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The knowledge-based economy: an integrated macroeconomic and management approach to the analysis of major forces affecting the evolution of modern economies²

FORWARD

This paper presents the introductory results of a broad analysis, with the aim of providing a personal and theoretical interpretation of how the different economic phenomena characterizing modern economies can be logically explained based on both macroeconomic theory and the evolution of management practices. The present work is based mainly on a critical analysis of academic literature, aimed at systematizing in a theoretical and meaningful way the evidence emerging from work partially available from other authors and that partially autonomously re-developed and processed by the author related to data concerning the evolution of income inequalities, economic growth and physical capital accumulation through the 20th and 21st centuries. Moreover, it has a secondary, although not irrelevant according to the author, goal of providing a short review of the theoretical developments of different schools of thought present in economic theory as well as of attempting partial integration of those approaches and of evaluating their usefulness in explaining the concrete phenomena registered in modern economies. The present article focuses in particular on checking the elements and arguments which can lead to interlinking and interpreting as two parts of a whole, on the one hand, the more general phenomenon of high income inequalities, low rates

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of economic growth, slower physical capital accumulation and of the renewed emergence at present of a regime of growth strikingly similar to that formerly occurring through the 20th century until the end of the Second World War, and, on the other hand, the observed in the literature emergence of the increased relevance of knowledge, human capital and innovation. Considering the availability in the literature of two different points of view – one underlining the completely novel nature of the knowledge-based economy phenomena, and the other focusing more on long term tendencies registered in economic system development, and stressing their relative novelty – the aim of the present study is then to illustrate how the adoption of a third approach integrating both approaches can be justified. Through the integration of mainstream and heterodox economic theory, it is, according to the author, possible to confirm the thesis that the same forces and mechanisms can logically explain both the affirmation of different phases of economic system development through the whole of the 20th and 21st centuries, as well as the differences, similarities and peculiarities of the knowledge-based economy in comparison to former phases of economic system evolution.

After a short review of the phenomena and different positions available in the literature, this paper presents a set of arguments which support the point of view that these two apparently self-excluding points of view available in the literature can be integrated. Then the author presents elements, mainly based on the theoretical approaches of Keynesian and non-mainstream authors, constituting the basis of the first arguments on the proposed theoretical explanation common to both present and future papers dedicated to the same issue.

The introductory conclusions of this paper consequentially lead to the representation of the knowledge-based economy as a phase of development of an economic system characterised by high income inequalities, low profitability of investments in physical capital and low rates of both capital accumulation and economic growth. Although some considerations of this kind are sketched in the conclusions of the present article, the detailed analysis of how such a categorisation can be useful to explain the typically observed phenomena of financialisation, servicisation, increased meaning of human capital, technical progress, knowledge and innovation in the present context, as well as its influence on management method evolution and their further examination, has been postponed to a second phase of the analysis complementing the one presented here. It needs to be pointed out that the introductory conclusions in this paper and the idea that the same forces are actually governing both the emergence of higher income inequalities, lower physical capital accumulation and lower economic growth rate, as well as the reorientation of the economy toward intangible assets leading to the increased relevance of knowledge, human capital and innovation, are, according to the author, the true novel features characterizing the proposed theoretical interpretation of the main phenomena affecting the current phase of development of modern economies, as argued here. This can moreover be considered one of the main

features supporting the usefulness of this work. As far as the author is aware, such an integrated interpretation of both the present income inequalities, economic growth and physical capital accumulation dynamics and those phenomena more strictly typical for knowledge-based economy is not yet available in the literature. This paper can thus be considered as useful in reducing the divide between the studies of more traditional and old styled income inequalities, income distribution and economic theory and those more focused on new trends and current peculiarities of the knowledge-based economy.

KNOWLEDGE-BASED ECONOMY: COMPLETE NOVELTY OR RE-EMERGENCE OF PAST TRENDS?

Many authors refer to modern economies as knowledge-based, underlining the increased relevance of knowledge, information, high skill levels and general human capital and innovation in advanced economies as sources of both economic growth and development at the aggregate macroeconomic level (OECD, [http](http://); OECD, 1995; Godin, 2006; Jabłonski, 2007; 2008; 2011; 2012), as well as relevant sources of comparative advantage over competitors or crucial factors of success at the single enterprise level (Czerniachowicz, 2003; Dzikowska, Gorynia, 2012; Gallon et al., 1995; Kozioł, 2009; Kunasz, 2006; Mikuła, 2006; Mikuła, Pietruszka-Ortyl, 2008; 2010; Pietruszka-Ortyl, 2005; 2006; 2008; 2018; Oczkowska, 2012a; 2012b; Oczkowska, Śmigielska, 2018). As noted by some authors (Cf. e.g. Kelly, 2001; Godin, 2006; Mikuła, 2006), the knowledge-based or new economy concepts are linked to the initial idea of the post-industrial economy, through a progressive evolution of the concept and accentuation in further definitions and theoretical elaborations of the increased roles that intangible assets, information and the services sector are playing in modern economies, in contrast to the former industrial era, or “old economy”, in which tangible assets and material and durable goods production were much more dominant (Mikuła, 2006). Having a deeper insight into the rise of the term and interest in the knowledge-based economy by the mid-1990s, however, it needs to be understood that its popularity can be partially seen as connected to its nature as a rhetorical term, an umbrella concept or a buzzword (Godin, 2006). It can be underlined that – similarly to such concepts as the National System of Innovation, Knowledge Society, Information Economy or New Economy – it was adopted and initially popularised by OECD officers and scholars engaged in its activities as an instrument to somehow increase the focus of both scholars and policy-makers on the relevant role of human capital, technical progress and, more broadly speaking, knowledge, which were perceived to contain, according to recent theoretical development, an element giving rise to economic growth and/or improvements in the performance of economic systems (Godin, 2006). Without negating the role of such factors in generating economic growth, which dates back to the very birth of economics as a separate academic discipline (Cf. i.e. Smith, 1776

