transnational Corporations*, 14(1), 13–23.

### Summary

The innovativeness of micro, small and medium-sized enterprises (MSMEs) is dependent on accessibility to appropriate knowledge resources that enable creation of new market offers. Due to inherent limitations related to the possibilities of investing in the acquisition or creation of new knowledge, smaller entities may benefit from the proximity of large companies, especially multinational corporations, which are actively involved in new knowledge creation, and this knowledge has the ability to spill over. The flow of knowledge from service centres to local smaller companies has the potential to stimulate innovativeness in regional service functions, creating opportunities for

local entrepreneurs to develop and grow. Hence, the purpose of the considerations presented in this paper is to analyse the impact of the flow of knowledge from service centres to MSMEs as a result of interactions between them. For this purpose, empirical data from quantitative research carried out by the research team in 2016 on a representative sample of 1,100 micro small and medium-sized enterprises in the Zachodniopomorskie (West Pomerania) voivodeship were used. The analysis shows that service centres can have a positive impact on the innovativeness of companies in the regions in which they are located, provided that there is a flow of knowledge as a result of direct transfer or personal interactions.

*Keywords:* innovativeness, service centres, knowledge spillover, MSME, region.

## **Przepływ wiedzy a innowacyjność: analiza relacji pomiędzy centrami usług a sektorem MMSP w ujęciu regionalnym**

### *Streszczenie*

Innowacyjność mikro, małych i średnich przedsiębiorstw (MMSP) determinowana jest posiadaniem odpowiednich zasobów wiedzy, które umożliwiają tworzenie nowych ofert. Ze względu na ograniczenia związane z możliwościami inwestowania w nabycie lub wytworzenie nowej wiedzy, mniejsze podmioty mogą odnosić korzyści z bliskości dużych firm, w tym szczególnie międzynarodowych korporacji, które tworzą nową wiedzę, która następnie rozprzestrzenia się w obszarze swojego oddziaływania. Przepływ wiedzy z centrów usług do lokalnych mniejszych firm niesie za sobą potencjał rozwoju innowacyjności w regionalnych funkcjach usługowych, stwarzając lokalnym przedsiębiorcom możliwość rozwoju i wzrostu. Stąd celem przedstawionych w artykule rozważań jest ocena wpływu przepływu wiedzy z centrów usług do MMSP, następującego jako rezultat występujących pomiędzy nimi interakcji, na innowacyjność MMSP. W opracowaniu posłużono się danymi empirycznymi z badań ilościowych zrealizowanych przez zespół badawczy w 2016 roku na reprezentatywnej próbie 1100 mikro, małych i średnich przedsiębiorstw województwa zachodniopomorskiego. Z przeprowadzonej analizy wynika, że centra usług mogą pozytywnie oddziaływać na innowacyjność firm w regionach, w których się lokuja, pod warunkiem wystąpienia przepływu wiedzy w wyniku bezpośredniego transferu lub styczności występujących pomiędzy personelem.

*Słowa kluczowe:* innowacyjność, centra usług, przepływ wiedzy, MMSP, region.

JEL: O31, D83, L80.



*Damian Mowczan, mgr*<sup>1</sup> 

Chair of Econometrics, Faculty of Economics and Sociology  
University of Lodz

## **Regional household poverty and mobility analysis – a transition probability approach<sup>2</sup>**

### INTRODUCTION

In the last few decades, economics literature has paid more attention to the issues of poverty<sup>3</sup>. Through websites and reports, various international institutions, including the World Bank and the European Commission, constantly compute, analyse and provide a large number of indices that enable a wider understanding of poverty (Narayan et al., 2018; World Bank, 2005; 2018; Eurobarometer, 2010). Such in-depth diagnoses are important because of the undeniable connection between poverty, social problems and their implications on the one hand, and economic growth at both regional and national levels on the other. A high likelihood of becoming poor could lead to serious problems like social exclusion (see Bieńkuńska, 2013), as well as affecting intergenerational mobility and poverty transfer from parents to children (see Corak, 2013).

The aim of this study was to estimate and analyse the transition-probability matrices on the NUTS-2 territorial-disaggregation level, emphasising the poverty class. Such estimation and analysis can help to identify which regions have the highest probability of remaining poor or of becoming poorer. The analysis used data from the Household Budget Survey (HBS), specifically the panel sub-sample of non-identifiable microdata concerning expenditures per capita and per equivalent unit. In addition, the study aimed to assess class-mobility expenditures

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<sup>1</sup> Correspondence address: University of Lodz, Faculty of Economics and Sociology, Chair of Econometrics, Rewolucji 1905 r. 41, 90-214 Łódź; e-mail: damian.mowczan@uni.lodz.pl. ORCID: 0000-0002-2971-2461.

<sup>2</sup> Chair of Econometrics own funds, for conference: *Gospodarka Polski 1990–2019*, Kraków.

<sup>3</sup> It is worth noting that Banerjee, Duflo and Kremer were awarded the 2019 Nobel Prize in Economics for their contribution to poverty reduction.

using Shorrocks' and Bartholomew's mobility indices and to assess inequalities within regions using the Gini index.

## LITERATURE OVERVIEW AND METHOD DESCRIPTION

Poverty can be defined in many ways, but it is a phenomenon that affects nearly every society as a complex, multidimensional problem. The pertinent literature widely discusses basic questions regarding poverty, including how to define it, who is really poor and whether the income criterion is sufficient to describe it. The World Bank (2005, p. 9) defines poverty as a "pronounced deprivation in well-being". The present study uses the monetary approach to that definition; therefore, the registered level of expenditures per capita (or per equivalent unit) to determine whether or not someone is poor<sup>4</sup>. Poverty analysis uses a wide range of methods, depending on which aspect of poverty is being analysed: its incidence, depth, intensity and severity. A sufficient overview of these methods is far beyond the scope of this paper, but can be found in Panek (2014), World Bank (2005), Haughton and Khandker (2009) and Atkinson (1987; 2019).

The present study used the classic Markov chain approach, focusing mainly on the matrix of transition probabilities, which can be defined as follows (Rey, 2014; Quah, 1995a; 1995b; Kordos, 1973; Edigarian et al., 2013):

$$P_{t/t+1} = \begin{bmatrix} p_{11} & p_{12} & \dots & p_{1k} \\ p_{21} & p_{22} & \dots & p_{2k} \\ \vdots & \vdots & \vdots & \vdots \\ p_{k1} & p_{k2} & \dots & p_{kk} \end{bmatrix} \quad (1)$$

where  $p_{ij}$  is a non-negative value that can be interpreted as the probability of an individual moving from state (class)  $i$  at time  $t$  to state  $j$  at time  $t+1$ . The sum of the probabilities in each row of the matrix is equal to 1.

The elements of the transition matrix can be estimated using the following unbiased, consistent maximum likelihood estimator (Rey, 2014; Kordos, 1973):

$$\hat{p}_{ij}(t) = \frac{n_{ij}}{n_{i,t}} \quad (2)$$

where  $n_{ij}$  is the number of observed transitions between states  $i$  and  $j$  during the period analysed.  $n_{i,t}$  is the number of individuals who are in state  $i$  at time  $t$ .

<sup>4</sup> The other approach refers to the ability to obtain specific types of goods, including food, education and healthcare (World Bank, 2005; Sen, 1981).

The presented transition-probability matrix can be used to assess the general scale of mobility in terms of distinct states (classes)<sup>5</sup> by computing Shorrocks' mobility index (Shorrocks, 1978; Panek, 2014):

$$\hat{M}(P) = \frac{k - \text{trace}(P)}{k - 1} \quad (3)$$

where  $k$  is the number of distinct classes in matrix  $P$ . This index is equal to 0 when perfect immobility occurs. In that case, all the diagonal elements of matrix  $P$  are equal to 1, so the trace is equal to the number of analysed classes. The higher the value of Shorrocks' index, the higher the mobility.

The Shorrocks' mobility index however takes into account only probabilities on the main diagonal of the transition matrix. The index ignores the distance that was travelled by a particular member of a household. That is, there is no difference between individuals that moved between the income classes 1 and 2 or classes 1 and 4. Obviously the second example implies greater mobility. In order to measure the scale of the distance that is travelled by the movers, the Bartholomew's Index of Social Mobility could be used (Bartholomew, 1973):

$$\hat{B}(P) = \frac{1}{k} \sum_{i=1}^k \sum_{j=1}^k p_{ij} |i - j| \quad (4)$$

This index is also equal to 0 when perfect immobility occurs. The higher the value of Bartholomew's index, the higher the mobility.

Application of the Markov chain framework to income analysis is not new. In addition, studies concerning Poland have been conducted by, for example, Kordos (1973) and Czajkowski (2009) and have focused mainly on forecasting income distributions<sup>6</sup>. One example of a poverty study can be found in Panek (2014), but that study does not include the regional aspect. Edigarian, Kościelniak and Trojak (2013) used transition-probability matrices to analyse regional differences in economic development using some synthetic measure as a base<sup>7</sup>.

The present study used the Gini index to highlight the differences in expenditure inequalities among Poland's regions. One common way to define the index is as follows (Kot, 2000; Jędrzejczak, 2011):

<sup>5</sup> The exact schema of expenditure classes will be presented in the next section.

<sup>6</sup> The forecasting formula requires holding some key assumptions, including, time homogeneity (meaning that transition probabilities are constant over time). An overview of the assumptions and properties of Markov chains can be found in, for example, Shorrocks (1976) or Edigarian, Kościelniak and Trojak (2013).

<sup>7</sup> Of course, Markov chains are widely used in other economic fields, including modelling excepted time to default (Górajski et al., 2016).

$$G = \frac{\Delta}{2\mu}, \quad \Delta = E|Y_i - Y_j| \quad (5)$$

where  $\Delta$  is the mean absolute difference between all pairs of incomes (expenditures) and  $\mu$  stands for mean income (expenditures). The value of the Gini index is equal to 0 in the case of an equally distributed category of analysis (i.e. income). The higher the value of the Gini index, the more unequal is the distribution (the upper limit for the value is 1).

### DATA USED

The present study used non-identifiable microdata from the HBS. The emphasis was on the regional aspect. The period of analysis was two years: 2015 and 2016. This is a relatively short period, but the design of the HBS enables the observation of the same sub-sample of households through both years<sup>8</sup>. As previously mentioned, the study used two categories, expenditures per capita and expenditures per equivalent unit, both of which were expressed in real terms using constant prices from the first quarter of 2015<sup>9</sup>. In poverty analysis, another common practice is to use household income. The literature provides some evidence in favour of using expenditures instead of income, especially in developed countries. This is so for two reasons: the income level might be underestimated by the respondents in certain cases, including attempts to hide illegal income, while fluctuations are more pronounced in income than in expenditure (World Bank, 2005)<sup>10</sup>.

One problem with using HBS data to measure poverty is that households differ in size and demographic structure. To accommodate these differences, in the present study, expenditures were computed per equivalent unit using the modified Organisation for Economic Co-operation and Development (OECD) equivalence scale. The scale weights were as follows (CSO, 2017, p. 35):

- 1 is assigned for the first adult in the household,
- 0.5 is assigned for every other adult in the household,
- 0.3 is assigned for each child, defined as a person under 14 years old.

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<sup>8</sup> Each year of the HBS data uses two overlapping sub-samples. One of these was also used in the previous year, and the other one will be used in the next year. The present study used one sub-sample, which enabled observation of year-to-year changes in expenditures for the same set of households. Detailed information about the HBS design can be found in the Central Statistical Office (CSO) (2016; 2017).

<sup>9</sup> Inflation will be taken into account using a quarterly consumer price index (CPI) deflator (CSO, 2019, <http>) due to available database information regarding the monthly rotation of households (CSO, 2016; 2017).

<sup>10</sup> Obviously, using expenditures has some disadvantages, including the possibility that some households are hiding either true luxuries or spending on illicit items. This could potentially lead to bias in the estimates of transition probabilities.

For the purpose of the present study, expenditure classes were set using the schema presented below, with the poverty line being 50% of the mean expenditures per capita or per equivalent unit in a particular region and in a particular year<sup>11</sup>.

- Class 1 – below or equal to 50% of mean expenditures.
- Class 2 – 50–75% of mean expenditures.
- Class 3 – 75–100% of mean expenditures.
- Class 4 – 100–125% of mean expenditures.
- Class 5 – 125–150% of mean expenditures.
- Class 6 – more than 150% of mean expenditures.

Because there is a significant diversification in expenditure categories among regions, the study used average expenditures computed separately for each region rather than one mean defined at the national level. Figure 1 shows this diversification, as averaged, for 2015 and 2016.

The highest values for both per capita and per equivalent unit expenditures were noted for Mazowieckie. The mean value for the per capita expenditures was 119.6% of the average level for Poland, while for the per equivalent unit expenditures, it was 119.4% (PLN 1320 and PLN 2028, respectively). Relatively high values were also noted for Łódzkie, Dolnośląskie and Śląskie.

The lowest values for the categories analysed were noted for Podkarpackie. For expenditures per capita, it was 79.9% of the average level for Poland, and for expenditures per equivalent unit, it was 83.4% (PLN 882 and PLN 1417, respectively). Relatively low values were also noted for Świętokrzyskie, Warmińsko-Mazurskie and Wielkopolskie.

In relative terms, there were no significant differences between expenditures per capita and expenditures per equivalent unit<sup>12</sup>, although in absolute values the average of the latter was notably higher for all regions<sup>13</sup>.

## RESULTS

The following includes a short analysis of the estimated-transition probabilities of the expenditure classes during 2015 and 2016 for Poland's regions (NUTS-2 level). Table 2 presents all transition matrices. For each region and each category of expenditures, the elements of the diagonals of the matrices were interpreted as the probabilities that a particular member of a household would remain in the same

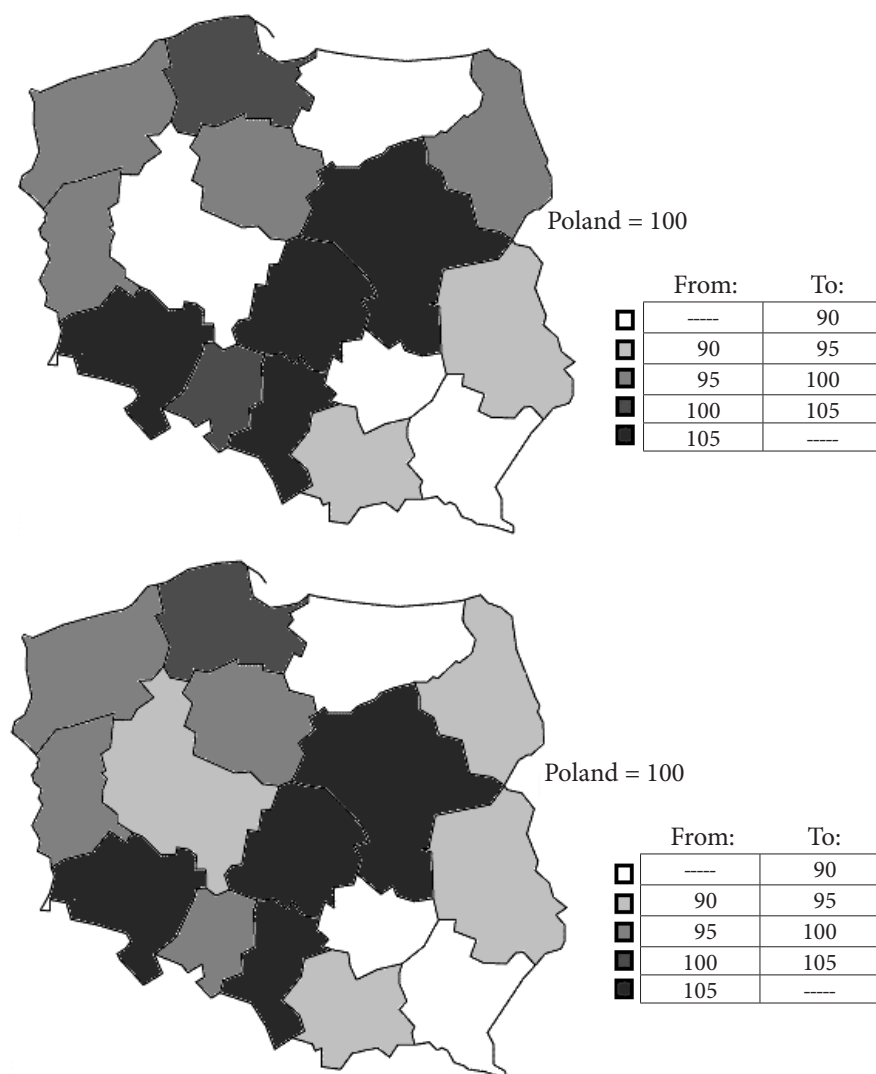
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<sup>11</sup> Expenditures in the following schema refer to expenditures per capita and expenditures per equivalence unit (at constant prices) for selected sub-sample.

