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‘Capital’ Accumulation, Economic Growth and Income Distribution: Different Theories and 20th and 21st Century Evidence

INTRODUCTION

Since its origins, the study of capital accumulation, economic growth and income distribution, as well as the inquiry of the relations between those elements, has been at the very core of economic theory and empirical research programmes. However, while economics founding fathers considered income distribution as one of the key factors to be assessed in economic inquiry [cf. e.g. Ricardo, 1821, p. 5], since neoclassical marginal revolution took place at the end of 19th century, a slow but progressive reduction of interest for income distribution study has taken place in *mainstream* literature. As well testified by Lucas affirmations according to which “of the vast increase in the well-being of hundreds of millions of people that has occurred in the 200-year course of the industrial revolution to date, virtually none of it can be attributed to the direct redistribution of resources from rich to poor” and that “of the tendencies that are harmful to sound economics, the most seductive, and in my opinion the most poisonous, is to focus on questions of distribution” [Lucas, 2004, p. 8], till very recently a relevant part of *mainstream* literature seemed, indeed, to support the exclusion of income distribution theory from the core of economic research or to prefer to generally neglect both distribution matters study and the study of its effects on other relevant macroeconomic variables analysed.

Recently, however, Piketty [2014] work succeeded in getting the attention of both many *mainstream* economists and the vast public, partially reviving income distribution theme. Providing rich long-run data sets about income distribution and “capital” accumulation for the main market economies, Piketty semi-

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nal work seems, moreover, to be very useful to reopen the debate about income distribution, capital accumulation and economic growth role in modern economies both at a theoretical and empirical level. Although open to debate and possibly to better fine-tuning, Piketty data can be, indeed, promptly integrated with already available data about GDP evolution, leading to a renaissance of the study of income distribution, capital accumulation and economic growth in a systematic and integrated way. Present paper will constitute an introductory attempt of such an inquiry, which, although still explorative and surely largely improvable, can provide researchers interested in such kind of studies with some basic reminders for further discussion.

Section one and two will, then, present and discuss determinants of income distribution, capital accumulation and economic growth respectively in *mainstream* and heterodox theory, as well as the mechanisms which, according to the different approaches considered in the paper, link the evolution of those variables one with another.

In section three, available data about 20th and 21st century income distribution, capital accumulation and economic growth evolution in main market economies will be then presented, with the aim of assessing whether observer trends seem more in accordance with Classical-Keynesian or Neoclassical theoretical assumptions. Although too much introductory and necessarily inconclusive for the definitive assertion of the general validity of one of the two approaches, the current study results will be argued to better fit a view of long-run determinants of income distribution, capital accumulation and economic growth based on Classical-Keynesian theoretical approach.

Arguments and results presented in all the afore mentioned sections will, then, justify author conclusions about the very urgent need for greater engagement of both economic theorists and empirical researchers in the holistic study of income distribution, capital accumulation and economic growth study. For the same reasons, strong need for a renewed inquiry of different theoretical approaches validity and possibility of integration will be in the end argued to exist in contemporary economics.

MAINSTREAM THEORY OF INCOME DISTRIBUTION, CAPITAL ACCUMULATION AND ECONOMIC GROWTH

Despite Lucas already cited position [Lucas, 2004, p. 8] and the fact that, considering both theoretical and empirical works, *mainstream* and heterodox authors elaboration seems to be apparently characterized by very different level of commitment to distributive matters study, income distribution, capital accumulation and economic growth can be argued to be deeply and intrinsically interlinked in *mainstream* economic theory as well. According to the author, this is

mainly due to the very particular and specific role which capital (and other factors) demand and supply functions play in the neoclassical and *mainstream* theoretical elaboration. It seems then really worth to present and analyse in detail the role which those very functions exert in *mainstream* approach.

One of the main principles of, today dominant, neoclassical theory relays on the assumption that both factors endowment levels and factors remuneration rates are simultaneously determined on the basis of productive factors supply and demand functions. Limiting our arguments strictly to the case of capital, according to neoclassical theory, capital demand function and capital supply functions will, then, be respectively a negatively and a positively sloped function linking capital endowment (measured in value) with the profit or the interest rate. As in Chart 1, thus, in *mainstream* theory, equilibrium between capital demand and supply will set simultaneously both profit rate and capital endowment.

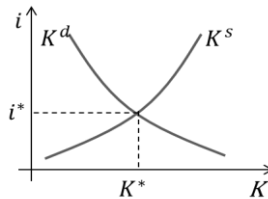


Chart 1. Capital supply and demand functions: neoclassical simultaneous determination of rate of profit and capital endowment

Source: author's elaboration.