with Galor, 2009; 2011; Galor, Moav, 2004), such a switch of interest, according to the author, can be seen as a tendency much in line with the evolution in mainstream economic thought and the progressive transition from exogenous growth models to endogenous growth theory. The endogenous models developed by various authors starting from the 1980s (Cf. e.g. Aghion, Howitt, 1992; 2007; Lucas, 1988; Mankiw et al., 1992; Romer, 1986; 1989; 1990; 1994) attempted to address the perceived issue of the unsatisfactory explanatory power of exogenous neoclassical growth theory (Cf. e.g. Solow, 1956; 1970; Sala-i-Martin, 1990a; 1990b) on the basis of which forces driving long-term growth would rely upon such traditional factors as labour, capital and other tangible assets employed as inputs in production endowment evolution alone (Godin, 2006; OECD, 1995). This led to the variously conceived introductions of knowledge as an additional factor positively affecting the economic growth dynamics in endogenous growth theory models (OECD, 1995), and the emergence of interest in knowledge management at management science level, already foreshadowed by some authors based on its similarity to the knowledge-based economy theoretical construct (Godin, 2006).

Alongside with the increased role of technical progress, human capital, innovation and knowledge, however, much more recent interest in the steadily increasing income inequalities, which were shown as to be some of the significant features characterising developed economies since the 1970s, has arisen since the publication of the work by Thomas Piketty (2014a). This led, in turn, to a revival in interwoven studies of income distribution as a relevant element which has to be taken into account in the study of the evolution of economic systems within a wider historical framework of analysis.

The author, as well as many other scholars, is rather critical about the economic theory instruments upon which such an approach relies. Although not sound in its specific formalisation, as proposed by Piketty (2014a), the same elements gave rise to the suggestive idea that, on the basis of observed trends in income and wealth distribution dynamics, the current phase of economic history and economic system evolution can be rather seen as a return to formerly prevailing trends, already experienced on a global scale since the industrial revolution – or even earlier if Piketty's view of the three fundamental laws of capitalism and natural value of interest or return rate is assumed to hold (Cf. Piketty, 2014a; 2014b; 2014c with Milanović, 2013; 2014; Kunkel, 2014; Galbraith, 2014; Homburg, 2014) – up until the beginning of the 20th century. This, then, led to the emergence of a slightly different approach to the present state of development of economic systems, somewhat alternative in comparison to the knowledge-based economy focus, which prevailed until very recently. Rather than the interpretation of modern economies as a completely new state or phase of economic system evolution into the knowledge-based economy, the new evidence which emerges from Piketty's work on tax income statistics rather supports the thesis according to which present trends can be interpreted only as relatively novel. The conditions currently registered differ from

those which were observed during the former “exceptional”, according to Piketty’s interpretation, economic system phase of development which characterised the so-called “golden age” of market economies, and it overlaps with the concept of the industrial era or old economy as it appears in knowledge-based economy literature (Cf. Piketty, 2014a; Kunkel, 2014; Miękka, 2006). They are, however, strikingly similar to those experienced in former periods of economic history. According to Piketty’s approach to economic system evolution on the basis of income inequality trends and his fundamental laws of the theoretical framework of capitalism analysis, as a result, the present phase of economic system evolution should be seen rather as a return to “normal” conditions. It has, then, to be pointed out, that in present so-called knowledge-based economic systems development phase – identically to what happened during the major part of market economies history (Kunkel, 2014; Piketty, 2014a; 2014b; 2014c; Milanović, 2013) – the rates of return on capital or wealth are higher than the income growth rate and thus support both the occurrence of high capital – or rather wealth as described in more detail in the forthcoming paper – to income ratios as well as deepening of the inequalities in income and wealth distribution as those currently observed and noted by Piketty.

On that basis, it has to be underlined that in recent economic literature two different points of view exist accounting for the main features of modern economies. According to the first and most recent one,³ the conditions currently experienced in modern economies are just a return to typical tendencies which characterised market economies and can be assumed to normally prevail, with the exception of extraordinary periods, as the only one ever actually experienced which lasted from the end of the Second World War until the end of the 1970s, when more extended public interventions and/or the shocks linked with First and Second World Wars led to lower wealth to income ratios and lower income inequalities (Cf. Piketty, 2014a; 2014b; 2014c; Kunkel, 2014). According to the second point of view, on interpreting the features of modern economies – which is more in line with recent, but still older than Piketty’s contribution, and revival of interest in income distribution and its influences on economic system evolution, knowledge-based or new-economy literature – conditions characterizing modern economies have to be considered, instead, as absolutely novel and should be analysed through completely new, or at least significantly different, approaches to economic system functioning (Cf. i.e. Lucas, 1988; 2004; Kunasz, 2006). Before adhering to just one of those apparently mutually excluding theses, however, it is worth noting that both approaches or points of view can be integrated and intermingled. Such an integration requires a review of both earlier analyses by the author and the contributions of other scholars not directly adhering to any of the two formerly presented points of view or to the mainstream school of economic thought.