<sup>12</sup> In the sense of share for average expenditures in particular regions in the average expenditures for the country as a whole.

<sup>13</sup> This is a result of dividing expenditures by the values from the equivalence scale. The values from the scale are usually lower than the number of household members.

expenditure class for one year<sup>14</sup>. The overall between-class mobility, as measured using Shorrocks' mobility index, is presented in Table 1. Additionally, Bartholomew's mobility index was also computed.



**Figure 1. Regional diversification of real expenditures per capita (upper) and per equivalent (lower) units, based on the averages for 2015 and 2016 (relative values)**

Source: own study based on HBS data.

<sup>14</sup> In fact, as suggested by Kot (2004, pp. 253–255), the data was also weighted by the number of household members. As a result, there was a shift from household distribution to individual distribution.

Table 1. Estimates of Shorrocks' and Bartholomew's Mobility Indices

Voivodeship	Expenditures per capita				Expenditures per equivalent unit			
	Shorrocks' mobility index	Bartholomew's mobility index			Shorrocks' mobility index	Bartholomew's mobility index		
		downward	upward	overall		downward	upward	overall
Dolnośląskie	0.6890	0.4600	0.3877	0.8477	0.7186	0.4689	0.4197	0.8886
Kujawsko-Pomorskie	0.7251	0.4725	0.3947	0.8671	0.7723	0.5317	0.4136	0.9453
Lubelskie	0.6766	0.4606	0.3894	0.8500	0.6959	0.4594	0.4003	0.8597
Lubuskie	0.7196	0.4678	0.4405	0.9083	0.7613	0.4836	0.4732	0.9568
Łódzkie	0.7269	0.4851	0.4044	0.8894	0.7384	0.5028	0.3954	0.8982
Małopolskie	0.7371	0.4647	0.4154	0.8801	0.7767	0.4971	0.4608	0.9579
Mazowieckie	0.6869	0.4822	0.3635	0.8457	0.6957	0.4810	0.3682	0.8492
Opolskie	0.6897	0.5334	0.3201	0.8535	0.6581	0.5729	0.3015	0.8745
Podkarpackie	0.6539	0.4338	0.3540	0.7878	0.7010	0.4410	0.3580	0.7989
Podlaskie	0.6709	0.5177	0.3626	0.8802	0.7337	0.5354	0.4029	0.9383
Pomorskie	0.6717	0.4961	0.3394	0.8355	0.7345	0.5046	0.3856	0.8902
Śląskie	0.7024	0.4868	0.3785	0.8652	0.7383	0.5079	0.3881	0.8960
Świętokrzyskie	0.7044	0.5587	0.3206	0.8793	0.7303	0.5503	0.3283	0.8786
Warmińsko-Mazurskie	0.7203	0.4823	0.3967	0.8790	0.7372	0.5101	0.4126	0.9227
Wielkopolskie	0.7096	0.4854	0.3770	0.8624	0.7532	0.5031	0.4147	0.9179
Zachodniopomorskie	0.6574	0.4107	0.3638	0.7745	0.6887	0.4107	0.4007	0.8114

Note: The lower the values of all indices, the lower mobility. Downward and upward refers to mobility, respectively towards and against poverty.

Source: own study based on HBS data.



Table 2. Estimates of Regional Transition-Probability Matrices

Voivodeship	Class #	Expenditures per capita						Expenditures per equivalent unit					
		1	2	3	4	5	6	1	2	3	4	5	6
Dolnośląskie	1	0.5634	0.3061	0.1049	0.0236	0.0020	0.0000	0.5136	0.3260	0.1230	0.0292	0.0052	0.0029
	2	0.1632	0.4856	0.2409	0.0654	0.0180	0.0269	0.1295	0.4318	0.2838	0.0933	0.0406	0.0212
	3	0.0295	0.2976	0.3639	0.1685	0.0819	0.0587	0.0504	0.2874	0.3802	0.1574	0.0699	0.0548
	4	0.0128	0.1273	0.2845	0.2662	0.1709	0.1384	0.0034	0.1487	0.2274	0.3002	0.1634	0.1568
	5	0.0000	0.1120	0.1696	0.2434	0.2327	0.2423	0.0000	0.0618	0.1506	0.3631	0.2168	0.2078
	6	0.0076	0.0302	0.0665	0.1331	0.1195	0.6432	0.0000	0.0552	0.0915	0.1266	0.1625	0.5643
Kujawsko-Pomorskie	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.4714	0.4188	0.0964	0.0000	0.0076	0.0058	0.4215	0.3871	0.1659	0.0220	0.0000	0.0036
	2	0.1061	0.4998	0.2783	0.0417	0.0169	0.0571	0.1022	0.4858	0.3082	0.0555	0.0265	0.0219
	3	0.0401	0.3490	0.3232	0.2121	0.0435	0.0321	0.0140	0.2923	0.3465	0.2480	0.0353	0.0640
	4	0.0381	0.0968	0.2256	0.2753	0.2574	0.1068	0.0147	0.1150	0.3593	0.1876	0.1943	0.1291
	5	0.0000	0.0355	0.2826	0.2155	0.2766	0.1898	0.0052	0.1287	0.2181	0.2727	0.2461	0.1291
Lubelskie	6	0.0029	0.0172	0.0864	0.1709	0.1944	0.5282	0.0000	0.0000	0.1323	0.2050	0.2117	0.4511
	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.5573	0.3709	0.0466	0.0118	0.0113	0.0021	0.5645	0.3553	0.0576	0.0226	0.0000	0.0000
	2	0.1826	0.4731	0.1867	0.0887	0.0368	0.0322	0.2012	0.4424	0.2269	0.0631	0.0481	0.0182
	3	0.0795	0.2071	0.3959	0.1241	0.1112	0.0823	0.0644	0.2427	0.4176	0.1323	0.0977	0.0454
	4	0.0534	0.0806	0.3041	0.2958	0.1462	0.1199	0.0408	0.1047	0.2177	0.3457	0.0990	0.1922
Lubuskie	5	0.0000	0.1006	0.1384	0.2938	0.2688	0.1984	0.0048	0.0470	0.1488	0.2374	0.2158	0.3462
	6	0.0024	0.0144	0.0953	0.1000	0.1617	0.6261	0.0000	0.0573	0.1025	0.0966	0.2090	0.5346
	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.5568	0.2198	0.1359	0.0640	0.0235	0.0000	0.3999	0.3763	0.1756	0.0246	0.0000	0.0236
	2	0.1227	0.4799	0.2714	0.0660	0.0377	0.0223	0.0999	0.4614	0.2510	0.1166	0.0453	0.0259
	3	0.0254	0.3587	0.3073	0.1826	0.0543	0.0718	0.0000	0.2929	0.3881	0.1668	0.1282	0.0239
Lubuskie	4	0.0000	0.0449	0.2989	0.3091	0.1958	0.1513	0.0000	0.1125	0.3552	0.2476	0.1378	0.1469
	5	0.0000	0.0737	0.2669	0.1676	0.2374	0.2544	0.0000	0.0718	0.1897	0.2805	0.1881	0.2698
	6	0.0271	0.0063	0.0827	0.1825	0.1897	0.5117	0.0000	0.0340	0.1397	0.1799	0.1382	0.5083

Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.5150	0.3972	0.0465	0.0158	0.0023	0.0232	0.4999	0.4015	0.0697	0.0092	0.0052	0.0145
	2	0.1861	0.4763	0.2543	0.0613	0.0149	0.0071	0.1461	0.4492	0.3032	0.0596	0.0088	0.0332
	3	0.0212	0.2662	0.3551	0.2336	0.0653	0.0586	0.0150	0.2758	0.4054	0.1864	0.0719	0.0455
	4	0.0034	0.1312	0.2746	0.2748	0.1497	0.1663	0.0134	0.1300	0.3260	0.2055	0.1778	0.1472
	5	0.0212	0.1477	0.1017	0.2705	0.1677	0.2912	0.0041	0.0801	0.1983	0.3630	0.1642	0.1903
Łódzkie	6	0.0238	0.0123	0.0836	0.1438	0.1600	0.5764	0.0258	0.0349	0.0845	0.1294	0.1414	0.5840
	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.5639	0.3186	0.0407	0.0718	0.0050	0.0000	0.3380	0.4466	0.1488	0.0379	0.0287	0.0000
	2	0.1469	0.4618	0.2973	0.0587	0.0197	0.0157	0.1365	0.5133	0.2170	0.0695	0.0357	0.0280
	3	0.0328	0.3080	0.2941	0.2393	0.0529	0.0730	0.0487	0.2641	0.3401	0.2129	0.0808	0.0533
	4	0.0257	0.1331	0.2934	0.2143	0.2135	0.1200	0.0129	0.1488	0.2948	0.2264	0.2140	0.1031
Małopolskie	5	0.0032	0.0989	0.2043	0.1965	0.1943	0.3027	0.0030	0.1068	0.1994	0.1948	0.2337	0.2623
	6	0.0088	0.0141	0.0534	0.1180	0.2198	0.5859	0.0026	0.0281	0.0581	0.1818	0.2642	0.4652
	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.6676	0.2559	0.0527	0.0170	0.0067	0.0000	0.5782	0.3174	0.0812	0.0104	0.0090	0.0039
	2	0.2247	0.4945	0.1733	0.0663	0.0274	0.0138	0.1830	0.5143	0.2002	0.0649	0.0243	0.0133
	3	0.0819	0.2384	0.3497	0.2026	0.0844	0.0429	0.0670	0.2843	0.3771	0.1554	0.0614	0.0548
Mazowieckie	4	0.0306	0.1246	0.3095	0.1930	0.1478	0.1945	0.0218	0.1315	0.2662	0.2755	0.1650	0.1400
	5	0.0076	0.0677	0.2024	0.2278	0.2329	0.2616	0.0180	0.0508	0.2300	0.2210	0.1813	0.2989
	6	0.0069	0.0335	0.0603	0.1289	0.1425	0.6279	0.0020	0.0275	0.0758	0.1376	0.1619	0.5951
	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.6826	0.1750	0.1284	0.0000	0.0140	0.0000	0.7059	0.1309	0.0598	0.1034	0.0000	0.0000
	2	0.2185	0.4726	0.2171	0.0590	0.0090	0.0238	0.1515	0.4805	0.2254	0.0829	0.0431	0.0166
Opolskie	3	0.0506	0.4590	0.2480	0.0927	0.0673	0.0824	0.0466	0.2559	0.5298	0.1020	0.0375	0.0282
	4	0.0309	0.1182	0.3281	0.3412	0.0877	0.0939	0.0398	0.1952	0.3731	0.2369	0.0368	0.1182
	5	0.0000	0.1130	0.1856	0.1630	0.3129	0.2256	0.0000	0.0714	0.2890	0.3761	0.1367	0.1268
	6	0.0000	0.0298	0.0931	0.1099	0.2728	0.4944	0.0000	0.0524	0.1400	0.0681	0.1200	0.6195

Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
Podkarpackie	1	0.7302	0.2220	0.0314	0.0163	0.0000	0.0000	0.5783	0.3357	0.0685	0.0176	0.0000	0.0000
	2	0.1245	0.4843	0.2741	0.0922	0.0194	0.0055	0.1670	0.4944	0.2426	0.0630	0.0210	0.0119
	3	0.0465	0.2734	0.3817	0.1850	0.0867	0.0267	0.0299	0.2933	0.3588	0.2131	0.0738	0.0311
	4	0.0157	0.1349	0.2060	0.3116	0.1629	0.1689	0.0153	0.1626	0.2735	0.2392	0.2240	0.0853
	5	0.0000	0.0917	0.1863	0.2028	0.2068	0.3124	0.0000	0.0429	0.1156	0.3114	0.2355	0.2946
	6	0.0000	0.0336	0.0690	0.1156	0.1657	0.6161	0.0000	0.0290	0.0781	0.1554	0.1486	0.5889
Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
Podlaskie	1	0.5765	0.2751	0.1147	0.0337	0.0000	0.0000	0.4153	0.3889	0.1540	0.0000	0.0332	0.0086
	2	0.1698	0.5286	0.2157	0.0319	0.0319	0.0222	0.1881	0.4666	0.2797	0.0425	0.0100	0.0131
	3	0.0692	0.3142	0.3611	0.1326	0.0422	0.0806	0.0521	0.2965	0.3535	0.1518	0.0434	0.1028
	4	0.0262	0.1205	0.2922	0.2852	0.1060	0.1700	0.0224	0.1574	0.3519	0.2766	0.1119	0.0798
	5	0.0311	0.1011	0.1922	0.2351	0.2397	0.2009	0.0000	0.0638	0.2331	0.1556	0.2683	0.2791
	6	0.0253	0.0555	0.0787	0.0538	0.1323	0.6542	0.0000	0.0973	0.1234	0.0894	0.1385	0.5514
Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
Pomorskie	1	0.7185	0.2068	0.0462	0.0232	0.0000	0.0053	0.5633	0.3195	0.0804	0.0247	0.0050	0.0071
	2	0.2209	0.4722	0.1852	0.0749	0.0156	0.0312	0.1981	0.4639	0.2165	0.0746	0.0181	0.0287
	3	0.0194	0.2974	0.3905	0.1628	0.0766	0.0534	0.0198	0.3257	0.3388	0.2093	0.0702	0.0362
	4	0.0198	0.2383	0.2190	0.2434	0.1292	0.1503	0.0249	0.1139	0.3427	0.2390	0.1269	0.1527
	5	0.0000	0.0690	0.1998	0.3068	0.1959	0.2285	0.0089	0.0301	0.2103	0.2573	0.2152	0.2782
	6	0.0111	0.0188	0.0602	0.1512	0.1375	0.6211	0.0118	0.0503	0.0779	0.1687	0.1839	0.5073
Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
Śląskie	1	0.5766	0.3193	0.0646	0.0333	0.0050	0.0012	0.4612	0.4309	0.0896	0.0182	0.0000	0.0000
	2	0.1222	0.5486	0.2383	0.0627	0.0145	0.0138	0.1417	0.5116	0.2320	0.0722	0.0272	0.0153
	3	0.0494	0.2867	0.3816	0.1450	0.0804	0.0569	0.0437	0.2351	0.4257	0.1584	0.0780	0.0590
	4	0.0145	0.1308	0.2778	0.2596	0.1308	0.1866	0.0035	0.1040	0.4078	0.2261	0.1374	0.1211
	5	0.0051	0.0432	0.1904	0.3130	0.1948	0.2534	0.0085	0.0727	0.1713	0.2682	0.2054	0.2739
	6	0.0078	0.0497	0.0924	0.1477	0.1757	0.5267	0.0110	0.0301	0.1209	0.1963	0.1630	0.4787

Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.6499	0.2660	0.0634	0.0052	0.0154	0.0000	0.5973	0.3010	0.0792	0.0148	0.0078	0.0000
	2	0.1846	0.4893	0.2554	0.0373	0.0151	0.0183	0.2435	0.3540	0.2953	0.0700	0.0168	0.0204
	3	0.0580	0.2561	0.4554	0.1585	0.0185	0.0535	0.0199	0.2833	0.4032	0.2177	0.0407	0.0353
	4	0.0835	0.1143	0.3658	0.1276	0.1714	0.1374	0.0101	0.2008	0.3087	0.2905	0.1397	0.0502
	5	0.0000	0.0918	0.2692	0.2404	0.1959	0.2027	0.0000	0.1158	0.1103	0.3260	0.2254	0.2224
Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.6039	0.2888	0.0562	0.0462	0.0000	0.0049	0.5724	0.2012	0.2049	0.0154	0.0061	0.0000
	2	0.2396	0.4930	0.1608	0.0780	0.0185	0.0101	0.1784	0.4522	0.2397	0.0733	0.0489	0.0074
	3	0.0426	0.3768	0.2598	0.1907	0.0193	0.1107	0.0683	0.2552	0.3659	0.1676	0.0917	0.0512
	4	0.0085	0.0476	0.3366	0.2395	0.1750	0.1928	0.0000	0.1506	0.3265	0.2344	0.1620	0.1266
	5	0.0358	0.0914	0.1276	0.2753	0.1885	0.2814	0.0000	0.0233	0.2670	0.2661	0.1318	0.3118
Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.5704	0.3370	0.0586	0.0169	0.0084	0.0088	0.4398	0.4142	0.0992	0.0120	0.0264	0.0084
	2	0.1868	0.4417	0.2507	0.0998	0.0076	0.0135	0.1826	0.4643	0.2323	0.0808	0.0362	0.0037
	3	0.0331	0.2795	0.3442	0.2467	0.0665	0.0300	0.0355	0.2804	0.3494	0.2220	0.0942	0.0185
	4	0.0294	0.0931	0.2667	0.2993	0.1980	0.1134	0.0077	0.0865	0.3083	0.2637	0.1922	0.1416
	5	0.0117	0.0952	0.2109	0.2190	0.2055	0.2578	0.0109	0.1084	0.1741	0.2844	0.1886	0.2336
Voivodeship	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.6037	0.3419	0.0329	0.0106	0.0075	0.0033	0.5712	0.2742	0.0978	0.0568	0.0000	0.0000
	2	0.0780	0.4540	0.4032	0.0217	0.0311	0.0118	0.0817	0.4230	0.4069	0.0470	0.0226	0.0189
	3	0.0315	0.2409	0.4361	0.1934	0.0739	0.0243	0.0347	0.2078	0.4135	0.2577	0.0555	0.0308
	4	0.0073	0.1067	0.2451	0.2794	0.2277	0.1338	0.0069	0.0924	0.2783	0.3436	0.2098	0.0691
	5	0.0000	0.1089	0.1534	0.2663	0.2711	0.2003	0.0000	0.0693	0.1781	0.2040	0.2379	0.3106
Zachodniopomorskie	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.6037	0.3419	0.0329	0.0106	0.0075	0.0033	0.5712	0.2742	0.0978	0.0568	0.0000	0.0000
	2	0.0780	0.4540	0.4032	0.0217	0.0311	0.0118	0.0817	0.4230	0.4069	0.0470	0.0226	0.0189
	3	0.0315	0.2409	0.4361	0.1934	0.0739	0.0243	0.0347	0.2078	0.4135	0.2577	0.0555	0.0308
	4	0.0073	0.1067	0.2451	0.2794	0.2277	0.1338	0.0069	0.0924	0.2783	0.3436	0.2098	0.0691
	5	0.0000	0.1089	0.1534	0.2663	0.2711	0.2003	0.0000	0.0693	0.1781	0.2040	0.2379	0.3106
Zachodniopomorskie	Class #	1	2	3	4	5	6	1	2	3	4	5	6
	1	0.6037	0.3419	0.0329	0.0106	0.0075	0.0033	0.5712	0.2742	0.0978	0.0568	0.0000	0.0000
	2	0.0780	0.4540	0.4032	0.0217	0.0311	0.0118	0.0817	0.4230	0.4069	0.0470	0.0226	0.0189
	3	0.0315	0.2409	0.4361	0.1934	0.0739	0.0243	0.0347	0.2078	0.4135	0.2577	0.0555	0.0308
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	2	0.0780	0.4540	0.4032	0.0217	0.0311	0.0118	0.0817	0.4230	0.4069			

Based on Shorrocks' index, the highest between-class mobility was noted for Małopolskie. The mobility rankings for regions varied for both variables, but Łódzkie, Kujawsko-Pomorskie and Lubuskie also could be perceived as high-mobility regions. The ranking for regions having low mobility was ambiguous: For expenditures per capita, Podkarpackie, Zachodniopomorskie and Podlaskie achieved rather low values of Shorrocks' index. For expenditures per equivalent unit, low values were noted for Opolskie (which had been in the middle of the previous ranking), Zachodniopomorskie and Mazowieckie. The general conclusion is that taking into account differences in the sizes and demographic structures of the households notably affected the overall mobility in the low and middle portions of the ranking. In this study, Shorrocks' index had values in the range 0–1.2, as the upper limit is not constant for this measure. For each region, the values of the mobility index were higher than 0.6 (midpoint of the interval), indicating that, in general, Poland's regions are rather mobile.

The very first element of the main diagonals of the transition matrices defined the probability of staying poor during one year (i.e. staying in the first expenditure class).

The following conclusions were reached regarding regional differentiation.

- For expenditures per capita, the highest probability of staying poor was noted for Opolskie, Pomorskie and Podkarpackie (approximately 0.68–0.73).
- For expenditures per equivalent unit, the highest probability was noted for Podkarpackie, Świętokrzyskie and Opolskie. It is worth remarking that there was a significant absolute difference between the first and second regions in this ranking (the probabilities were approximately 0.60 and 0.71, respectively).
- The lowest probability for expenditures per capita was noted for Kujawsko-Pomorskie, Łódzkie and Lubuskie (approximately 0.47–0.56).
- The lowest probability for expenditures per equivalent unit was noted for Małopolskie, Lubuskie and Podlaskie (approximately 0.34–0.42).

The very last element of the main diagonals of the transition matrices defined the probability of staying in the highest (sixth) expenditure class during one year. The following conclusions were reached regarding regional differentiation.

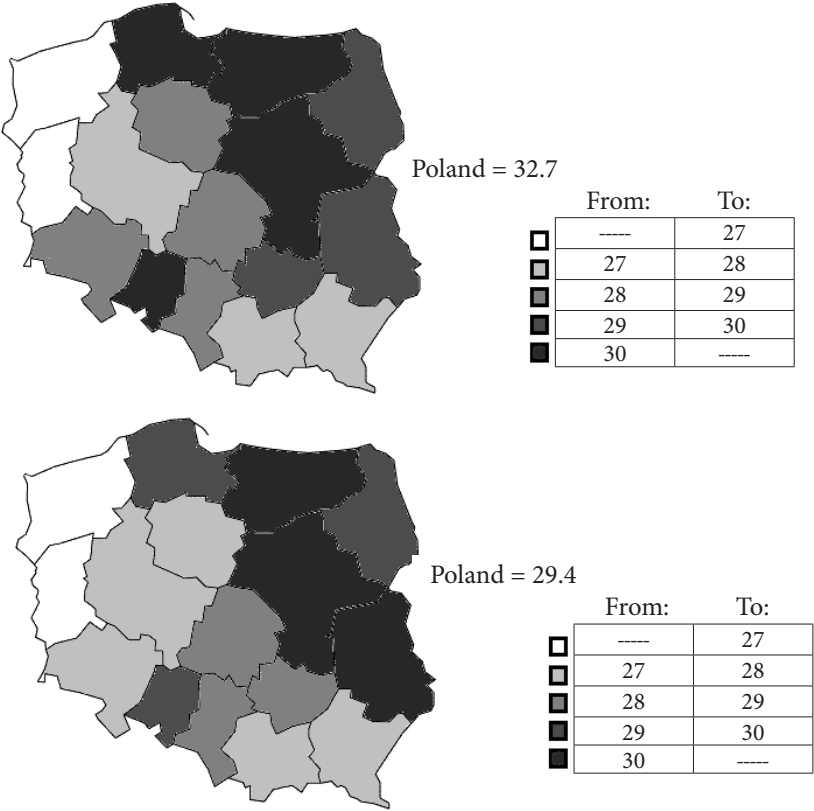
- For expenditures per capita, the highest probability of staying in "the richest" class was noted for Dolnośląskie, Podlaskie and Zachodniopomorskie (approximately from 0.64–0.67).
- For expenditures per equivalent unit, the highest probability was noted for Podkarpackie, Mazowieckie and Opolskie (approximately 0.59–0.62).
- The lowest probability for expenditures per capita was noted for Opolskie, Lubuskie and Śląskie (approximately 0.49–0.53).
- The lowest probability for expenditures per equivalent unit was noted for Kujawsko-Pomorskie, Małopolskie and Świętokrzyskie (approximately 0.45–0.48).

Taking into account the probabilities outside the main diagonals of the transition matrices, Mazowieckie had the highest probability of falling into the first expenditure class from another class for expenditures per capita and Lubelskie had the highest

probability for expenditures per equivalence unit. The lowest levels were for Zachodniopomorskie and Lubuskie (for both types of expenditures)<sup>15</sup>.

The values of the Bartholomew’s mobility index suggest that higher mobility between income classes occurs towards poverty (see Table 1, “downward” and “upward” columns). Those results hold on for every analysed region. Additional conclusions are as follows.

- The highest mobility towards poverty was noted for Opolskie, Podlaskie and Świętokrzyskie (both for expenditures per capita and per equivalent unit).
- The lowest mobility towards poverty was noted for Zachodniopomorskie and Podkarpackie (also for both types of expenditures).
- The highest mobility against poverty was noted for Lubuskie and Małopolskie.
- The lowest mobility against poverty was noted for Opolskie and Świętokrzyskie.



**Figure 2. Regional differentiation of the Gini index for real expenditures per capita (upper) and per equivalent (lower) units, based on the averages for 2015 and 2016**

Source: own study based on HBS data.

<sup>15</sup> Based on the probabilities from the first columns of Table 2.

Figure 2 shows the estimated values of the Gini indices. The highest expenditure inequality was found in Mazowieckie. The Gini index for that region was equal to approximately 0.35 for expenditures per capita and approximately 0.32 for expenditures per equivalent unit. A high inequality level was also identified for Warmińsko-Mazurskie.

The lowest inequality level was noted for Lubuskie in expenditures per capita (approximately 0.28) and for Zachodniopomorskie in per equivalent units (approximately 0.25). Low inequality levels were also identified for Wielkopolskie, Podkarpackie and Małopolskie.

## CONCLUSIONS

Poland's regions are distinguished by significant differences in levels of average expenditures per capita and per equivalent unit as well as in their levels of transition probability. In addition, the estimates of Shorrocks' mobility index show that some differences exist in these levels among regions. The exact ranking is sensitive regarding the category of expenditures applied, but in general, Poland's regions are rather mobile. Bartholomew's index revealed that Polish regions were characterized by a greater "towards poverty" mobility (in comparison to upward mobility). This is a serious problem that can lead to social exclusion. Of course, probabilities estimated only on the basis of a single two-year sample cannot answer questions about the nature of the poverty in particular regions. These questions about the persistence of poverty are important, especially in the context of social-policy strategies, and should deepen the regional dimension of future research (see Panek, 2014)<sup>16</sup>. Furthermore, the Gini index values show some differences in expenditure inequality among regions, although the ranking is fairly consistent between the per capita and per equivalent unit versions of expenditures.

Except for Opolskie and Lubelskie, all regions have lower probabilities of staying poor (in the first class) regarding expenditures per equivalent unit than per capita expenditures. In addition, the Gini index of inequality was lower for equivalent unit cases. Similar results regarding inequality measurement were obtained by Kot (2004, p. 267).

The monetary approach to poverty analysis that was used in this study does not cover all the aspects of poverty itself. The literature also suggests taking into consideration the multidimensional framework for computing poverty indices. Alkire, and Foster measures, for example, make use of weighted dimensions that refer to education, health and living environment like pollution or safety (see Alkire,

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<sup>16</sup> In addition to the question of the nature of poverty, there is also the issue of how stable in time the estimated probabilities are. This stability issue could be checked using other samples from other years and will be the subject of future research.



Apablaza, 2016). Without any doubt, the true nature of poverty cannot be explained by just one dimension.

Finally, it is worth noting that obtained results suggest that social policy should put more emphasis on the spatial diversification of poverty. The relative distance between the “poor” in Mazowieckie region and the “poor” in Świętokrzyskie region could be significant. A similar problem refers to particular individuals’ chance of improving their overall situation. Thus, this implies a more contextual approach to policymaking.

### BIBLIOGRAPHY

- Alkire, S., Apablaza, M. (2016). Multidimensional poverty in Europe 2006–2012: Illustrating a methodology. *OPHI Working Paper*, 74, 1–22.
- Atkinson, A. B. (1987). On the measurement of poverty. *Econometrica*, 55(4), 749–764. DOI: 10.2307/1911028.
- Atkinson, A. B. (2019). *Measuring poverty around the world*. New Jersey: Princeton University Press. DOI: 10.1515/9780691191898.
- Bartholomew, D. J. (1973). *Stochastic Models for Social Processes*. London: J. Wiley and Sons. DOI: 10.1002/bimj.19740160813.
- Bieńkuńska, A. (2013). Multidimensional poverty and social isolation in Poland. *Working Paper*, 20, 1–14.
- Corak, M. (2013). Income inequality, equality of opportunity, and intergenerational mobility. *Journal of Economic Perspectives*, 27(3), 79–102. DOI: 10.1257/jep.27.3.79.
- CSO (2016). *Household budget survey in 2015*. Warsaw: Central Statistical Office.
- CSO (2017). *Household budget survey in 2016*. Warsaw: Central Statistical Office.
- CSO (2019). *Local data bank*. Retrieved from: <https://bdl.stat.gov.pl/BDL/start> (2019.6.06).
- Czajkowski, A. (2009). Forecasting income distributions of households in Poland on the basis of Markov chains. *Acta Universitatis Lodzianensis*, 225, 245–256.
- Edigarian, E., Kościelniak, P., Trojak, M. (2013). Analiza różnicowania rozwoju ekonomicznego województw i powiatów oparta na łańcuchach Markowa. In: M. Trojak, T. Tokarski (Eds.), *Statystyczna analiza przestrzennego różnicowania rozwoju ekonomicznego i społecznego Polski* (pp. 111–128). Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego.
- Eurobarometer (2010). Poverty and social exclusion. *Special Eurobarometer*, 321. Retrieved from: [https://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs\\_321\\_en.pdf](https://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_321_en.pdf) (2019.06.06).
- Haughton, J., Khandker, S. R. (2009). *Handbook on poverty and inequality*. Washington D.C.: World Bank. DOI: 10.1596/978-0-8213-7613-3.
- Górajski, M., Serwa, D., Wośko, Z. (2016). Measuring expected time to default under stress conditions for corporate loans. *NBP Working Paper*, 237, 1–36.
- Jędrzejczak, A. (2011). *Metody analizy rozkładów dochodów i ich koncentracji*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
- Kordos, J. (1973). *Metody analizy i prognozowania rozkładów płac i dochodów ludności*. Warszawa: Państwowe Wydawnictwo Ekonomiczne.

- Kot, S. M. (2000). *Ekonometryczne modele dobrobytu*. Warszawa–Kraków: Wydawnictwo Naukowe PWN.
- Kot, S. M. (2004). Rozkłady dochodów, nierówności i dobrobyt w Polsce. In: S. M. Kot, A. Malawski, A. Węgrzecki (Eds.), *Dobrobyt społeczny, nierówności i sprawiedliwość dystrybutywna* (pp. 248–280). Kraków: Wydawnictwo Akademii Ekonomicznej w Krakowie.
- Narayan, A., Van der Weide, R., Cojocaru, A., Lakner, C., Redaelli, S., Mahler, D. G., The-wissen, S. (2018). *Fair progress?: Economic mobility across generations around the world. Equity and development*. Washington D.C.: World Bank. DOI: 10.1596/978-1-4648-1210-1.
- Panek, T. (2014). Ubóstwo i wykluczenie społeczne. In: T. Panek (Ed.), *Statystyka społeczna* (pp. 195–239). Warszawa: Polskie Wydawnictwo Ekonomiczne.
- Quah, D. T. (1995a). Aggregate and regional disaggregate fluctuations. *Centre for Economic Performance Discussion Paper No. 275*.
- Quah, D. T. (1995b). Empirics for economic growth and convergence. *Centre for Economic Performance Discussion Paper No. 253*.
- Rey, S. (2014). Rank-based Markov chains for regional income distributions dynamics. *Journal of Geographical Systems*, 16(2), 115–137. DOI: 10.1007/s10109-013-0189-0.
- Sen, A. K. (1981). *Poverty and famines: An essay on entitlement and deprivation*. Oxford: Clarendon Press. DOI: 10.5040/9781474220156.ch-005.
- Shorrocks, A. F. (1976). Income mobility and the Markov assumption. *The Economic Journal*, 86(343), 566–578. DOI: 10.2307/2230800.
- Shorrocks, A. F. (1978). The measurement of mobility. *Econometrica*, 46(5), 1013–1024. DOI: 10.2307/1911433.
- World Bank (2005). *Introduction to poverty analysis*. World Bank Institute. Retrieved from: <http://siteresources.worldbank.org/PGLP/Resources/PovertyManual.pdf> (2019.06.15).
- World Bank (2018). *Poverty*. Retrieved from: <https://www.worldbank.org/en/topic/poverty> (2019.08.18).