Capital supply and demand function can be, then, regarded as a constitutive element of both income distribution and accumulation theory. In *mainstream* approach, indeed, income distribution and capital accumulation are simultaneous and overlapping.

As a matter of fact, mainstream capital demand and supply functions are first of all paralleled by labour demand and supply functions which allow determining labour endowment and wage per unit of labour, as shown in Chart 2.

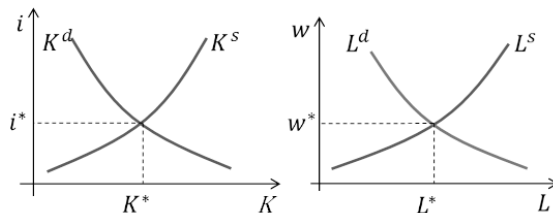


Chart 2. Capital and labour demand and supply functions: neoclassical theory of income distribution determination

Source: author's elaboration.

Due to the fact that in neoclassical theory not only income distribution and capital accumulation but even production level and price system are simultaneously determined, those two groups of curves together allow setting income distribution. Once that products demand is determined on the basis of consumers preferences and that the available set of production techniques (on the basis of which firms can employ labour and capital to produce the required goods) is given, demand and supply forces simultaneously at work on products and factors markets will act as to lead altogether in equilibrium the supply and demand of all factors and goods. On the basis of the principle of uniformity of the profit rate in different sectors of the economy, capital demand and supply functions can be seen, then, as one of the key elements determining and influencing income distribution, production level and price system.

As shown in Chart 3, capital demand and supply functions are, secondly, paralleled by investment demand and saving supply curves on the basis of which capital accumulation can be determined as well. Abstracting from capital gains and capital losses, positive capital accumulation rates – defined as the rapport between investment [I^*] and current capital endowment [K^*] – are registered only if current investments exceed current capital amortisations costs, linked with obsolescence and wear and tear of existing capital endowment. Higher amounts of investments can thus be expected to, *ceteribus paribus*, increase both current capital accumulation rate and capital endowment available in future periods.

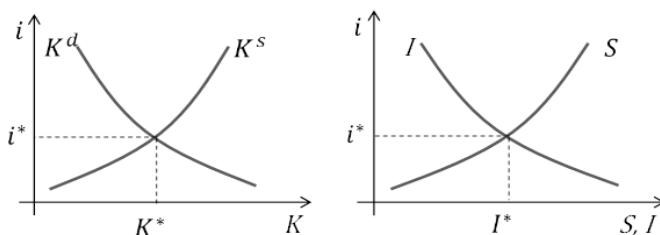


Chart 3. Capital demand and supply functions and investment demand and saving supply functions: the neoclassical parallel setting of main capital accumulation determinants

Source: author's elaboration.

Being based on assumptions similar and directly derived from those which support the formulation of capital demand and supply functions², investment and

² Although a detailed discussion of those principles and similarities it is behind the scope of present article and, as already signalized by Keynes [1936, p. 112–124] in the case of interest rate and capital linkages, in *mainstream* literature it is hard to find a clear statement of the ways in which capital demand and supply function are directly related to investment and supply functions, it seems, however, possible to point out that:

a) the principle of decreasing marginal productivity of capital endowment utilized in production, on which capital demand function is based, is paralleled by the principle of decreasing mar-

saving curves can be considered to be a their direct derivation and can be, thus, regarded as specific counterparts of more general capital demand and supply functions. Being strictly linked with present income and production levels, investments and savings can be in particular considered to be the part of capital demand and supply which is currently taking place in addition to capital demand and supply already present at the beginning of the period and dependent upon levels of production and income registered in former periods. As already underlined in the literature [Woźniak, 2008, p. 109], existing capital endowment can be, as a matter of fact, considered as the sum of investments which either are currently taking place or took place in the past. Capital goods current availability can, thus, be seen as the result of the current or past realization of investments which allowed, in the present or in a former period, the creation of the considered plant or machine. A currently available productive plant or machine is, then, strictly linked to an investment that either currently or sometimes in the past has taken place in the economy. The direct linkage between investment and capital demand functions is, furthermore, perfectly evident under the simplifying assumption that the whole set of available capital goods will become obsolete (or will completely wear and tear) at the end of the single (short or long-run) period considered. In this case, indeed, no currently available capital good will be the result of investments which took place in former periods and in consequence capital demand function will perfectly overlap and coincide with investment demand function.