³ This was initially proposed by Piketty and somewhat adopted by some scholars who appreciated his contribution to the re-emergence of income distribution and economic development studies in more traditionally oriented terms (Cf. e.g. Kunkel, 2014; Galbraith, 2014; Homburg, 2014; Krugman, 2014a; 2014b; 2014c; 2014d; Milanović, 2002; 2011; 2013; 2014; Saez, Zucman, 2014).

A PROPOSAL FOR INTEGRATING THE PRESENTED POINTS OF VIEW

It must be noted first that, together with the observed increase in the wealth to income ratio and income inequalities registered by Piketty (2014a), as per an earlier analysis (Valente, 2016a), the tendencies registered in income distribution evolution⁴ in the main market economies during the whole of the 20th and 21st centuries were paralleled (Figure 1) by similarly paced, but opposite in direction, tendencies in GDP growth rate and capital accumulation rates, where reductions can be considered as an additional and very relevant feature differentiating the currently prevailing economic environment from the much more stable regime of economic growth and capital accumulation prevailing in the 1950s–1970s during the former phase of economic system evolution of the so-called industrial era or golden age of market economies.

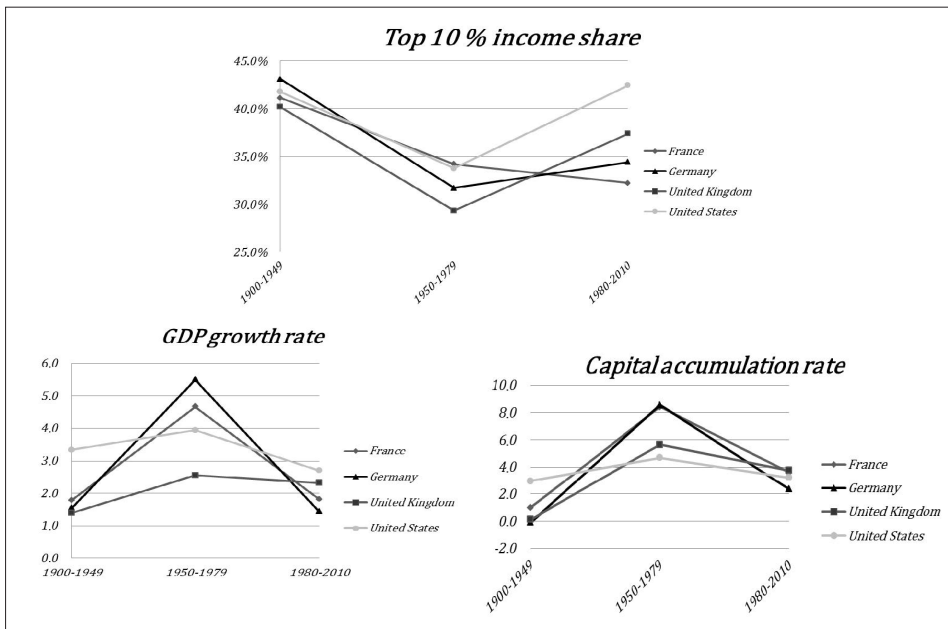


Figure 1. Relevant macroeconomic trends

Source: own study based on Piketty (2014a) and Maddison project datasets (Cf. Valente, 2016a).

As previously argued in other papers (Valente, 2016a; 2016b), all opposing that assumed by both Piketty (2014a; 2014b; 2014c) and mainstream endogenous growth theorists, who mostly exclude or do not take into sufficient account that

⁴ Illustrated in the following chart presenting the share of the wealthiest 10% of members in total income. Trends observed in France seem to be just an apparent outlier due to averaging problems derived by higher income inequalities registered during the 1960s (Cf. Valente, 2016a).

income distribution can relevantly affect long term GDP growth rate and/or physical capital accumulation (Garegnani, 1962; 1983; 1992; Petri, 2001; 2003; 2011a; 2011b; 2013; 2015; Setterfield, 2003; 2014), this tendency can be seen as worth noting and as relevant when dealing with the assessment of the main forces guiding the evolution of modern economies. In theoretical approaches alternative to the neoclassical or mainstream ones, income distribution evolution can be seen as an additional source of endogenous economic growth through the effects it can both be assumed to exert and be empirically demonstrated to historically exert throughout the 20th and 21st centuries on investments, physical capital accumulation and GDP growth dynamics (Cf. Valente, 2016a; Keynes, 1936; Onaran, Stockhammer, 2001a; 2001b; Onaran, Galanis, 2013; Lavoie, Stockhammer, 2012; 2013). As mentioned above, the very same knowledge-based economy concept development and popularity can be connected, moreover, with the fact that the new generation of mainstream economists have been mostly dissatisfied with former mainstream exogenous growth models, which considered traditional factor endowment – and thus forces affecting economic growth – as determined outside the growth models (i.e. Solow, 1956; 1970; Sala-i-Martin, 1990a; 1990b). In recent works some non-mainstream authors have already stressed how the lack of soundness of traditional mainstream exogenous growth models can be partially linked to the specific assumptions upon which the mainstream neoclassical approach is based and which were by no means rejected in further developments by neoclassical endogenous growth model theorists (Petri, 2001; 2003; 2013; Setterfield, 2014). It is worth mentioning that, as shown in the next section, based on alternative theoretical approaches, which seem more in line with the evolution of the main variables taken into account during the whole of the 20th and 21st centuries (Cf. Valente, 2016a), the factors analysed in traditional neoclassical exogenous growth theory can be considered far from being exogenously determined. They can be argued, indeed, to be path-dependent upon their former values through different mechanisms linking them either or both to aggregate demand evolution and income distribution as per the Keynesian or mixed Keynesian-classical approach (Cf. e.g. Setterfield, 2003; Onran, Stockhammer, 2001a; 2001b; Onran, Galanis, 2013). Such factors can thus be taken into account as additional sources of endogenous growth on the same level as knowledge, innovation, human capital accumulation and technical progress. As already indicated in the literature (Setterfield, 2014; Petri, 2001; 2003; Valente, 2016b), this leaves it wide open for both theoretical developments and empirical studies, which could focus on bridging the gap between economic growth models and empirical studies addressing the role of neoclassical endogenous economic growth sources alone and those stressing just that played by heterodox endogenous – or more properly path-dependent – growth sources not taken into account in traditional neoclassical and mainstream studies. Such an attempt leads, according to the author, to the emergence of a wider picture for both the forces governing the peculiar present phase of economic system