### *Summary*

The main objective of this paper was to estimate and analyse transition-probability matrices for all 16 of Poland's NUTS-2 level regions (voivodeship level). The analysis is conducted in terms of the transitions among six expenditure classes (per capita and per equivalent unit), focusing on poverty classes. The period of analysis was two years: 2015 and 2016. The basic aim was to identify both those regions in which the probability of staying in poverty was the highest and the general level of mobility among expenditure classes. The study uses a two-year panel sub-sample of unidentified unit data from the Central Statistical Office (CSO), specifically the data concerning household budget surveys. To account for differences in household size and demographic structure, the study used expenditures per capita and expenditures per equivalent unit simultaneously. To estimate the elements of the transition matrices, a classic maximum-likelihood estimator was used. The analysis used Shorrocks' and Bartholomew's mobility indices to assess the general mobility level and the Gini index to assess the inequality level.

The results show that the one-year probability of staying in the same poverty class varies among regions and is lower for expenditures per equivalent units. The highest probabilities were

identified in Podkarpackie (expenditures per capita) and Opolskie (expenditures per equivalent unit), and the lowest probabilities in Kujawsko-Pomorskie (expenditures per capita) and Małopolskie (expenditures per equivalent unit). The highest level of general mobility was noted in Małopolskie, for both categories of expenditures.

*Keywords:* poverty, transition probability, Markov chains, mobility, inequality, regional analysis.

### **Regionalna analiza ubóstwa i mobilności gospodarstw domowych – podejście oparte na prawdopodobieństwie przejścia**

#### *Streszczenie*

Głównym celem niniejszego artykułu była próba estymacji i analizy macierzy prawdopodobieństw przejścia, określonej dla wszystkich szesnastu regionów Polski (województwa, poziom NUTS-2). Analiza została przeprowadzona pod kątem przejść pomiędzy sześcioma klasami wydatków (w ujęciu *per capita* oraz na jednostkę ekwiwalentną), ze szczególnym uwzględnieniem sfery ubóstwa. Okres analizy obejmował dwa lata: rok 2015 oraz 2016. Podstawowe pytanie dotyczyło tego, w których regionach prawdopodobieństwo pozostawania w biedzie jest największe oraz jaki jest ogólny poziom mobilności pomiędzy klasami wydatków. Do badania została wykorzystana dwuletnia podpróba panelowa oparta o nieidentyfikowalne dane jednostkowe Głównego Urzędu Statystycznego, pochodzące z badania budżetów gospodarstw domowych. W badaniu wykorzystano zarówno wydatki *per capita*, jak i wydatki na jednostkę ekwiwalentną, aby wziąć pod uwagę różnice w wielkości i strukturze demograficznej gospodarstw domowych. Elementy macierzy przejścia były szacowane za pomocą klasycznego estymatora największej wiarygodności. Analiza została uzupełniona ogólną oceną mobilności za pomocą indeksów mobilności Shorrocksa i Bartholomewa oraz oceną poziomu nierówności wydatków za pomocą indeksu Giniego.

Wyniki pokazały, że roczne prawdopodobieństwa pozostawania w biedzie różnią się w zależności od regionu i są mniejsze dla wydatków na jednostkę ekwiwalentną. Największe prawdopodobieństwo zaobserwowano dla województwa podkarpackiego (wydatki *per capita*) oraz opolskiego (wydatki na jednostkę ekwiwalentną). Najniższym prawdopodobieństwem odznaczało się województwo kujawsko-pomorskie (wydatki *per capita*) oraz małopolskie (wydatki na jednostkę ekwiwalentną). Najwyższym ogólnym poziomem mobilności charakteryzowało się województwo małopolskie (dla obu kategorii wydatków).

*Słowa kluczowe:* ubóstwo, prawdopodobieństwa przejścia, łańcuchy Markowa, mobilność, nierówności, analiza regionalna.

JEL: I32, C10, R10.

Piotr Wetoszka, mgr<sup>1</sup> 

Department of Economics  
Maria Curie-Skłodowska University in Lublin

## The allocation of participatory budgeting funds within the context of population ageing and social inequalities<sup>2</sup>

### INTRODUCTION

Participatory budgeting (PB), an instrument of involving citizens in the process of allocation of public resources (Sintomer et al., 2008, p. 168) started in the early 90s in Brazil. In Porto Alegre, the very first widely recognised example of participatory democracy, the cooperation of citizens and local authorities enabled the enhancement of life quality across neighbourhoods. The way financial resources were allocated was linked to diversified criteria, with the situation of the worst-off, deprived neighbourhoods in mind (Marquetti et al., 2012; Friant, 2019). Originally an empowering tool against intra-urban inequalities in a developing country, participatory budgeting has soon spread across the globe, reaching developed countries in Europe and losing some of its reformative and equalising potential underway (Ganuza, Baiocchi, 2012).

Throughout the 30 years of the history of participatory budgeting, the nature of problems cities face has changed, too. Urban areas expand and while they do, they become internally more differentiated with respect to e.g. wealth concentration and the ethnic and age structure of population across city parts (OECD, 2018). Some pressing urban policy challenges arise as a result, including the accommodation of urban space to the needs of the growing elderly population concentrated in the oldest, old-town neighbourhoods, as well as tackling environmental issues. Poor air quality and a lack of green spaces may substantially affect health and well-being of residents, especially the elderly feeling emotionally attached to their surroundings (Rosel, 2003; Masotti et al., 2006).

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<sup>1</sup> Correspondence address: e-mail: piotr.wetoszka@umcs.pl. ORCID: 0000-0002-7196-0899.

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Local governments are urged to reformulate their policy agendas to withstand these trends. Is modern participatory budgeting, mostly devoid of its empowering function, not becoming a threat to tackling these issues rather than a solution as it originally was? As a step towards answering such a complex, political question, it is worth to examine what kind of city parts tend to accumulate more of PB funds or votes cast on winning projects. Do neighbourhoods with more elderly, typically less politically active residents tend to receive less votes and thus less funding?

The literature on elite capture suggests that organised groups of interest, such as local authorities or certain social groups, may steer and extensively benefit from decision making processes that they are part of (Sheely, 2015). The intra-urban allocation of participatory budgeting funds has been studied in international literature (e.g. Grillos, 2017; Shybalkina, Bifulco, 2019) and the problem of elite capture was addressed there, yet not in relation to age-related intra-urban differences. Furthermore, the specificity of Polish PBs has rarely been considered in this context.

The present paper should contribute to filling the existing research gap with a case study of Wrocław, a city with a long tradition of participatory budgeting by Polish standards and one that provides access to extensive micro open data. The overall goal of the study is to investigate the connection between the age composition of neighbourhoods and their PB performance, measured for example by the share of funds they obtain. The main methods used are critical review of theoretical and empirical literature on participatory budgeting, as well as exploratory statistical methods: hierarchical clustering and multiple correspondence analysis. The state of art in research, the choice of methods and the analytical procedure will be discussed in the following sections of the paper.

## PARTICIPATORY BUDGETING: LITERATURE REVIEW

The participatory budget in Porto Alegre was an attempt to bring democracy into the city (Ganuza, Baiocchi, 2012). Citizens and city officials collaboratively decided on the projects to be financed, and before that, discussions within smaller communities and at the city level with neighbourhood leaders were conducted. One of the cornerstones of this worldwide first PB experiment was a special formula for the allocation of funds that combined objective criteria (availability of infrastructure, population size) with subjective rankings of investment priorities provided by each neighbourhood involved (Friant, 2019). Participatory budgeting succeeded in enhancing the access to basic public goods, such as water sanitation systems and walkable pedestrian streets, and in empowering groups at risk of social exclusion in the country, including women and Afro-Americans (Baiocchi, 2005, p. 15; Fedozzi et al., 2013, p. 29, cited by Friant, 2019, p. 85).

Participatory budgeting that has appeared in Europe favours more often direct rather than representative democracy by guaranteeing each and every citizen the

voting right. Yet in these new, diversified policy devices citizens have limited or no legal possibilities to enforce their own ideas (Dias, 2014; Allegretti, Herzberg, 2004). What is more, some modern PBs appear to be “politically malleable” (Ganuza, Baiocchi, 2012, p. 1), since local governments may exploit the non-binding character of voting. This can be done e.g. by *ex post* limiting the funds allocated to the winning projects (Sheely, 2015) or defining vague criteria, such as *rationality*, *social value* or *feasibility* for projects, which in fact allow to legally reject any kind of project (Kębłowski, 2014, pp. 17–18).

These are examples of *elite capture*, a consequence of a group disproportionately influencing the decision-making process to achieve their own goals (Beard, Phakphian, 2009, p. 11). In some participatory budgeting models, including the one dominant in Poland, the voting process may turn into a “quasi-referendum” (Sześciło, 2015). Citizens are tempted to choose projects benefiting their own neighbourhoods, without seeing a broader context of disparities within the city. Hence, neighbourhoods with better connected and more knowledgeable citizens may enter the voting phase with enough well-prepared project proposals to ensure themselves a satisfying voters’ base. Since a typical PB voter is a middle-aged, well-qualified citizen (e.g. Messer, 2013), the changing demographic structure of cities, the development of suburbs attracting wealthier people while leaving the elderly in the oldest, central city parts may lead to another, age structure-related *elite capture*. Possibly, neighbourhoods with above-average shares of the youngest (16–18) and the oldest (80+) could be among the “losers” of the vote.

So far, though, this problem has not been comprehensively addressed by scientists from this perspective. Researches link PB outcomes mostly to various geographical and infrastructural features. For example, Kociuba and Rabczewska (2019, p. 98) demonstrate in their case study of Lublin that investments realised as part of PB are concentrated in old, multi- and single-family neighbourhoods and e.g. in the vicinity of schools and stadiums. The authors of the Functional Analysis of Wrocław’s neighbourhoods point at the growing popularity of PB among neighbourhoods of different types from 2013 to 2015, including post-rural areas (Mironowicz, 2016, pp. 66–75).

Such observations are part of what is described in urban studies as *neighbourhood effects*, drivers of urban change that represent the notion of intra-city differences resulting from place-specific features (Lupton, Power, 2004). In the present study, the focus is on the age composition across city parts as a place-specific feature and a potential driver of urban change related to the allocation of PB funds.

#### PARTICIPATORY BUDGETING IN WROCLAW

With over 700,000 inhabitants, Wrocław represents one of the most-populated cities in Poland. Since 1990 there have been 48 auxiliary units called *osiedla* (neighbourhoods) in Wrocław. They are presented in Figure 1.

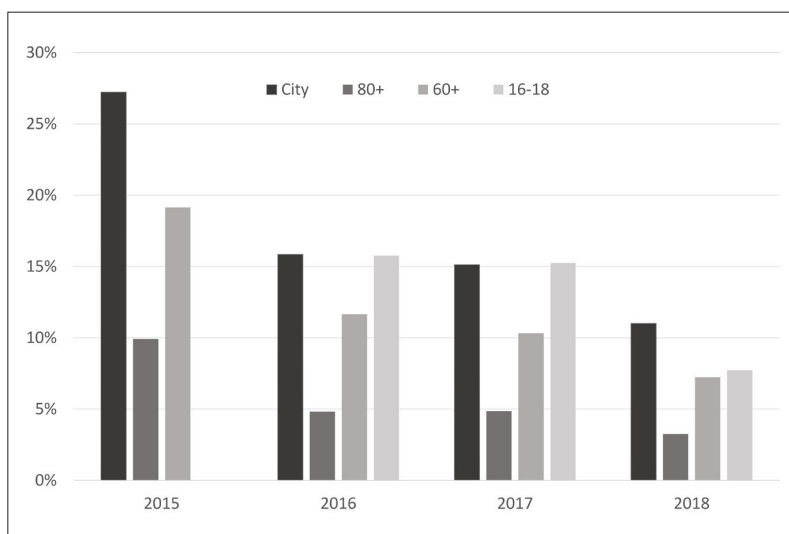






PB in Wrocław has some distinctive features when compared with the two other cities. A minimum of 100 votes per project as an acceptance threshold prevents the flow of funds into projects favoured only by small communities. Also, since 2016 neighbourhoods are grouped into artificial zones for the purpose of limiting funds concentrating in single locations in the city. Furthermore, lack of the principle of one-year-implementability creates possibilities for the citizens to submit financially demanding proposals as a series of smaller neighbourhood projects for two or more consecutive years.

Is participatory budgeting popular among the inhabitants of Wrocław? Voter turnout<sup>4</sup> between 2015–2018 for three age cohorts and the whole city is presented in Figure 2.



**Figure 2. Voter turnout in Wrocław's participatory budget between 2015–2018 for all residents (*City*) and broken down by age cohorts**

Source: own study based on Wrocław Participatory Budget (<http>).

The interest in participatory budgeting in Wrocław peaked in 2015 and then declined substantially. Except for the initial year, voter turnout of the youth cohort (16–18) resembles the share of the whole population that cast their votes, and the same applies to the population of the elderly. This is best visible in the years 2016 and 2017, when the participation rates of the elderly were at the level of 15%, close to or just as much as the city average.

<sup>4</sup> Since no official data on voter turnout in Wrocław's participatory budgeting is published, the data is calculated as a number of voters divided by the number of registered residents in a given age group or in the city. For the year 2015, no separate data for the cohort 16–18 is available.

The drop in participation rates should be attributed to the sinking interest in participatory democracy among prime age voters<sup>5</sup>, which could have been reinforced by changes to some of the PB procedures in Wrocław. These were meant to eliminate “loopholes” from the two initial PB editions and include the aforementioned “100 votes rule”, as well as some other regulations concerning procedural requirements for the implementation of projects.

For further analysis, two editions, from 2016 and 2017, were chosen. They represent the beginning of a mature period of PB in Wrocław with no major changes in PB procedures, a stable funding level and stable participation rates.

## METHODOLOGY

The methods used in the paper are clustering and multiple correspondence analysis (MCA). This combination proves useful when the research goal is to uncover the relationships between various quantitative or qualitative characteristics of observations and upon that – to build a typology of these observations. Clustering methods “aim at extracting hidden structure from data” (Schäfer, Laub, 2004, p. 682), that is, identifying groups (clusters) that would be hard to see otherwise. These groups should be homogenous – any two objects within a cluster should be more similar to each other than any two objects picked from two different clusters (Timm, 2002). There is a variety of clustering methods to choose from (see Kassambara, 2017a for an overview), the two most popular being centroid and hierarchical clustering. As opposed to the former, hierarchical clustering does not require any assumptions regarding the number of clusters to be generated and provides tree-like structures instead which can be conveniently cut at any level of details needed by the researcher. Hierarchies can be built either bottom-up or top-down, whereby the latter proves more time-efficient when the dataset is not big (Rajalingam, Ranjini, 2011)<sup>6</sup>.

Clustering helps in reducing the volume of information that can be passed on to MCA. MCA is an extension of correspondence analysis (CA) in that it helps determine the relationship between more than two categorical variables. It delivers a graphic representation of observations in, preferably, a two-dimensional coordinate system (Stanimir, 2005), and so it helps to gain a general understanding of the data that can be explored further with more complex tools, such as regression methods.

The joint use of the two methods is a standard procedure used in medical and market research but also in urban studies, as exemplified by the works of Scheid (2004) and Deguen, Padilla, Padilla and Kihal-Talantikite (2017). In both studies,

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<sup>5</sup> Due to the higher population volume of the prime age cohort 25–44, which consists of several age subgroups, it is not presented in the figure in order to keep it readable.

<sup>6</sup> In the bottom-up approach (agglomerative clustering) each observation starts in its own cluster and then clusters are stepwise merged. In the top-down approach (divisive clustering) each observation is initially part of one cluster which is then split into smaller clusters.

variations of clustering and correspondence analysis methods were applied to sets of intra-urban features representing neighbourhood effects. Scheid (2004) classifies Dortmund's neighbourhoods to deliver a reference point for public policy makers, while Deguen *et al.* (2017) investigate the link between objective and subjective understanding of air pollution, concluding that the latter can be generally considered as a good proxy for the former.