Through its influence on the determination of capital accumulation, this intrinsic linkage between principles laying at the very basis of both neoclassical concepts of capital demand and supply functions, on one hand, and investment demand and saving supply functions, on the other hand, has a third and very relevant effect. It, indeed, links simultaneous neoclassical determination of income distribution, capital accumulation and both short period level of production and price system with the neoclassical theory of economic growth. In *mainstream* literature physical capital accumulation is, indeed, argued to be positively

ginal returns on additional investment projects, which allow obtaining investment demand function inversely proportional to increases of the interest (or profit) rate [cf. e.g. Keynes, 1936, p. 88–94 with Garegnani, 1978 and Galor & Moav, 2004, p. 1010];

b) income redistribution toward the wealthiest is assumed to have positive effects on both saving supply and capital (or long run saving) supply functions on the basis of similar arguments [cf. e.g. Keynes, 1936 and Garegnani, 1978 with Solow, 1957; Sala-i-Martin, 1992, p. 10; Galor & Moav, 2004];

c) positive effects of higher interest rate on both capital supply and saving supply function seem to be justified mostly on the basis of the same principle according to which wealth owners will willingly loan larger amounts of money to their potential borrowers when they will receive higher interests for a loan of equal import [cf. e.g. Keynes, 1936 with Galor & Moav, 2004].

affecting long-run economic growth either temporary, in exogenous growth models [Solow, 1956; Sala-i-Martin, 1992, p. 10], or stably, in endogenous growth ones [Mankiw, Romer & Weil, 1992; Sala-i-Martin, 1992; Aghion & Howitt, 2007]. Being typically supply-side limited, in *mainstream* literature long-run capital accumulation is, moreover, assumed to be positively affected by increases of income inequalities.

The existence of a positive linkage between income inequalities increases and economic growth in *mainstream* theory seems, then, to depend too on the neoclassical concept of capital (or investment and saving) demand and supply curves. *Mainstream* authors, indeed, base their reasoning, first of all on the fact that, as unanimously assumed in economic theory, propensity to save is higher among the wealthiest members of a given society than among the less affluent ones. They argue, then, that increases of income inequalities and wealthiest income will increase propensity to save. Since income is supposed not to vary³, increases of average propensity to save caused by increases of income inequalities are in turn expected to increase saving supply and capital supply. As shown in Chart 4, *mainstream* positive dependency of saving and capital supply upon income inequalities increases can be, thus, represented as a right side movement of either saving or capital supply curve which will cause equilibrium investment and capital endowment levels rises, due to the fact that *mainstream* theory holds that, as in Say law, it is rather supply which limits demand than demand which limits supply in both products and factors market.

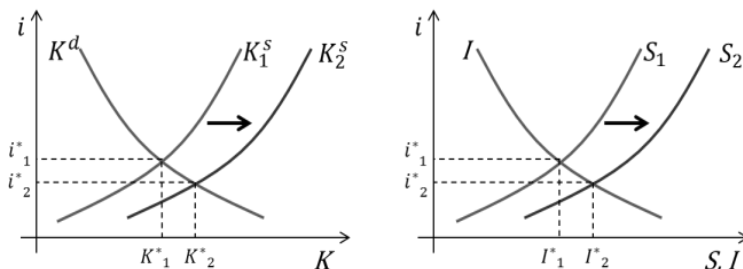


Chart 4. Effects of income inequalities' increases on capital and saving supply: the main neoclassical linkage between income distribution and economic growth

Source: author's elaboration.

It has, thus, to be pointed out that the widely accepted in economic literature *mainstream* point of view according to which higher levels of income inequali-

³ In mainstream theory, negative effects of income inequalities increases on aggregate demand and income are, at least in the long run, excluded so that, all at the opposite than in Keynesian and Post-Keynesian approach, income is supposed not to vary in response to income distribution changes.

ties positively affect capital accumulation and economic growth heavily relies on the assumptions and principles which support capital demand and supply functions formulation. Those moreover are fundamental to the typical *mainstream* conclusion according to which income distribution can be expected to be efficiently set on the basis of labour and capital marginal productivity long run evolution and to be, as even Piketty explicitly admitted to be initially assuming on the basis on *mainstream* reasoning in his former works [Piketty, 2015, p. 8–10], quite stable in the long run and rather independent of political, historical and social trends registered in a given economy or at global level. Due to the very particular formulation and role of factors demand and supply functions, in *mainstream* theory, initial increases of income inequalities will as a matter of fact lead not only to increased capital accumulation and increases of long run capital endowment, but will exert a second very relevant effect as well. If technical change does not allow capital marginal productivity increases and consequent rightward movements of capital and investment demand curves, income inequalities increases will, indeed, lead, as evident in Chart 4, to falls of profit (or interest) rate paid per unit of capital employed in the economy. Under the often verified in practice assumption that capital owners will be on average wealthier than wage earners, this will, thus, partially contrast initial income inequalities increases and potentially cause counterbalancing effects on income distribution. In consequence, it is possible to underline that, in a *mainstream* theoretical framework, income distribution variations will be limited by factor marginal productivity evolution and can then be expected to be generally lesser than those which can be expected to show up according to other theoretical approaches⁴.