development – the knowledge-based economy – as well as the long-run differing historical phases of economic development during the course of the whole of the 20th and 21st centuries.

It is worth noting, moreover, that the observed integrated explanation of both the peculiarities characterizing the knowledge-based economy as well as its similarities and differences in comparison to former phases of economic development, accounts for other relevant phenomena characterizing present day economies as well. Financialisation, servicisation and the evolution of management methods registered since the 1970s can be included and seen as part of this wider picture. They can be explained relying on the same arguments which link the increased relevance of knowledge, human capital and innovation, with increased income inequalities, economic growth and capital accumulation stagnation in current economies. It seems worth moving to the merit of the current paper, which shows why increases in income inequalities and capital accumulation along with economic growth stagnation can be seen as relevant factors at the core of the integrated approach to the evolution of present economic systems, as proposed by the author and discussed both in this and further studies.

A THEORETICAL EXPLANATION OF THE MECHANISMS INTERLINKING INCOME INEQUALITIES, CAPITAL ACCUMULATION AND ECONOMIC GROWTH EVOLUTION

To better explain the point of view stated by the author, it is worth focusing on how the integration of mainstream growth models⁵ with non-mainstream models⁶ can be useful in bringing together the novel character of some features characterising economies today – from the knowledge-based economy point of view – and how the present situation compares to former phases of economic history and economic system development, according to Piketty and other authors more focussed on the income distribution evolution point of view.

It needs to be pointed out that in opposition to the traditional mainstream exogenous growth model, according to a Keynesian approach, rises in income – as well as wealth, as shown by Piketty (2014a), based on the argument that income from capital was systematically less evenly distributed during the whole period of economic history of market economies than income from work in whatever country and period – distribution inequalities can be expected to exert a durable effect on both short and long

⁵ In particular those stressing the relevance of human capital, technical progress and general knowledge and innovation as sources of endogenous growth.

⁶ In particular those based on Keynesian or Classical and Keynesian approaches, and supporting the introduction of path-dependency of economic growth, physical capital accumulation and income distribution evolution from the formerly registered value of those variables as an additional source of endogenous growth.

term evolution of production and income levels, employment and capital endowment. According to the multiplier effect, it is worth noting that since the wealthier members of society have a lower propensity to consume and a higher propensity to save in comparison to less well-off members, increases in income distribution inequalities have, in the short term, a negative effect on consumption demand, reducing the value of the multiplier and thus giving rise to total aggregate demand levels that are lower than those associated with the same amount of autonomous effective demand, which could be expected to be observed if such an income distribution change was not experienced (Cf. Keynes, 1936). Both directly and indirectly generated multiplicative effects of reductions in effective demand connected with income distribution inequalities increase, lead thus to a reduction in sales opportunities, production levels in enterprises and income levels at the aggregate level, giving rise to reductions in both total profits and total wages in the economy, as clearly illustrated by Keynes (1936) on the basis of his well-known paradox of thrift.

Secondly – in opposition to mainstream models in which long term capital demand is assumed to be limited by capital supply⁷ and thus income inequalities rises are expected to exert positive long run effects on capital accumulation, through larger and/or cheaper availability of financing sources, and by this mean of economic growth – Keynesian models introduce variously conceived acceleration mechanisms. Through them, investments at the single enterprise level, capital accumulation rate and capital endowment in a given economic system can be in turn be expected to be rather positively linked in both the short and long term with sale opportunities improvements, increases in aggregate demand and volumes of production which can be expected to derive from reduction of inequalities in income distribution. According to this approach, increases in income inequalities can be expected to have negative effects on investment, capital accumulation, capital endowment and economic growth, leading – through the positive dependence of income inequalities on the level of unemployment, which, based on mixed Keynesian and classical theory assumptions, can be expected, in turn, to be negatively linked to lower physical capital accumulation and economic growth stagnation – to further depending of the initially arising disparities in the distribution of income⁸. As described in a former

⁷ On the basis of long term Say's law acceptance and implicit rejection of any long term effect of the paradox of thrift, which leads mainstream author to assume that income inequalities rises will lead to increases of average propensity to save (Cf. Sala-i-Martin, 1990a; 1990b with Petri, 2011a; 2011b; 2013; 2015).