In the present study, MCA is combined with top-down, divisive hierarchical clustering, similarly to the study design in Deguen *et al.* (2017). All calculations and related figures are delivered with *R* in version 3.5.2 (*R* Core Team 2018) with the addition of packages *factoMineR* (Lê et al., 2008) and *factoextra* (Kassambara, Mundt, 2017b).

## ANALYSIS AND DISCUSSION OF RESULTS

The overall aim of the analysis is to determine the relationship between the age composition of neighbourhoods and their PB performance. The following two hypothesis are tested:

- H1: Neighbourhoods with higher shares of residents aged 25–44 and lower shares of those aged 80+ tend to perform better (accumulate greater shares of funds and votes).
- H2: Neighbourhoods with lower shares of residents aged 25–44 and higher shares of those aged 80+ tend to perform worse (accumulate lower shares of funds and votes).

The analysis is conducted in two steps. In the first step, neighbourhoods are grouped by demographic criteria and, separately, by voting outcomes. The following variables are used:

- 1) Demographic features:
  - a) residents aged 25–44 as a percentage of all residents in a given neighbourhood;
  - b) residents aged 80+ as a percentage of all residents in a given neighbourhood.
- 2) Voting outcomes:
  - a) votes cast in favour of neighbourhood projects benefiting<sup>7</sup> a given neighbourhood as a percentage of all votes cast in favour of neighbourhood projects in the city;
  - b) funds assigned to the winning neighbourhood projects benefiting a given neighbourhood as a percentage of all funds assigned to neighbourhood projects in the city.

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<sup>7</sup> To determine whether a given project benefits a neighborhood (rather than is only physically ascribed to it), the project description was checked for mentions of project beneficiaries; additionally, the location criterion was used. In some cases, votes and/or funds were split between two or more neighbourhoods.

Data for the two PB editions are merged to calculate shares of total funds and total votes cast. Shares of residents in age cohorts are calculated as averages of respective values from 2016 and 2017. Some neighbourhoods were merged to ensure the comparability of demographic and PB-related data<sup>8</sup>. These are:

- a) Brochów and Bieńkowice;
- b) Ołbin and Plac Grunwaldzki;
- c) Polanowice-Poświętne-Ligota, Lipa Piotrowska and Widawa.

In the second step, multiple correspondence analysis was run to inspect connections between the clusters across the two typologies presented in Tables 2 and 3.

**Table 2. Age-based typology of neighbourhoods in Wrocław**

Cluster	Number of neighbourhoods	City residents (%)	Min. and max. share (%) of the age cohort 25–44 in clustered neighbourhoods	Min. and max. share (%) of the age cohort 80+ in clustered neighbourhoods
Prime age	18	32	34–51	1–6
Moderate	17	44	29–34	3–7
Oldest	9	24	25–30	9–13

Source: own study.

**Table 3. Outcomes-based typology of neighbourhoods in Wrocław**

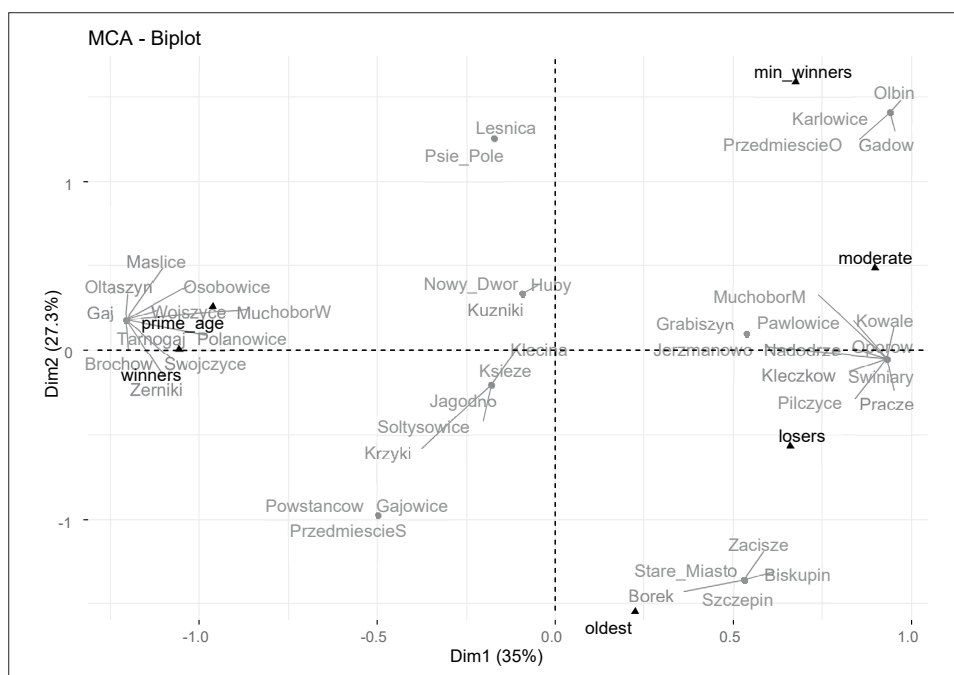
Cluster	Number of neighbourhoods	City residents (%)	Min. and max. share (%) of the total votes cast in clustered neighbourhoods	Min. and max. share (%) of the total funds accumulated in clustered neighbourhoods
Losers	20	36	0–3	0–1
Winners	17	34	1–3	2–4
Minority winners	7	31	4–6	4–7

Source: own study.

The cluster *prime age* is of special interest. Each of its members has a share of prime age residents higher than the city average, that is more than ca. 33%, with an outstanding case of Jagodno (over 50%). As far as the second typology is concerned, more than 1/3 of the city residents live in neighbourhoods where slightly over 10% of PB funds pool is assigned. Each of the *losers* benefits less than it would if the distribution was perfectly even, that is less than approx. 2.27% of total funding. Importantly, for most of the *losers* the share of votes cast lies between 0 and 1, which reflects a weak mobilisation in submitting projects. Only in Biskupin and Pilczyce-Kozanów-Popowice Pn, a fairly high share of total votes at around 3% did not translate into commensurate funding.

<sup>8</sup> A full description of the data set used in research can be sent on request.

The remaining 2/3 of the city residents fall into two clusters of winners with a total of 80% of PB funding. Both *winners* and *minority winners* constitute neighbourhoods with mixed densities and area coverage. The difference between them lies in the efficiency of voting. The higher the ratio, the worthier a single vote and, assumingly, the more skilled a neighbourhood in casting votes on projects with real winning chances. *Losers* manage to get, on average, about PLN 50 from each vote cast, *minority winners* – double the amount, and *winners* – four times as much. The group of *winners* appears to be best at submitting well-planned projects backed by local communities.



Note: Normalisation method: column-principal.

**Figure 3. Multiple correspondence analysis: age-based and outcomes-based clusters**

Source: own study.

In the following section the results of the final analysis step are presented. Figure 3 demonstrates the relations between clusters. Grey-coloured labels represent 44 observations corresponding to the modified set of Wrocław's neighbourhoods. Black-coloured labels with triangles are variables corresponding to six clusters from the two constructed typologies (see Tables 2 and 3). The further the variables and the observations are from the coordinate system origin, the more unique characteristics they possess. The closer the variables are to each other, the higher correlation between them can be assumed, given that the variation of data is explained by the two first principal components in about 60%.

Variables *prime-age* and *winners* appear to be related to each other. This suggests that neighbourhoods with high shares of the population aged 25–44 and low shares of the elderly have a higher chance of benefitting approximately proportionately or slightly more than proportionately (2%–4% of total funds) from participatory budgeting. No conclusions can be drawn for other variables, though, since they are scattered across the plot. Importantly, there is no indication that neighbourhoods with a higher share of the elderly are more prone to be the losers of the funds allocation system. Hence, other factors might contribute to the variation of data, which, as prior research suggests, are related to geographical expansion of cities.

In Figure 4, the geographical expansion of Wrocław is presented. The encircled individuals are *winners* that simultaneously fall into the cluster *prime age*. The neighbourhoods of interest were incorporated into the city mostly at later stages of urbanisation, after the Second World War. Their population density does not exceed 2000 people per km<sup>2</sup>, with the exception of Gaj with over 7000 residents per km<sup>2</sup>. The prevailing neighbourhood types are bedroom neighbourhoods with single-family dwellings (e.g. Widawa, Polanowice) and for example, former villages and small cities (Lipa Piotrowska, Brochów). These kinds of urban development are often called “incomplete” because they lack one or more elements of basic public infrastructure, such as schools or recreation spaces.

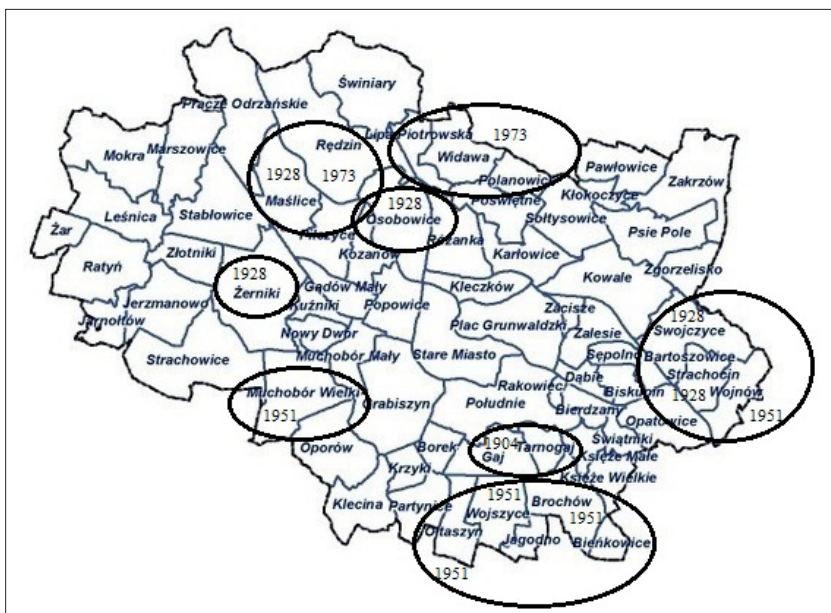


Figure 4. Geographical expansion of Wrocław with encircled neighbourhoods from the cluster *winners* (year of incorporation in brackets)

Source: own study based on the graphic retrieved from: <https://www.wroclaw.pl/dzielnice-wroclawia-mapa-liczby-i-fakty-o-osiedlach-i-dzielnicach-wroclawia> (2020.02.21).

The Functional Analysis of Wrocław's neighbourhoods conducted in 2015/2016 reveals that in the neighbourhoods under inspection the availability of services is low, but, at the same time, the level of citizens' engagement in local matters is high (Mironowicz, 2016). This is an important observation since in the first PB editions in Wrocław in 2013 and 2014, peripheral neighbourhoods with many detached houses were among the least active city parts in terms of the number of project proposals submitted (*ibidem*). Apparently, the inflow of wealthier, primary age population has enhanced social capital in these areas. The overall conclusion is that both city territorial expansion and age structure dynamics simultaneously contribute to the explanation of PB-funds allocation.

## CONCLUSIONS

Findings from the analysis allow the confirmation of the first research hypothesis. A typical "winner" of the two PB editions in Wrocław is a low-to medium-density neighbourhood with an above-average share of prime age residents and a development type with one or more important infrastructural elements missing. It must be stressed that the verified connection applies only to a part of the group of winners. The second hypothesis could not be confirmed: there is no indication that neighbourhoods with greater shares of the elderly would tend to benefit less from funds distribution. Yet it is not to be ruled out that such an effect may occur in future, as the ageing process progresses.

An interplay between various *neighbourhood effects* shall be assumed, including the stage of infrastructural development and the role of peers sharing common interests (prime-age residents in bedroom neighbourhoods). These effects are probably reinforced by the lack of one-year-implementability-rule that helps maintain the interest of most politically active residents on a year-to-year basis. Another important factor to be considered is learning effects with respect to project submission, observed in prior research on PB in Wrocław (Mironowicz 2016). Again, those to learn the fastest are those who are wealthier, with a vital interest in improving their living conditions.

The undertaken analysis has some limitations. It should be assumed that by including only registered city occupants into the dataset, the population of some neighbourhoods, especially the newly incorporated, fast-growing neighbourhoods, could have been underestimated. Yet the study opens possibilities for further research, which is needed since the lack of comparable studies in the field allows for no cross-references. Participatory budgeting remains a relatively new phenomenon with a year-to-year dynamic difficult to interpret. One possibility for further research is to use regression modelling on panel data in order to study the PB dynamics and possibly uncover some geographical, time-related or city-specific patterns in the allocation of PB funds.



Undeniably, the evolution of participatory budgeting must be followed for scholars and policy makers to understand the possibilities it offers and to better utilise it in a dynamically changing world of urban development and societal ageing.

## BIBLIOGRAPHY

- Allegretti, G., Herzberg, C. (2004). *Participatory budgets in Europe. Between efficiency and growing local democracy* (TNI Briefing Series, No 5). Amsterdam: Transnational Institute and the Centre for Democratic Policy-Making.
- Attachment no. 2 to the President of Lublin's decree no 127/3/2019. *Dziennik Urzędowy Województwa Lubelskiego*.
- Beard, V., Phakhphian, S. (2009). Community-based Planning in Chiang Mai, Thailand: Social Capital, Collective Action and Elite Capture. In: A. Daniere, H. V. Luong (Eds.), *The Dynamics of Social Capital and Civic Engagement in Asia* (pp. 145–162). London: Routledge. DOI: 10.4324/9780203126516.
- Bednarska-Olejniczak, D., Olejniczak, J. (2016). Participatory Budget of Wrocław as an Element of Smart City 3.0 Concept. In: V. Klimova, V. Zitek, (Eds.), *19th international colloquium on regional sciences June 15–17, 2016, Cejkovice, Czech Republic* (pp. 760–766). Masaryk Univ, Fac Econ & Adm, Dept Reg Econ & Adm. DOI: 10.5817/CZ.MUNI.P210-8273-2016-97.
- Deguen, S., Padilla, M., Padilla, C., Kihal-Talantikite, W. (2017). Do Individual and Neighbourhood Characteristics Influence Perceived Air Quality? *International Journal of Environmental Research and Public Health*, 14(12), MDPI, 1559–1577.
- Dias, N. (2014). 25 years of Participatory Budgets in the world: a new social and political movement? In: N. Dias (Ed.), *Hope for democracy. 25 years of participatory budgeting worldwide* (pp. 21–27). IN LOCO Association. Retrieved from: <https://partycypacjaobywatelska.pl/strefa-wiedzy/biblioteka/publikacje/hope-for-democracy-25-years-of-participatory-budgeting-worldwide/> (2020.04.06).
- Friant, M. C. (2019). Deliberating for sustainability: lessons from the Porto Alegre experiment with participatory budgeting. *International Journal of Urban Sustainable Development*, 11/1, 81–99. DOI: 10.1080/19463138.2019.1570219.
- Ganuza, E., Baiocchi, G. (2012). The Power of Ambiguity: How Participatory Budgeting Travels the Globe. *Journal of Public Deliberation*, 8(2). Retrieved from: <https://www.publicdeliberation.net/jpd/vol8/iss2/art8> (2020.02.24).
- Grillos, T. (2017). Participatory Budgeting and the Poor: Tracing Bias in a Multi-Staged Process in Solo, Indonesia. *World Development*, 96, 343–358. DOI: 10.1016/j.worlddev.2017.03.019.
- Kassambara, A. (2017a). *Practical Guide to Cluster Analysis in R*. STHDA.
- Kassambara, A., Mundt, F. (2017). *Factoextra: Extract and Visualize the Results of Multivariate Data Analyses. R package version 1.0.5*. Retrieved from: <https://CRAN.R-project.org/package=factoextra> (2020.02.24).

- Kębłowski, W. (2014). *Budżet partycypacyjny. Ewaluacja*. Warszawa: Instytut Obywatelski.
- Kociuba, D., Rabczewska, K. (2019). Rola budżetów partycypacyjnych w zagospodarowaniu przestrzeni publicznych polskich miast – studium przypadku Lublina. *Studia Regionalne i Lokalne*, 2(76), 82–109. DOI: 10.7366/1509499527605.
- Lê, S., Josse, J., Husson, F. (2008). FactoMineR: An R Package for Multivariate Analysis. *Journal of Statistical Software*, 25(1), 1–18. DOI: 10.18637/jss.v025.i01.
- Lupton, R., Power, A. (2004). *What we know about neighbourhood change: A literature review (CASE Report 27)*. Retrieved from: <http://eprints.lse.ac.uk/27357> (2019.09.01).
- Map of Wrocław's neighbourhoods*. Retrieved from: <https://www.wroclaw.pl/dzielnice-wroclawia-mapa-liczby-i-fakty-o-osiedlach-i-dzielnicach-wroclawia> (2020.02.21).
- Marquetti, A., da Silva, C. E. S., Campbell, A. (2012). Participatory economic democracy in action: Participatory budgeting in Porto Alegre, 1989–2004. *Review of Radical Political Economics*, 44(1), 62–81. DOI: 10.1177/0486613411418055.
- Masotti, P. J., Fick, R., Johnson-Masotti, A., MacLeod, S. (2006). Healthy Naturally Occurring Retirement Communities: A Low-Cost Approach to Facilitating Healthy Aging. *American Journal of Public Health*, 96(7), 1164–1170. DOI: 10.2105/AJPH.2005.068262.
- Messer, K. (2013). *Participatory budgeting as its critics see it*. Retrieved from: <http://www.buergerhaushalt.org/en/article/participatory-budgeting-its-critics-see-it> (2019.09.01).
- Mironowicz, I. (2016). *Analiza Funkcjonalna Osiedli Wrocławia*. Wrocław: Fundacja Dom Pokoju.
- OECD (2018). *Divided Cities. Understanding intra-urban inequalities*. Paris: OECD Publishing. DOI: 10.1787/9789264300385-en.
- Rajalingam, N., Ranjini, K. (2011). Hierarchical Clustering Algorithm – A Comparative Study. *International Journal of Computer Applications*, 19(3), 42–46. DOI: 10.5120/2340-3052.
- R Core Team (2018). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Vienna. Retrieved from: <https://www.R-project.org/> (2020.02.24).
- Resolution No. IX/165.2019 of Rzeszów City Council, 26.03.2019. Biuletyn Informacji Publicznej Miasta Rzeszowa.
- Resolution No. XI/237/2019 of Rzeszów City Council. Dziennik Urzędowy Województwa Podkarpackiego.
- Rosel, N. (2003). Aging in place: Knowing Where You Are. *International Journal of Aging & Human Development*, 57(1), 77–90. DOI: 10.2190/AMUD-8XVX-9FPK-MR8G.
- Rules of Participatory Budget in Lublin*. Retrieved from: <https://lublin.eu/mieszkancy/partycypacja/budzet-obywatelski/budzet-obywatelski-vi-edycja/nowe-zasady/> (2019.09.01).
- Schäfer, C., Laub, J. (2004). Annealed k-Means Clustering and Decision Trees. In: C. Weihs, W. Gaul (Eds.), *Classification – the Ubiquitous Challenge* (pp. 682–689). Proceedings of the 28th Annual Conference of the Gesellschaft für Klassifikation, e.V. University of Dortmund, March 9–11. DOI: 10.1007/3-540-28084-7\_81.

- Sheely, R. (2015). Mobilization, Participatory Planning Institutions, and Elite Capture: Evidence from a Field Experiment in Rural Kenya. *World Development*, 67, 251–266. DOI: 10.1016/j.worlddev.2014.10.024.
- Scheid, S. (2004). Correspondence clustering of Dortmund city districts. In: C. Weihs, W. Gaul (Eds.), *Classification – the Ubiquitous Challenge* (pp. 690–697). Proceedings of the 28th Annual Conference of the Gesellschaft für Klasifikationen, e.V. University of Dortmund, March 9–11. DOI: 10.1007/3-540-28084-7\_81.
- Shybalkina, I., Bifulco, R. (2019). Does Participatory Budgeting Change the Share of Public Funding to Low Income Neighborhoods. *Public Budgeting and Finance*, 39(1), 45–66. DOI: 10.1111/pbaf.12212.
- Sintomer, Y., Herzberg, C., Röcke, A. (2008). Participatory Budgeting in Europe: Potentials and Challenges. *International Journal of Urban and Regional Research*, 32(1), 164–178. DOI: 10.1111/j.1468-2427.2008.00777.x.
- Stanimir, A. (2005). *Analiza korespondencji jako narzędzie do badania zjawisk ekonomicznych*. Wrocław: Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu.
- Sześciło, D. (2015). Participatory Budgeting in Poland: Quasi-Referendum Instead of Deliberation. *Croatian and Comparative Public Administration*, 15(2), 373–388.
- Timm, N. H. (2002). *Applied multivariate analysis*. New York: Springer Verlag.
- Wrocław Participatory Budget. Retrieved from: <https://www.wroclaw.pl/rozmawia/wroclawski-budzet-obywatelski> (2019.09.01).
- Wrocław's annual report on budget execution 2018, Wrocław, March 2019. Biuletyn Informacji Publicznej Urzędu Miejskiego Wrocławia.

### Summary

In Brazil in the late 1980s, participatory budgeting was introduced to help develop deprived neighbourhoods. Modern European cities must face environmental and social threats that cause intra-urban inequalities to grow, especially with respect to the elderly. Local governments are urged to reformulate their policy agendas to withstand these trends. Is participatory budgeting not becoming a threat to tackling these issues rather than a solution as it originally was?

To address this question, the intra-urban concentration of funds must be investigated. Do neighbourhoods with a higher share of the elderly – less politically active yet emotionally bound to their surroundings – tend to get less funding, as the theory of elite capture could suggest? While this question has been discussed in literature, neither the intra-urban age composition nor the specificity of Polish participatory budgets was considered.

The overall goal of the study was to investigate the relationship between the age structure of neighbourhoods in Wrocław and their performance in participatory budgeting editions run between 2016–2017. By means of clustering and multiple correspondence analysis, a typical “winner” of the two editions can be determined. It is a neighbourhood incorporated into the city at later stages of suburbanisation, with single-family housing and an above-average share of residents aged 25–44. The analysis performed does not reveal any similar connections for other types of neighbourhoods, including those with above-average shares of the elderly. It is safe to argue that territorial city expansion and age-related inter-city differences cannot be seen independently of each other.

**Keywords:** participatory budgeting, demographics, ageing, suburbanisation, Wrocław.

## **Alokacja środków z puli budżetu obywatelskiego w kontekście starzenia się społeczeństw i nierówności społecznych**

### *Streszczenie*

W Brazylii pod koniec lat 80. XX w. wdrożony został budżet obywatelski (BO), który zapewniał przepływ stosownej części funduszy do najbardziej zaniedbanych dzielnic. Współczesne europejskie miasta również muszą sprostać wyzwaniu rosnących wewnętrznych nierówności w jakości życia, zwłaszcza wśród osób starszych. Powstaje pytanie, czy współczesny budżet obywatelski jest narzędziem umożliwiającym realizację tych celów, tak jak w oryginalnym modelu z Porto Alegre?

Odpowiedź na to pytanie wymaga przyjrzenia się koncentracji środków z BO w obrębie miasta. Czy dzielnice z największym odsetkiem osób starszych – mało aktywnych politycznie i przy tym szczególnie związanych ze swoją najbliższą okolicą – otrzymują mniej środków niż inne dzielnice, jak może sugerować teoria *elite capture*? Choć pytanie to stawiane już było w literaturze, w dotychczasowych badaniach nie uwzględniano ani kwestii zróżnicowania struktury wiekowej w obrębie miast, ani specyfiki polskich BO.

Celem badania jest określenie związku pomiędzy strukturą wiekową dzielnic we Wrocławiu a ich osiągnięciami w dwóch edycjach budżetu obywatelskiego w latach 2016–2017. Zastosowanie analizy skupień oraz wielorakiej analizy korespondencji pozwala na określenie typowego „zwyczajcy” dwóch głosowań. Jest to osiedle powstałe na późniejszych etapach suburbanizacji, o zabudowie jednorodzinnej oraz o ponadprzeciętnym odsetku rezydentów w wieku 25–44. Badanie nie pozwala natomiast na ustalenie podobnych zależności dla innych typów osiedli, w tym takich o znacznym udziale rezydentów w wieku 80+.

Sklania to do wnioskowania, że procesy urbanizacji oraz przestrzennego zróżnicowania wiekowego miast powinny być rozpatrywane łącznie: ekspansja geograficzna miast pociąga za sobą przepływ do nowo powstających osiedli ludności zamożnej, zmobilizowanej do podjęcia działań na rzecz poprawy jakości życia w warunkach niekompletności infrastruktury.

Słowa klucze: budżet obywatelski, demografia, starzenie się, suburbanizacja, Wrocław.

JEL: R23.

Anita Szymańska, dr hab.<sup>1</sup> 

Department of Economic Policy  
University of Gdańsk

Małgorzata Zielenkiewicz, dr<sup>2</sup> 

Department of Microeconomics  
University of Gdańsk

## **Inclusive development. How is Poland doing in comparison to other OECD countries?**

### INTRODUCTION

The idea of inclusiveness appeared when it was noticed that economic growth *per se* is insufficient for the fight against poverty and income inequality. Furthermore, growing income differentiation within societies has become a matter of concern, leading to the conclusion that the phenomenon is dangerous for the economy and social cohesion. Thus, active state involvement in market mechanisms, which tend towards unequal and uneven outcomes, is needed.

Despite the wide popularity of the idea of inclusive growth and development, it is difficult to find a uniform, precise and coherent definition of this idea. Proposals for measuring the degree of inclusiveness of the economy are to a large extent discretionary, depending on the adopted assumptions. It should be emphasised, however, that research on growth and inclusive development is becoming increasingly extensive and the concepts of measurement are gradually being developed. Ultimately, taking into account the complexity of the issue, one can expect new proposals concerning the discussed area.

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<sup>1</sup> Correspondence address: University of Gdańsk, Faculty of Economics, Department of Economic Policy, Armii Krajowej 119/121, 81-824 Sopot; tel. +48 58 523 14 20; e-mail: anita.szymanska@ug.edu.pl. ORCID: 0000-0002-1042-6924.

<sup>2</sup> Correspondence address: University of Gdańsk, Faculty of Economics, Department of Economic Policy, Armii Krajowej 119/121, 81-824 Sopot; tel. +48 58 523 11 64; e-mail: malgorzata.zielenkiewicz@ug.edu.pl. ORCID: 0000-0001-8691-955X.

Inclusiveness is still a prevailing issue. In particular, in the situation of growing income inequalities and the identification by researchers of the negative consequences of this phenomenon, the idea of including the entire society in the distribution of the national welfare is a key aspect of socio-economic development.

The aim of the study is to present a general outline of inclusive growth and development and to examine the position of Poland in this respect compared to other OECD countries. Based on the OECD method, after modifying it for the needs of this study, the evaluation of the advancement of inclusive development in Poland was investigated. The hypothesis states that the development in Poland is less inclusive than the OECD average. The research covers data from 30 countries and was conducted with the use of the following methods: data normalisation, cluster analysis, and comparative analysis.

#### INCLUSIVE GROWTH AND DEVELOPMENT CONCEPT

Since the late 2000s, inclusive growth has become the subject of a wide interest among economists and politicians in many countries (Grimm et al., 2015, p. 2). Despite this, there is still no consensus on the precise definition of this concept and the methods of its operationalisation.

The inclusiveness of growth is considered in close association with the issues of increasing economic inequalities observed in society. Simplistically, the idea is that all citizens in a country should benefit from the fruits of economic growth. In this way, the existing economic inequalities could be reduced, or at least not deepened. This approach is in opposition to the hypothesis that one of the unavoidable choices made in a market economy is one between equality and efficiency. The striving for the increase of economic egalitarianism takes place, according to this hypothesis, at the expense of the economy's ability to develop<sup>3</sup>. The idea of inclusive growth emphasises that not only economic growth and the simultaneous reduction of economic inequalities (including the elimination of poverty) is possible, but these goals may be even complementary (the implementation of one goal favours the achievement of the other). In particular, to achieve sustainable growth in the long term, reducing excessive inequalities, including fighting poverty, appears to be crucial. Observations indicate that it is much easier to ignite economic growth than to sustain its stability in the long run (Hausmann et al., 2005, pp. 303–329). Apart from the factors that can be included in the pantheon of critical determinants of economic growth and its duration (the quality of economic and political institutions, an outward orientation of the economy, macroeconomic stability, and human capital accumulation), less inequality seems to be associated with more sustained growth.

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<sup>3</sup> Arthur Okun became the populariser of this hypothesis by publishing in 1975 his monograph "Equality and Efficiency: The Big Tradeoff". According to Okun, there is a conflict between the social need to reduce excessive economic inequalities and the efficiency of the economy (Okun, 1975).

Too much inequality might be destructive to the persistence of economic growth. Berg and Ostry even state “that it would be a big mistake to separate analyses of growth and income distribution” (Berg, Ostry, 2011). Growth and equity can and should go hand in hand.

The analysis of sometimes different definitions of inclusive growth leads to the conclusion that the most common components of the concept in question are: poverty, economic inequality, productive employment, and equal opportunities (Ranieri, Ramos, 2013, p. 18).

The necessity to reduce poverty is the original and key premise of the idea under discussion. It has been stated beyond reasonable doubt that economic growth *per se* is not a guarantee for poverty reduction (as assumed, for example, by the concept of Kuznets curve<sup>4</sup>). This opened the space for the idea of pro-poor growth (Grimm et al., 2015, pp. 1–4), which is sometimes misguidedly identified with the concept of inclusive growth, although it is an essential part of it. While in the case of pro-poor growth, the focus is on reducing poverty spheres through economic growth, the concept of inclusive growth covers the whole of society. Economic growth should benefit all social groups: the poor, the middle class and the rich (Klasen, 2010, p. 2). These benefits should ultimately lead to the reduction of economic inequalities between the citizens.

In order for the idea of inclusive growth to materialise, the manner in which this growth is achieved, in addition to the high rate of economic growth, is also important. Both of these two components are interrelated and play a key role in the strategy of achieving high and sustainable economic growth. A necessary condition for the success of this strategy is a broad-based involvement of all members of society in the process of building wealth. In the idea of inclusive growth, the priority is to strengthen productive employment<sup>5</sup>. Hence, the focus should be not only on employment growth, but also on productivity growth. Increasing the welfare of the less affluent strata of society should not be achieved through direct redistribution of income, especially in the case of long-term policies. Social transfers can only provide short-term support for the poor (Ianchovichina, Lundstrom, 2009, p. 2). In the long term, they may contribute to an excessive burden on public finances and hamper economic growth. Ultimately, the condition of equal opportunities is much more exposed than income equality.

The research results indicate a relationship between equality of opportunity, social mobility and equality of outcome. More inequality is associated with less

<sup>4</sup> According to Simon Kuznets, economic growth initially entails an increase in income disparities, which then decline. However, further studies of the relationship between economic growth and changes in the level of inequality produced different results. The Kuznets curve has lost empirical confirmation (Kuznets, 1955, pp. 1–28; Fields, 2001, pp. 36–72).

<sup>5</sup> Productive employment is considered by the International Labour Organization as employment yielding sufficient returns for labour to permit a worker and his/her dependents a level of consumption above the poverty line (Ripley, Hartrich, 2017).



mobility across the generations (this is illustrated by the so-called Great Gatsby Curve) (More: Corak, 2013, pp. 79–102). Inequality lowers mobility because it shapes opportunity. When children inherit much of their economic status from their parents, this creates a perception of unfairness and a lack of opportunity. Inequalities are acceptable if they result from individual effort or personal abilities and talents. But if they relate to inherited property, discrimination or place of residence, then they should be considered detrimental. Ali and Zhuang (2007) point out that equal opportunity is one of the basic human rights, and a lack of it is unethical and immoral. Furthermore, equal access to opportunities for all boosts the growth potential. Otherwise, inefficient utilisation of human and physical resources, the decline in the quality of institutions and policies, the erosion of social cohesion, and the increase of social conflict take place (Ali, Zhuang, 2007, p. 10). Thus, an important issue of inclusive growth is to provide equal opportunities for people from different areas and social backgrounds.