⁸ The above synthetically recalled theoretical argumentation, although much more articulated in reality, can be, for the sake of simplicity, summarized in the following statements. The lower the capital accumulation, economic growth rate, investment and aggregate demand is, the lower the expected level of production and the higher the unemployment in a given economy. Due to its negative effects on workers and trade union bargaining power – as well as due to the negative effects which can eventually be expected to logically show up in labour productivity based on lower investment, capital accumulation rates, and thus the possible emergence of lower per worker capital endowment – higher unemployment will lead to lower wages, labour share and increases in the

paper (Valente, 2016a) and confirmed based on a similar approach by other authors both at the single country level and when considering the growth performance of a wider set of countries accounting for as much as 80% of world GDP (Onran, Stockhammer, 2001a; 2001b; Lavoie, Stockhammer, 2012; 2013; Onran, Galanis, 2013), such an approach seems in line with the evolution of income inequalities, economic growth and capital accumulation during the whole of the 20th and 21st centuries. It justifies both lower inequalities in income distribution, higher capital accumulation and economic growth rates experienced during the “exceptional” and completely unexplained by Piketty’s so-called fundamental laws of capitalism (Kunkel, 2014) industrial era or “golden age” of the market economies phase of development of economic systems that took place between the end of the Second World War and the 1970s in the main market economy and on a global level, as well as the higher income inequalities, lower capital accumulation and economic growth rates periods experienced at the beginning of the 20th century and since the 1980s in the main market economies.

The main difference in such an approach, in comparison to mainstream ones, and the most significant and potentially controversial element of the proposed interpretation of economic system evolution relies solely on the functioning of an acceleration mechanism assumed to be at work. It links lower short term consumption demand, which can be logically assumed to derive from increases in income inequalities based on whatever theoretical approach, to lower investments and capital accumulation. Through the hypothesis of positive dependence of the economic growth rate on capital accumulation, which has been since the very start of economic thought broadly accepted by economists of almost every known orientation, it, as a matter of fact, leads to the result that income distribution plays a decisive role in the determination of the long term evolution of the economic system. It must be remembered that these arguments lay at the core of the explanation – proposed in the forthcoming paper – of why the increased relevance of human capital, technical progress, knowledge and innovation, financialisation and increases in intangible asset relevance in the determination of company market value and management method reorganisation can be observed in present day economies and become well-known and characteristic features of the knowledge-based economy or the current phase of development of economic systems. It seems worthwhile to briefly illustrate why an acceleration mechanism can be expected to occur in an economic system on a general basis, stressing how the existence of such a mechanism can lead to a different interpretation of the main knowledge-based economy features, which will lay at the centre of further studies into the forces at work in the present phase of economic development.

differences between pay for qualified and unqualified workers in the considered economic system, finally leading through such a mechanism to further increases in the initial inequalities in income distribution (Cf. i.e. Setterfield, 2003; Onran, Stockhammer, 2001a; 2001b; Onran, Galanis, 2013).

ACCELERATION MECHANISM AND KNOWLEDGE-BASED ECONOMY AS A PHASE
OF ECONOMIC DEVELOPMENT CHARACTERISED BY LOW PROFITABILITY
OF INVESTMENTS IN PHYSICAL CAPITAL

The positive dependence of investment and/or capital accumulation upon increases in effective demand and reduction of inequalities in the distribution of income – the accelerator concept – is variously justified in Keynesian literature. The different elaborations can be categorised in three separate, although interlinked, sets of arguments.

The first and oldest one derives from the idea already introduced by Keynes (1936), according to which any capital investment must sooner or later finish in a capital disinvestment, so that capital accumulation and investment demand cannot be seen as independent of the consumption demand and consumption acts found in a given economic system. Due to the conventional nature of the propensity to invest, and expectation of future profits upon which the investment demand curve relies, according to Keynes (1936), whatever decrease (or increase) of propensity to consume, which is considered permanent by entrepreneurs, will affect negatively (or positively) not just consumption but also investment demand. In other words, when the propensity to consume increases (as when inequalities in income distribution are reduced) the profit expectations of entrepreneurs, on which their investment decisions depend, will be higher and thus will lead to the realisation of larger investment amounts whatever will be the interest rate prevailing in the economy. When the average propensity to consume is permanently reduced (as is the case when inequalities in income distribution increase), companies face more difficulties in keeping the same level of sales due to the aggregate demand reductions, so that their profit expectations and willingness to invest will decrease.

A second more complex set of arguments supporting the functioning of an acceleration mechanism in the economic system is based on the integration of the work of different authors (Badhuri, Marglin, 1990; Onran, Stockhammer, 2001a; 2001b; Onran, Galanis, 2013; Lavoie, Stockhammer, 2012; 2013; Setterfield, 2014), with considerations inspired by Kalecki (1942; 2013a; 2013b) and more relevant autonomous developments by the author. In the face of these arguments, not only does the willingness to invest rise or become reduced together with increases or decreases in effective demand and propensity to consume, but the availability of own funds and the possibility to finance investments through credit is affected by these two factors as well, due to their effects on both the total level of profits and the profit rate. In such an approach, the initial increases in wages or reductions in income inequalities lead to increased sales opportunities for companies due to aggregate demand increases. This in turn can be logically argued to lead to:

1. increases in sales volumes and revenues;
2. increases in productive capacity utilisation rates and lowering of the unitary costs of production of goods in the case of idle capacity – in accordance with the

arguments presented below and constituting the third type of justification for the existence of an acceleration mechanism present in the literature – was initially available and/or economies of scale take place in the production process;

3. reduction in the storage of unsold goods and products;
4. possibility to increase sale prices;
5. shortening of the time between production cost payments and revenues from sales perception and thus a reduction of time during which the financial assets of the enterprise remain locked in the production process as well as a decrease of own or third party funding required to finance the realisation of the same volume of production;
6. the existence of all the above phenomena at the same time.