There are two possible focal aspects identified for inclusive growth: outcomes and process. The “process” of growth allows participation of (and contribution by) all members of society, with particular emphasis on the ability of the poor and disadvantaged to participate in growth (the “non-discriminatory” aspect of growth). The term “outcomes” of growth is associated with declining inequality in those non-income dimensions of well-being that are particularly important for promoting economic opportunities, including education, health, nutrition and social integration (the “disadvantage-reducing” aspect of inclusive growth) (OECD, 2015, p. 84).

Incorporating non-income dimensions into the analysis introduced a new distinction. The notion of inclusive growth should pertain to the distribution of increases in income, whereas the distribution of improvements along dimensions other than income should be termed as inclusive development (Rauniyar, Kanbur, 2010, p. 4). Nevertheless, these two notions are used interchangeably by most authors, and in many cases, inclusive growth is even used as a broad concept similar in fact to inclusive development.

Intrinsically, the term “inclusive development” should be consistent with the perception of the idea of economic development. But, whereas the term “economic growth” is usually crystal clear, “a comprehensive history of the idea of development has yet to be written” (Sachs, 2004, p. 3). The evolution of the idea of development may be summarised as an enhancement of its content by the addition of new dimensions: economic, social, political, cultural, and sustainable (Sachs, 2004, p. 7). Development is an ever evolving concept including: the protection of social and economic human rights, meeting basic human needs, reducing poverty, enhancing wellbeing, minimising externalised environmental impacts, focusing on rural development to balance urban development, and empowerment of social cohesion (Pouw, Gupta, 2017, pp. 104–108). Development should be understood as dimensions of well-being beyond income, while inclusiveness focuses attention on the distribution of well-being (van Gent, 2017).

Generally, in the broad sense, quality of life and high living standards for all matter, considering that the relevant dimensions of inclusive development may vary across countries depending on their level of economic development, social preferences, specific conditions and circumstances (Samans et al., 2015).

#### INCLUSIVE DEVELOPMENT IN THE OECD COUNTRIES – METHODOLOGY

Although inclusive growth and development is a relatively new concept, in recent years, many propositions of measurement have appeared. Previously, indices which focused on income or welfare inequalities have existed, such as the Gini index and the Inequality-adjusted Human Development Index (UNDP, 2019). There is also a growing number of measures designed to capture individual wellbeing, life satisfaction, happiness, and some “beyond GDP” aspects of welfare (Fleurbaey, Blanchet, 2013). Inclusiveness, however, needs measures that emphasise the aspects related to the participation of individuals in the overall benefits of socio-economic development. In recent years, international organisations have developed different sets of variables to be taken into account in assessing the progress of inclusiveness in a country. The European Commission focuses more on inclusive growth (Eurostat, 2020), the OECD (2015; 2018) and the World Economic Forum (Samans et al., 2015; WEF, 2018) have a wider scope of inclusiveness, and the World Bank has created the Global Findex focused on financial inclusion only (Demirguc-Kunt et al., 2017). For the purpose of the research, the OECD’s approach was applied. The main reason is that all of the countries studied belong to the OECD, hence in the study, there are no underdeveloped countries, where even basic needs are not met, which would require a different approach than in the case of highly developed countries (Samans et al., 2015). The OECD’s set of variables is designed for more developed countries. It consists of the four main pillars shown in Table 1. Not all data proposed in the report was available for all OECD countries, thus some of them were replaced by data with a similar meaning. Two variables were dropped as there was no complete data that could be a good replacement for the original version. The replacements and drops in the data set are listed below Table 1.

Most of the data came from the OECD database, an exception being 2.7 which was taken from The Global Findex database, and one piece of information had to be filled in from the original Canadian source. The data are usually from the second half of the 2010s (for more specific data, the period is different, such as in the case of voter turnout, which is calculated for a whole decade). The research covers 30 countries belonging to the OECD. Countries not included due to a lack of data are: Colombia, Chile, Iceland, Israel, Japan, Korea, and Mexico.

Table 1. A set of variables proposed by the OECD for measuring inclusive development

1. Growth and ensuring equitable sharing of benefits from growth	2. Inclusive and well-functioning markets	3. Equal opportunities and foundations of future prosperity	4. Governance
1.1 GDP per capita growth (%)	2.1 Annual labour productivity growth (2.1a) and level (2.1b) (%; USD PPP)	3.1 Variation in science performance explained by students' socio-economic status (%)	4.1* Confidence in government (%)
1.2* Median income growth and level (%; USD PPP)	2.2 Employment-to-population ratio (%)	3.2* Correlation of earnings outcomes across generations (coefficient)	4.2 Voter turnout (%)
1.3 S80/20 share of income (ratio)	2.3 Earnings dispersion (inter-decile 9/1 ratio)	3.3* Childcare enrollment rate – children aged 0–2 (%)	4.3* Female political participation (%)
1.4 Bottom 40% wealth share and top 10% wealth share (% of household net wealth)	2.4* Female wage gap (%)	3.4* Young people neither in employment nor in education & training: 18–24-year-olds (%)	
1.5 Life expectancy (number of years)	2.5 Involuntary part-time employment (%)	3.5* Share of adults who score below Level 1 in both literacy and numeracy (%)	
1.6 Mortality from outdoor air pollution (deaths per million inhabitants)	2.6** Digital access (businesses using cloud computing services) (%)	3.6** Regional life expectancy gap (%) difference)	
1.7 Relative poverty rate (%)	2.7* Share of SME loans in total business loans (%)	3.7* Resilient students (%)	

\*Variables changed:

1.2 Median disposable income (level)

2.4 Gender wage gap at median

2.7 Loans borrowed to start, operate, or expand a farm or business (% age 15+)

3.2 Earnings gap for ages 15–24/25–54 (3.2a) and 55–64/25–54 (3.2b)

3.3 Childhood education and care, 3–5-year-olds (%)

3.4 Share of young people neither in employment nor in education & training, aged 15–24 (%)

3.5 Adult education level below upper secondary, 25–64-year-olds (%)

3.7 Students' socio-economic status measured by the PISA index of economic, social and cultural status (95th – 5th percentile)

4.1 Trust in government (%)

4.3 Women parliamentarians (%)

\*\*Variables dropped because of a lack of complete data: 2.6 and 3.6.

Source: (OECD 2018; OECD database; The Global Findex database, Child care Canada).

The study consists of the stages as follows:

1. Data normalisation. The original data are in different units, different scales, and have a different preferred direction of changes (the higher – the better/the worse). To make comparison possible, the data were normalised and rescaled to the range [1;10] using the min-max formula (Jayalakshmi, Santhakumaran, 2011):
  - a. for stimulants:

$$V = \frac{score - min}{max - min} \cdot (new_{max} - new_{min}) + new_{min} \quad (1)$$

For scale [1;10], it means:

$$V = \frac{score - min}{max - min} \cdot 9 + 1 \quad (2)$$

- b. for destimulants:

$$V = \frac{score - min}{max - min} \cdot (new_{min} - new_{max}) + new_{max} \quad (3)$$

For scale [1;10], it means:

$$V = \frac{score - min}{max - min} \cdot (-9) + 10 \quad (4)$$

*Score* is the level of the original characteristic for the country, *min* and *max* mean the minimum and maximum value of the original characteristic, and *new<sub>min</sub>* and *new<sub>max</sub>* mean the boundary values of the new scale, in this case, they are 1 and 10.

2. Data aggregation. The OECD proposal contains 24 variables, grouped into four pillars. After normalisation, the variables were treated as sub-indices. The four pillars were calculated as an arithmetic mean of the sub-indices. Then, the main index was calculated as an arithmetic mean of the pillars.
3. Results ordering. After calculating the indices, all countries were ranked from the best to the worst. The rankings were made for a total score and for the four main pillars.
4. Cluster analysis. Rankings show only an overall view. In fact, countries may cope better in some areas, and worse in others, which cannot be seen after averaging. A cluster analysis groups the countries in terms of their multidimensional similarity to each other. This shows which other countries the entity is most similar to, but also how much groups of countries differ from each other.

The Euclidean distance was the basis for measuring the similarity (Gatnar, Walesiak, 2004, p. 317):

$$d(x_i, x_k) = d_{ik} = \sqrt{\sum_{j=1}^p (x_{ij} - x_{kj})^2}, \quad (5)$$

where  $j$  is the characteristic for the objects  $x_i$  and  $x_k$ , and  $p$  is the number of characteristics.

The method used for the clustering was the Ward variant – a hierarchic method based on the minimum variance, where the algorithm in each step merges the objects in such a way as to obtain the smallest possible increase of variance within the group (Romesburg, 2004).

5. Groups comparison. The cluster analysis grouped the countries. The comparison between the cluster groups made it possible to show their strengths and weaknesses, and to identify the most inclusive countries.
6. Comparative analysis of Poland and the OECD average and median. The Polish scores were compared with the average and median values for the OECD. A look at the sub-indices level made it possible to indicate the areas for improvement for Poland.

## INCLUSIVE DEVELOPMENT IN THE OECD COUNTRIES

### – RESEARCH RESULTS

To examine the level of advancement of inclusive development in Poland, it was necessary to make the data comparable. Table 2 shows the results of the data normalisation to the scale [1;10]. At the most aggregated level (Total Score), the Nordic countries are at the top, with Norway in 1<sup>st</sup> place. Turkey closes the ranking, right after Greece and the USA, which had very low scores in the 1<sup>st</sup> and 4<sup>th</sup> pillars. Poland occupies the 18<sup>th</sup> position in the overall result, and even comes 8<sup>th</sup> in the 3<sup>rd</sup> pillar.

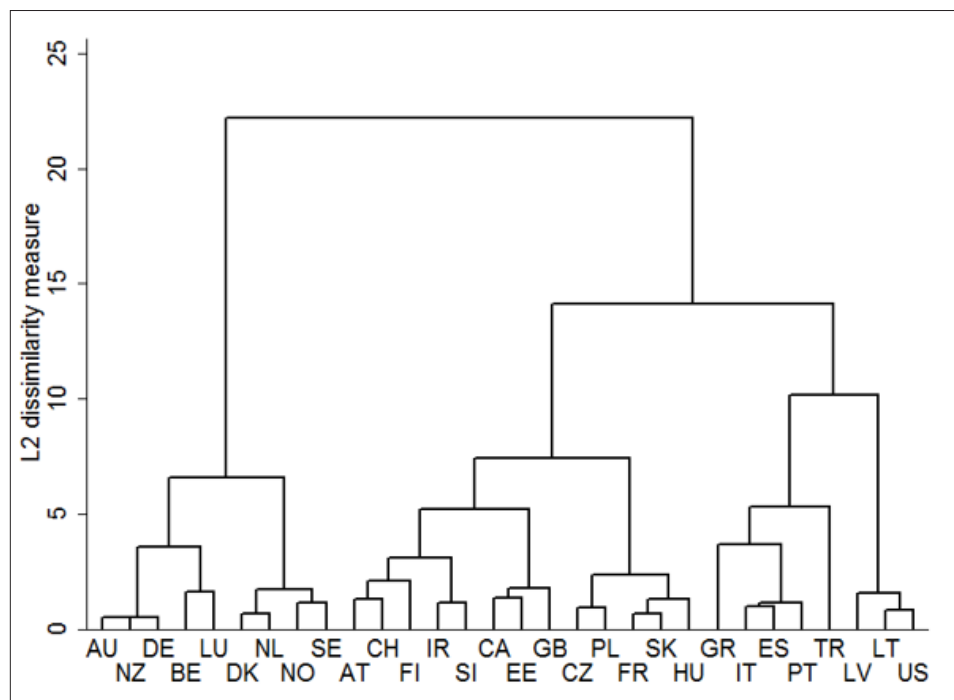
**Table 2. Scores after data normalisation and the OECD countries' positions in the rankings**

Country	Normalised Scores					Position in the ranking				
Name	Total Score	Pillar 1	Pillar 2	Pillar 3	Pillar 4	Total Score	Pillar 1	Pillar 2	Pillar 3	Pillar 4
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>
Norway	8.05	8.08	8.28	7.77	8.07	1	4	1	2	3
Denmark	7.62	7.65	7.20	7.74	7.89	2	5	3	3	4
Sweden	7.60	7.50	7.73	6.97	8.18	3	6	2	14	1
Netherlands	7.30	7.27	6.76	7.55	7.62	4	10	6	6	5

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>
Finland	7.13	8.20	6.20	7.21	6.91	5	3	10	9	10
Ireland	6.86	8.25	6.70	7.13	5.37	6	1	8	12	16
Belgium	6.81	7.34	6.75	5.58	7.58	7	8	7	24	6
New Zealand	6.53	6.15	6.00	6.82	7.14	8	21	11	15	7
Germany	6.51	6.57	5.88	6.50	7.09	9	16	12	18	8
Luxembourg	6.50	5.89	6.99	5.06	8.07	10	23	4	27	2
Slovenia	6.49	8.25	6.21	7.17	4.35	11	2	9	10	21
Switzerland	6.46	7.23	6.90	5.73	6.01	12	11	5	23	12
Canada	6.44	6.83	5.60	7.66	5.68	13	14	17	4	14
Australia	6.44	6.35	5.54	6.81	7.05	14	19	19	16	9
Austria	6.32	7.22	5.70	6.21	6.17	15	12	14	20	11
Estonia	6.08	6.52	5.01	8.17	4.61	16	17	25	1	20
Czech Republic	5.97	7.48	5.62	6.97	3.82	17	7	16	13	23
Poland	5.94	6.74	5.56	7.51	3.97	18	15	18	8	22
United Kingdom	5.93	5.20	5.65	7.60	5.26	19	26	15	5	17
Spain	5.55	6.19	4.86	5.43	5.73	20	20	26	25	13
Slovak Republic	5.52	7.07	5.25	6.25	3.50	21	13	23	19	24
France	5.46	7.32	5.50	5.73	3.29	22	9	20	22	25
Portugal	5.20	6.50	4.60	4.53	5.15	23	18	29	29	18
Hungary	5.19	6.14	5.40	6.14	3.07	24	22	22	21	28
Italy	5.10	5.66	4.61	5.17	4.97	25	24	28	26	19
Lithuania	4.88	3.28	5.88	7.17	3.18	26	30	13	11	26
Latvia	4.65	3.69	4.61	7.55	2.76	27	27	27	7	29
United States	4.62	3.48	5.40	6.51	3.08	28	28	21	17	27
Greece	4.30	5.57	3.88	5.06	2.71	29	25	30	28	30
Turkey	4.12	3.36	5.02	2.47	5.64	30	29	24	30	15

Source: own study.

Figure 1 presents the dendrogram made with use of the Ward method. The groups created on the basis of this dendrogram are included in Table 3, together with their characteristics. Visualisation of the main differences between the groups is presented in Figure 2.



**Figure 1. Dendrogram for OECD countries (the Ward method)**

Source: own study.

**Table 3. Cluster groups and their characteristic**

Cluster Groups		Average scores				
Group	Countries	Pillar 1	Pillar 2	Pillar 3	Pillar 4	Total
I	AU, NZ, DE, BE, LU, DK, NL, NO, SE	6.98	6.79	6.76	7.63	7.04
II	AT, CH, FI, IR, SI, CA, EE, GB	7.21	6.00	7.11	5.54	6.47
III	CZ, PL, FR, SK, HU	6.95	5.47	6.52	3.53	5.62
IV	GR, IT, ES, PT, TR	5.46	4.59	4.53	4.84	4.86
V	LV, LT, US	3.48	5.30	7.08	3.01	4.72
OECD	All countries – Average	6.43	5.84	6.47	5.46	6.05
	All countries – Min	3.28	3.88	2.47	2.71	4.12
	All countries – Max	8.25	8.28	8.17	8.18	8.05
	All countries – Range (Max – Min)	4.97	4.41	5.70	5.47	3.93

Source: own study.



The cluster analysis (Figure 1, Table 3) shows that Poland, in terms of inclusiveness, is most similar to the Czech Republic, but also quite similar to France, the Slovak Republic, and Hungary. It can also be observed that other cluster groups overlap to some extent based on the geographical and cultural area – the Nordic countries are together in one group, and most of the Mediterranean countries create a separate cluster, and also Great Britain, Ireland, Canada, Australia and New Zealand are in the same group. However, there are some exceptions, the most important one seems to be the US, which is not grouped together with other Anglo-Saxon countries.

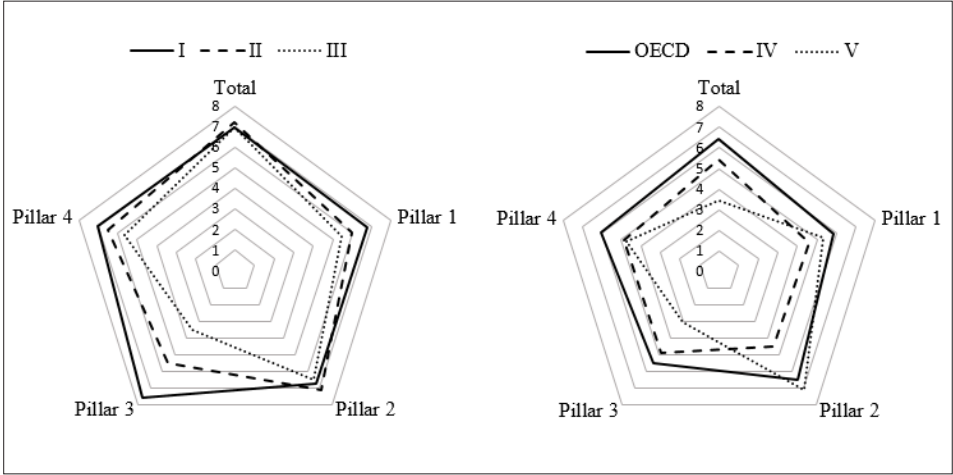


Figure 2. Group comparison in terms of pillars of inclusive development

Source: own study.

The pillar where countries differ the most (Figure 2), is the 4<sup>th</sup> one – Governance. The smallest variation can be seen in the area of the 2<sup>nd</sup> pillar – Inclusive and well-functioning markets. The most inclusive countries belong to Groups I and II – both groups have all scores above the OECD average. Group I has better results in the 2<sup>nd</sup> and 4<sup>th</sup> pillars, group II, in the 1<sup>st</sup> (Growth and ensuring equitable sharing of benefits from growth) and the 3<sup>rd</sup> (Equal opportunities and foundations of future prosperity). Group IV has all scores below the OECD average – these are the Mediterranean countries. Poor results can also be observed in Group V, where only 3<sup>rd</sup> pillar is above the OECD average. Group III (Poland’s group, together with other Central European countries, and France) has high results in the 1<sup>st</sup> and 3<sup>rd</sup> pillars, a bit worse, but still high scores in the 2<sup>nd</sup> pillar, and very low results in the 4<sup>th</sup> pillar.

Table 4 allows for a more detailed indication of the reasons why some pillars have high/low scores in Poland.

**Table 4. Inclusiveness scores for Poland and average and median values for the OECD**

Score for:	Pillar 1	1.1	1.2	1.3	1.4	1.5	1.6	1.7
Poland	6.74	7.55	8.71	8.65	4.17	2.98	7.05	8.06
OECD Average	6.43	4.99	7.14	6.99	6.95	6.31	6.01	6.63
OECD Median	6.65	4.10	8.16	7.57	7.90	6.52	6.53	6.79
Score for:	Pillar 2	2.1a	2.1b	2.2	2.3	2.4	2.5	2.7
Poland	5.56	7.24	1.39	5.64	4.83	7.83	9.49	2.52
OECD Average	5.84	4.27	4.22	6.63	6.53	6.90	7.50	4.86
OECD Median	5.64	4.00	3.83	6.91	6.46	6.87	7.97	4.79
Score for:	Pillar 3	3.1	3.2a	3.2b	3.3	3.4	3.5	3.7
Poland	7.51	6.21	6.53	7.21	6.26	7.84	9.72	8.77
OECD Average	6.47	5.81	5.14	4.70	7.37	7.49	7.76	7.03
OECD Median	6.82	6.24	4.94	4.68	8.26	7.87	8.13	7.42
Score for:	Pillar 4	4.1	4.2	4.3	Total Score			
Poland	3.97	4.90	1.19	5.81	5.94			
OECD Average	5.46	5.19	5.09	6.10	6.44			
OECD Median	5.51	5.01	4.73	6.17	6.20			

Source: own study.

In the case of the 1<sup>st</sup> pillar, the overall score is higher than the OECD average and median, and only sub-indices 1.5 (Life expectancy) and 1.4 (Bottom 40% / top 10% wealth share) are below these levels. The 2<sup>nd</sup> pillar is a bit below the average and median, but this area is very diverse internally. A very low score can be observed in the case of sub-index 2.1b (Labour productivity level), while 2.1a (Labour productivity growth) is higher by nearly 3 points than the OECD average, which represents a chance to catch up in the future. Sub-indices 2.2 (Employment ratio), 2.3 (Earnings dispersion), and 2.7 (Loans to start, operate, or expand a farm or business) are also below the average and median. At the same time, 2.5 (Involuntary part-time employment) has a score around 9.5, which is one of the best in the OECD (it is a destimulant, so a high score means the low intensity of the problem). Pillar 3 is higher by roughly 1 point than the average. In this case, only 3.3 (Early childhood education and care) is a weak point (the score is below the OECD average and median). The score for the 4<sup>th</sup> pillar is by roughly 1.5 points lower than the average and median. All components of this pillar are low, but sub-index 4.2 (Voter turnout) is the lowest.

## CONCLUSION

Inclusive growth and inclusive development have many definitions and, they are understood differently in the literature. However, it can be said without doubt that the idea of inclusive development is not about short-term supports for the poor, but about creating long-term conditions of equal opportunities. A lack of such opportunities is not only a moral issue, but also results in a waste of potential for countries to create their wealth and progress. Definitions and measurement of the inclusiveness still needs clarification, but regardless of the conceptual ambiguity, the phenomena of inclusiveness is worthy of study, to make comparisons between the countries and tracking their possible progress.

In this paper, from the existing propositions of inclusive development measures, the OECD's set of variables was adopted as the basis for the evaluation of Poland's position in comparison to other OECD countries. According to the results, Poland has a middle, 18<sup>th</sup> position in the overall ranking of 30 countries, and is part of a cluster group together with the countries from Central Europe, and with France. But Poland's scores are varied – indices related to the income issue (pillar 1) are quite good, as well as equal opportunities connected with education (pillar 3). Far weaker results can be observed regarding the functioning of the labour market (indicators connected with the level of labour productivity, employment, earnings), and access to loans for starting or expanding a business, but also life expectancy and wealth distribution, early childhood education and care, and, most of all, the whole governance area. These issues can be recommended as the areas for improvement for Poland in order to make the socio-economic progress more inclusive. For future research, it is also worth examining which variables are important for the countries with a similar level of advancement to Poland, because which determinants matter the most depends on the level of development the country is at.

## BIBLIOGRAPHY

- Ali, I., Zhuang, J. (2007). Inclusive growth toward a prosperous Asia: Policy implications. *Economics and Research Department, 97, Working Paper Series*. Mandaluyong City: Asian Development Bank.
- Berg, A., Ostry, J. D. (2011). Equality and Efficiency. *Finance & Development, 48*(3), 12–15.
- Child care Canada. Retrieved from: <https://www.childcarecanada.org> (2020.07.11).
- Corak, M. (2013). Income Inequality, Equality of Opportunity, and Intergenerational Mobility. *Journal of Economic Perspectives, 27*(3), 79–102. DOI: 10.1257/jep.27.3.79.
- Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., Hess, J. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. Washington D.C.: The World Bank.

- Eurostat website on social inclusion indicators. Retrieved from: <https://ec.europa.eu/eurostat/web/european-pillar-of-social-rights/indicators> (2020.07.13).
- Fields, G. (2001). *Distribution and Development. A New Look at the Developing World*. Cambridge, Massachusetts, and London: Russel Sage Foundation, New York, and The MIT Press.
- Fleurbaey, M., Blanchet, D. (2013). *Beyond GDP: Measuring welfare and assessing sustainability*. Oxford: Oxford University Press. DOI: 10.1093/acprof:oso/9780199767199.001.0001.
- Gatnar, E., Walesiak, M. (2004). *Metody statystycznej analizy wielowymiarowej w badaniach marketingowych*. Wrocław: Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu.
- Grimm, M., Sipangule, K., Thiele, R., Wiebelt, M. (2015). Changing views on growth: What became of pro-poor growth? *Poverty Reduction, Equity and Growth Network (PEGNet) Policy Brief No. 1*. Kiel: Kiel Institute for the World Economy.
- Hausmann, R., Pritchett, L., Rodrik, D. (2005). Growth Accelerations. *Journal of Economic Growth*, 10(4), 303–329. DOI: 10.1007/s10887-005-4712-0.
- Ianchovichina, E., Lundstrom, S. (2009). Inclusive growth analytics: framework and application. *Policy Research Working Paper, 4851*. Washington D.C.: The World Bank. DOI: 10.1596/1813-9450-4851.
- Jayalakshmi, T., Santhakumaran, A. (2011). Statistical normalization and back propagation for classification. *International Journal of Computer Theory and Engineering*, 3(1), 1793–8201.
- Klasen, S. (2010). Measuring and Monitoring Inclusive Growth: Multiple Definitions, Open Questions, and Some Constructive Proposals. *ADB Sustainable Development Working Paper Series, 12*. Mandaluyong City, Philippines: Asian Development Bank.
- Kuznets, S. (1955). Economic Growth and Income Inequality. *American Economic Review*, 45, 1–28.
- OECD database. Retrieved from: <https://stats.oecd.org> (2020.07.10).
- OECD (2015). *All on board: making inclusive growth happen*. Paris: OECD Publishing. DOI: 10.1787/9789264218512-en.
- OECD (2018). *Opportunities for All: a framework for policy action on inclusive growth*. Paris: OECD Publishing. DOI: 10.1787/9789264301665-en.
- Okun, A. M. (1975). *Equality and Efficiency: The Big Tradeoff*. Washington D.C.: The Brookings Institution.
- Pouw, N., Gupta, J. (2017). Inclusive development: a multi-disciplinary approach. *Current Opinion in Environmental Sustainability*, 24, 104–108. DOI: 10.1016/j.cosust.2016.11.013.
- Ranieri, R., Ramos, R. A. (2013). Inclusive Growth: Building up a Concept. *Working Paper, 104*. International Policy Centre for Inclusive Growth, Brasilia.
- Rauniyar, G., Kanbur, R. (2010). *Inclusive Development: Two Papers on Conceptualization, Application, and the ADB Perspective*. Mandaluyong City, Philippines: Asian Development Bank.
- Ripley, M., Hartrich, S. (2017). *Measuring Productive Employment: A 'How To' Note*. Geneva: ILO, July.
- Romesburg, C. (2004). *Cluster analysis for researchers*. North Carolina: Lulu Press.

- Sachs, I. (2004). Inclusive Development Strategy in an Era of Globalization. *Working Paper*, 35. Geneva: International Labour Organization. DOI: 10.2139/ssrn.908233.
- Samans, R., Blanke, J., Corrigan, G., Drzeniek, M. (2015). *The inclusive growth and development report 2015*. Geneva: World Economic Forum (Vol. 13).
- The Global Findex database. Retrieved from: <https://globalfindex.worldbank.org> (2020.07.10).
- van Gent, S. (2017). *Beyond buzzwords: What is "Inclusive Development"?* Synthesis report. Retrieved from <https://includeplatform.net/wp-content/uploads/2017/11/Final-Inclusive-Development-Report.pdf> (2020.07.10).
- UNDP (2019). *Human Development Report 2019. Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century*. New York: UNDP. Retrieved from: <http://hdr.undp.org/en/content/human-development-report-2019> (2020.07.15).
- WEF (2018). *The Inclusive Development Index 2018*. Cologne/Geneva: World Economic Forum.

### Summary

Inclusive development is a multifaceted conception, which makes it difficult to measure. Recent years, however, have brought some proposals for measuring this phenomenon, which opens up new opportunities to deepen the knowledge of how countries are doing in making their economic and social progress more inclusive. The aim of the paper is to examine the level of advancement of inclusive development in Poland in comparison to other OECD countries. The main hypothesis states that the development in Poland is less inclusive than the OECD average. The research covers data from 30 countries (OECD members, excluding the countries where such data were unavailable), and is based on the OECD's proposal of measurement. The study was conducted with the use of data normalisation into unified indices, taxonomic methods (cluster analysis based on the Ward hierarchic method), and comparative analysis. The results indicate areas of improvement for Poland. These are issues connected with the functioning of the labour market (the level of labour productivity, employment ratio, earnings dispersion), access to loans for starting or expanding businesses, but also life expectancy, wealth distribution, early childhood education and care, and, most of all, characteristics related to the area of governance, such as trust in the government, and voter turnout.

*Keywords:* inclusiveness, growth, development, economic and social exclusion, OECD.

## Rozwój inkluzywny – Polska na tle innych krajów OECD

### Streszczenie

Rozwój inkluzywny jest pojęciem wielowymiarowym, co czyni go trudnym do zmierzenia. Jednak w ostatnich latach pojawiły się propozycje pomiaru tego zjawiska, które otwierają nowe możliwości pogłębienia wiedzy na temat tego, jak poszczególne kraje radzą sobie w czynieniu ekonomicznego postępu bardziej włączającym. Celem artykułu jest sprawdzenie poziomu zaawansowania inkluzywności rozwoju w Polsce w porównaniu do innych krajów OECD. Za główną hipotezę przyjęto w artykule stwierdzenie, że rozwój w Polsce jest mniej inkluzywny niż przeciętnie w OECD. Badanie obejmuje 30 krajów członkowskich OECD (pominięto te, dla których dane nie były dostępne) i opiera się na propozycji pomiaru rozwoju inkluzywnego opracowanej przez OECD. W badaniu wykorzystano normalizację danych do jednolitych indeksów, metody taksonomiczne (analiza skupień w wersji

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*Słowa kluczowe:* inkluzywność, wzrost, rozwój, wykluczenie ekonomiczne i społeczne, OECD.

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<https://www.ur.edu.pl/universytet/nauka/czasopisma-universytetu-rzeszowskiego-punktowane-p/nierownosci-spoeczne-a-wzrost-gospodarczy>.

### **Procedura recenzowania i proces wydawniczy**

10. Redakcja czasopisma dba o właściwy poziom merytoryczny tekstów. Po wstępnej akceptacji tekstu przez redaktora naukowego wspieranego przez komitet redaktorów tematycznych artykuły przekazywane są do recenzji zewnętrznej. Wszystkie publikowane artykuły są recenzowane w trybie anonimowym według modelu double-blind review process (recenzent nie zna tożsamości autora, a autor nie otrzymuje informacji o osobie recenzenta). Ocena dokonywana jest z wykorzystaniem formularza blankietu recenzji dostępnego na stronie: <https://www.ur.edu.pl/universytet/nauka/czasopisma-universytetu-rzeszowskiego-punktowane-p/nierownosci-spoeczne-a-wzrost-gospodarczy>. Każda publikacja oceniana jest przez dwóch niezależnych recenzentów zewnętrznych spoza jednostki naukowej afiliowanej przez autora publikacji, których nazwiska są publikowane raz w roku – w ostatnim numerze czasopisma oraz na stronie internetowej (<https://www.ur.edu.pl/universytet/nauka/czasopisma-universytetu-rzeszowskiego-punktowane-p/nierownosci-spoeczne-a-wzrost-gospodarczy>).

11. Podstawą publikacji tekstu są dwie pozytywne recenzje. Autorzy artykułów są zobowiązani do uwzględnienia uwag recenzentów lub merytorycznego uzasadnienia braku akceptacji tych uwag. W przypadku rozbieżnych ocen recenzentów artykuł może być skierowany do publikacji pod warunkiem uzyskania pozytywnej opinii trzeciego recenzenta lub komitetu redaktorów tematycznych. W przypadku dwukrotnej negatywnej oceny tekstu redakcja wyklucza możliwość publikacji artykułu.

12. W dalszych etapach procesu wydawniczego artykuły zawierające metody statystyczne poddawane są korekcie statystycznej. W ramach prac realizowanych przez Wydawnictwo Uniwersytetu Rzeszowskiego materiał poddawany jest ponadto korekcie językowo-stylistycznej. O ostatecznej kwalifikacji do druku decyduje redakcja.

13. Cykl wydawniczy od momentu skierowania artykułu do recenzji do ukazania się publikacji wynosi 4–5 miesięcy.