As all these factors either positively affect the total amount of profits, the profit rate or both of them at the enterprise level, the positive dependence of capital accumulation (and thus economic growth) upon initial increases in effective demand derived from income inequality reduction can be argued to exist through such a channel, due to the fact that the investment decisions of entrepreneurs can be logically expected to be positively linked with higher profits (Ornan, Galanis, 2013; Lavoie, Stockhammer, 2012; 2013)⁹.

The third and final way through which the acceleration mechanism can be argued to exist is based on the considerations of Keynesian authors (Garegnani, 1962; 1983; 1992; Petri, 2001; 2003; 2013; 2015), through the positive dependence of capital accumulation upon the capacity utilisation rate, and the dependence of the capacity utilisation rate upon aggregate demand level and income inequality variations, relying on the assumption that productive capacity at both the company and aggregate levels is normally not fully utilised¹⁰. It can indeed be observed that increases in aggregate demand, sales and production levels lead to:

⁹ It seems worth noting that such a mechanism has already been demonstrated to empirically hold in the much more restrictive cases of wage rises, profit and capital accumulation increases, wage reductions, profit and capital accumulation contractions, even when the effects of wage variation on exports are taken into account (Ornan, Stockhammer, 2001a; 2001b).

¹⁰ Some of the reasons according to which such an assumption can be true were already discussed in former papers by the author and other Keynesian economists (Cf. Valente, 2014; 2016a; 2016b; 2018; 2019; Garegnani, 1962; 1983, 1992; Petri, 2013; Lavoie, Stockhammer, 2012; 2013; Bhaduri, Marglin, 1990; Ornan, Stockhammer, 2001a; 2001b). To provide a short recap and to underline some additional elements, based on both macroeconomics and production management and planning theory and practice (Cf. i.e. Brzeziński, 2000; 2002; 2013; Pająk, 2011; Szatkowski, 2014), which can support such a hypothesis, it can be stressed that:

– due to the very nature of durable goods constituting fixed capital, when economic growth and sales opportunities can be assumed to act as they normally do in an economic system, new plants and machinery in their first phase of utilisation will be available and utilised below the maximum level of capacity utilisation (they should serve to realise a larger amount of production when operating at maximum levels), while due to the same reasons the plants and machinery employed in the production process of goods whose life cycle is in its first or final phase will also be not fully

1. increased consumption of fixed capital and increased wear and tear of existing machinery and equipment;
2. shortening of the amortisation time linked with the faster pace at which the initial machinery and equipment purchasing costs – as well as other fixed costs – will flow back to the company in the form of revenue due to the higher volumes of production sold in a given unit of time;
3. reductions in reserves of idle capacity, which due to the nature of master production scheduling with the most profitable rates of capacity utilisation level for continuous (or semi-continuous) mass production of standardised goods can be assumed to be always available and needed at single company level to systematically absorb, seasonal production peaks, unforeseen variations in sales volumes and production needs, eventual deviations of actual time of production process realisation in com-

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- utilised (in the central phase of a product life cycle the production levels will be much higher), so that these kinds of plants and connected idle capacity at the aggregate level can be always assumed to exist in a given economic system;
 - reserves of productive capacity will systematically show up even in the continuous production processes of standardised goods produced in mass (which, as per production scheduling management and production planning theory and practice, is the kind of productive process characterised by the highest level of capacity utilisation possible, while capacity utilisation will be lower for whatever process organised not in mass on dedicated and exclusive production lines and realised on the same line or work station on which the productive processes of other goods or varieties of the same goods are realised, causing machine and work station set-up times to show up during the process and reducing the actual time the work stations are employed in realising production, thus decreasing the capacity utilisation rate), due to the existence of seasonal peaks of production and other factors described in point 3 of the following sentence in the main text;
 - idle capacity can be normally assumed to exist due to the willingness of companies to maintain extra capacity in comparison to normal foreseen needs of production as per the monopoly degree or power arguments discussed in point 4 of the next sentence in the main text;
 - due to the fact that, with the exception of plants and sectors in which production is realised 24 hours a day, 7 days a week, the same production master schedule, plan of production and scheme of workloads at different working stations – even if, as in reality it never happens in practice, it means prescribing full utilisation of capacity – can in reality be realised at a faster pace, generating larger volumes of products through recurring to the very easy trick of overtime and extension of plant operation days. To keep the reasoning easily understandable even to readers not familiar with production planning it can be, indeed, argued that the same master production schedule, setting workloads, capacity utilisation at single work station levels and volume of production for the whole production line per given period of reproducibility of the schedule in an automotive factory, and characterised, for example, by that the production of 1000 cars every two eight-hour work shift will lead to a total output of 5000 cars per week in a plant operating two shifts per day, five days per week. It, however, leads, without any change in the schedule or in the quantity of the work stations, machinery and equipment required to realise it, to the production of 10,500 cars per week with an increase of 110% of production volumes, if the plant starts to operate three shifts per day, seven days per week. Taking into account how actual production processes are organised at a single enterprise level, the very concept of full capacity utilisation, implicitly assumed to exist in the mainstream macroeconomic approach and central to many of the conclusions typical for such a school of thought, which stress the limitations which increase in aggregate demand due to this factor, seems to the author to have become an abstraction.

parison to planned time norms, as well as to avoid problems in the synchronisation and harmonisation of output per unit of time at a single work station level, and to achieve better reproducibility of master production schedules and workloads in production process planning (Brzeziński, 2000; 2002; 2013; Szatkowski, 2014);

4. weakening of the degree of monopoly or monopoly power of companies operating in sectors experiencing increased sales volumes, which, in an extreme simplification of Kalecki's (2013a; 2013b) reasoning related to the concept, enterprises can be assumed to consider to be profitable to maintain the ability to increase production levels when demand for the products rises, and to defend themselves from the entry of new competitors into the market, which can be expected to be the more probable the larger the increases in unitary sale price and the greater the gap between production capacity availability and demand level.

All these elements can be seen as signals that may lead to an increased willingness to invest in expanding the productive capacity at the company level and thus lead to higher physical capital accumulation and increased economic growth. Such a conclusion can be argued to be even more true if, as per the first set of arguments justifying the existence of an acceleration mechanism, the increase in the capacity utilisation rate at any moment is due to increases in effective demand, which can be both observed and perceived as long-lasting as those supported by the propensity to consume increases and income inequalities reductions, and enterprises are registering increases in the availability of their own funds and/or increased chances to obtain access to third party credit due to profit and revenue increases, in accordance with the second set of arguments supporting the acceleration mechanism formulation available in the literature.

The centrality of the arguments for the existence of an acceleration mechanism for the interpretation of the observed tendencies in economic system evolution, as described above, seem very clear for the author. Indeed, based on the theoretical arguments discussed above, the phases of high income distribution inequalities, lower economic growth and lower capital accumulation rate registered between the start of the 20th century and the end of the Second World War, as well as the current phase of development of economic systems since the end of the 1970s can be interpreted, on the basis of the accelerator concept, as periods during which investment in physical capital and thus its accumulation was less profitable in comparison to the extraordinary period of higher GDP growth, higher rate of capital accumulation and lower inequalities in the distribution of income registered in developed economies from the 1950s until the end of the 1970s.

CONCLUSIONS

The transition from the industrial or golden era of market economies to the progressive affirmation of the present knowledge-based economy can be seen, according to the arguments presented here, as a phenomenon of lower profitability

of investments in tangible assets and physical capital, both in companies and at the aggregate level, which through the direct mechanisms which link changes in physical capital accumulation with variations in the same direction of GDP growth rate, and the direct and indirect ones linking lower GDP growth and lower capital accumulation with rises in income inequalities, lead to the emergence of path-dependency mechanisms reinforcing the initial variations registered in the 1970s.¹¹ This intuition, according to the author, paves the way to the new possibilities in interpreting both the peculiarities of the knowledge-based economy and the phenomena characterising the modern economic system evolution phase, leaving a wide gap for further papers to develop an integrated theoretical model able to synthesise the complex mechanisms governing economic system development and functioning.

Based on these conclusions, as it will be argued in more detail in further papers directly dedicated to the analysis of those other phenomena and to the development of the introductory results achieved here, the financialisation currently observed in modern economies can be interlinked with the increased availability of wealth and increases in wealth to income ratio deriving from the currently prevailing high levels of income inequalities and with the reduced profitability of physical capital accumulation that those increases in income inequality support (Cf. i.e. Piketty, 2014a; with Garegnani, 2011; Galbraith, 2014; Homburg, 2014). Similarly, by integrating the already presented elements derived from Keynesian and Classical theory with the mainstream endogenous growth theory, the increased relevance of human capital accumulation and knowledge can be seen as the effect of the fall of profitability in physical capital accumulation and the increased returns which human capital and higher levels of work skills are generating both for individuals investing in the improvement of their skills and the companies hiring them, thus increasing the attractiveness of the former. A similar

¹¹ A much more extended discussion of path-dependency mechanisms and a review of the related literature were already presented in previous works (Valente, 2014; 2016a; 2016b), while a short insight into the mechanisms at work in the 1970s in the case of the Italian economy was also attempted (Valente, 2018) and will not be repeated here. A more general, although for matter of space, much more superficial analysis of the reasons why some of the specific conditions registered during the 1970s could start the switch from one phase or regime of economic system development to another will be presented in a forthcoming paper constituting the continuation of the present, while referring to changes in management methods which began to emerge in the 1970s and 1980s. The opposite switch from the high income inequalities, lower capital accumulation and growth to the exceptional period following the Second World War will, instead, not be further discussed, neither in the present nor the forthcoming paper, even if the author judges this matter worthy of analysis in the future. Although further refinements will be for sure needed and will arise during future research about this period, it seems worthwhile signalling to the reader that an explanation of this former switch phase can be based on the integration of Piketty (2014a; 2014b; 2014c) and his critical reviewers' considerations already available (Galbraith, 2014; Homburg, 2014; Kunkel, 2014), with some very interesting earlier analyses by economists, among which one of the factors leading to 1929 stock market crash provided by Keynes (1936) and Kalecki (1971), considerations of the reasons supporting the stabilization of the market economies in the Western block countries during the 1950s–1970s are considered particularly suggestive by the author.

line of reasoning in terms of innovation will be developed in future articles by the author, assessing, in more detail, the peculiarities of the knowledge-based economy, stressing how, when physical capital accumulation is stagnating, both an increased return of innovation in comparison to the rate of return on investment perceived by non-innovating subjects – as per Schumpeterian argumentation (Cf. i.e. Anghion, Howitt, 1992; 2007) – and a slower pace of innovation diffusion – as per Kalecki (1974) argumentation – can be assumed to emerge. The fall of both economic growth and physical capital accumulation and the increased relevance of human capital can be reconnected with the transition from more rigid, quantity oriented and capital-intensive Fordistic just-in-case methods to the recourse to the more flexible lean management and just-in-time production methods¹², generating, for the companies adopting them further, increased possibilities to cope with the less stable regime of economic growth and increased competition characterising the current phase of economic development as well as allowing them to effectively deal with the lower profitability of physical capital accumulation and tangible assets.

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¹² As to say from methods that can be shortly characterised as production organisation techniques focused mainly on achieving higher productive capacity utilisation and lower unitary costs of production, based on sales forecasts, detailed planning of workloads, operation and quantity produced at the single work station level, parcelling out of productive processes and recourse to a strict control and order system, to methods which, instead, are characterised by lower-capital intensity, the increased meaning of product quality, teamwork, self-management, appropriate selection, training and motivation of employees and focusing on the shortening of the production cycle (Cf. Brzeziński, 2000; 2002; 2013; Pająk, 2011; Szatkowski, 2014).

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Summary

The present article represents the first part of wider research focusing on the development of an authorial interpretation of the phenomena characterising modern economies on the basis of a critical analysis of macroeconomic and management literature. It points out, first of all, the existence of two opposing approaches to the interpretation of phenomena characterising the knowledge-based economy. The first one describes these as a completely new phenomenon requiring the development of theoretical instruments significantly different from those already available. The second one, instead, underlines that the conditions characterising modern economies can be treated rather as an economic system development phase, which, based on income inequalities, economic growth and capital accumulation evolution, resembles a return to trends already observed in the past. The paper presents the author's proposal of integrating both approaches and knowledge-based economy interpretations as an economic development phase characterised – based on the observed trends and a set of theoretical arguments derived from Keynesian theory and justifying the existence of an acceleration mechanism – by the lower profitability of physical capital accumulation. The conclusions indicate how the existence of such a mechanism and the underlining of such a feature of modern economies suffices, according to the

author, to explain both the emergence of different phases of development as well as specific economic phenomena considered typical for the knowledge-based economy in the literature. Forthcoming articles will supplement the present one, focusing on their analysis, leading to the development of a unified interpretation scheme able to explain the main mechanisms and major forces affecting economic system functioning both at a given development phase and in the longer-term perspective.

Keywords: knowledge-based economy, economic growth theory, income distribution inequalities, acceleration mechanism, Keynesian theory.

Gospodarka oparta na wiedzy: zintegrowane podejście do analizy najważniejszych sił wpływających na ewolucję współczesnych gospodarek na podstawie makroekonomii i dorobku nauk o zarządzaniu

Streszczenie

Artykuł stanowi pierwszą część szerszych badań poświęconych opracowaniu własnej koncepcji interpretacji zjawisk, charakteryzujących współczesne gospodarki na podstawie krytycznej analizy piśmiennictwa naukowego z zakresu zarówno makroekonomii, jak i nauk o zarządzaniu. W pracy podjęto dyskusję wokół dwóch przeciwstawnych stanowisk, co do interpretacji zjawisk cechujących gospodarki oparte na wiedzy. Pierwsze z nich opisuje je jako zupełną nowość wymagającą opracowania znacząco różnych od już dostępnych narzędzi analizy teoretycznej. Drugie, natomiast, podkreśla, że kondycje cechujące współczesne gospodarki można potraktować bardziej jako kolejną fazę ewolucji systemów gospodarczych, którą można scharakteryzować jako etap powrotu do trendów już zarejestrowanych w przeszłości na podstawie zaobserwowanej ewolucji nierówności w podziale dochodu, wzrostu gospodarczego oraz akumulacji kapitału fizycznego.

Opracowanie przedstawia autorską propozycję ujednoczenia owych stanowisk i interpretacji istoty gospodarki opartej na wiedzy jako fazę rozwoju gospodarki, cechującą się – na podstawie zarówno zaobserwowanych trendów, jak i szeregu argumentów teoretycznych wynikających z opracowań przedstawicieli nurtu keynesowskiego i uzasadniających występowanie w gospodarce mechanizmu akceleracyjnego – niską opłacalnością inwestycji w kapitał fizyczny. W konkluzjach podkreślono, dlaczego występowanie takiego mechanizmu i wyróżnienie takiej cechy współczesnych gospodarek są, zdaniem autora, samodzielnie wystarczające, aby wyjaśniać zarówno długookresowe pojawianie się różnych faz rozwoju gospodarczego, jak i występowanie specyficznych zjawisk gospodarczych zasygnalizowanych w literaturze jako typowych dla gospodarki opartej na wiedzy. Te zjawiska będą przedmiotem kolejnych analiz ukierunkowanych na zbudowanie ujednoczonego schematu interpretacyjnego, który będzie w stanie wyjaśnić główne mechanizmy i podstawowe siły determinujące działanie systemu gospodarczego zarówno w danym etapie rozwoju, jak i w dłuższym okresie.

Słowa kluczowe: gospodarka oparta na wiedzy, teoria wzrostu gospodarczego, nierówności w podziale dochodu, mechanizm akceleracyjny, teoria keynesowska.

JEL: E12, M11, N10, O11.