Seen the very relevant role which in *mainstream* theory capital supply and demand curves play in the determination of economic growth, capital accumulation and income distribution, it is, however, unsurprising that in heterodox literature it is possible to find alternative approaches to the determination of income, accumulation and growth based on the rejection of capital (or investment and saving) demand and supply functions. Criticising various neoclassical assumptions concerning the role of capital demand and supply functions in different ambits of economic theory, indeed, heterodox authors come to completely opposite conclusions about existing linkages among those three very relevant variables. Next section will thus present and discuss some of the arguments, which both support the rejection of neoclassical assumptions concerning capital demand and supply role in different spheres of economic theory

⁴ In particular, in next section arguments criticizing neoclassical capital demand and supply function role will be considered, pointing out that in heterodox literature mechanisms reinforcing and confirming previously registered income distribution variations trends are supposed to exist.

both lead to the elaboration of heterodox approaches to capital accumulation, economic growth and income distribution determination, which are strictly alternative to *mainstream* approach.

HETERODOX APPROACHES TO CAPITAL ACCUMULATION, ECONOMIC GROWTH AND INCOME DISTRIBUTION

Since the opening of this section, it seems worth underlining that here considered heterodox arguments supporting the rejection of *mainstream* concept of equilibrium between capital and demand function are based on the elaboration of two different schools of thought: the Keynesian and Post-Keynesian one and the Classical-Sraffian one. It has, thus, to be pointed out, that although perfectly compatible and easy to integrate among themselves, arguments presented are independent one of another. Each of them, moreover, affects different areas of economic theory in different degrees. The two first set of arguments are, indeed, more Keynesian in nature and, although they already support the existence of rather a positive linkage between income inequalities reduction, capital accumulation and economic growth, come in contradiction with *mainstream* point of view mainly in the areas of capital accumulation and economic growth determination. The last set of arguments, instead, although questions *mainstream* theory of capital accumulation as well, contradicts more directly the neoclassical income distribution theory. This last group of considerations is, moreover, based on Classical and Sraffian authors theoretical elaboration.

A first point of disagreement and divergence among heterodox and *mainstream* authors theoretical elaboration derives, first of all, from the Keynesian negation of Say's law long and short run validity, which has significant implication for capital accumulation and economic growth theory. As a matter of fact, it justifies investment and capital demand independence from former propensity to save increases and income inequalities rises and leads to the result that both capital accumulation and economic growth increases are perfectly compatible with capital share and/or income inequalities reductions.

Since General Theory publication, indeed, it has been pointed out that saving supply does not depend only upon propensity to save but depends upon income level as well. So far as income is supposed to be positively dependent upon aggregate demand level, in accordance with Keynesian effective demand theory, and independently of both alternative interest rate theory and further considered arguments supporting the existence of acceleration mechanisms, it can be firstly argued that equilibrium between investment demand and saving supply will be reached rather through aggregate demand and income level

changes than through interest rate variation. Secondly, also causal linkage between investment and supply will be reverted in comparison with *mainstream* reasoning. As well explained by Keynes [1936, p. 84] on the basis of the so-called paradox of the thrift, indeed, rather than being increases of saving supply which will lead to increases of investment demand through interest rate reductions⁵, it is increased investment demand which leads, through income variations, to increases of saving supply. According to Keynes, then, “the growth of wealth, so far from being dependent on the abstinence of the rich, as is commonly supposed, is more likely to be impeded by it. One of the chief social justifications of great inequality of wealth is, therefore, removed” [Keynes, 1936, p. 253].

In the short run Keynesian arguments can be represented graphically either as in the right part of Chart 5 or as in right part of Chart 6.

Starting from Chart 5 it is worth underlining that, although it perfectly overlaps with Chart 4 which represented *mainstream* approach, the reasoning leading to this very same graphical result is completely different. In Chart 5, indeed, it is investment demand increase, caused by interest rate reduction, which is leading to increased saving supply through variation of aggregate demand and income level, not being any former propensity to save or income inequalities increase needed. As in Chart 5, it can be, thus, pointed out that even if relative profit earners income share (and thus income inequalities)⁶ will be falling, in Keynesian theory increases of investment, production, capital accumulation and, as will be further pointed out, long run economic growth can be nonetheless registered due to effective demand theory and Say’s law rejection.

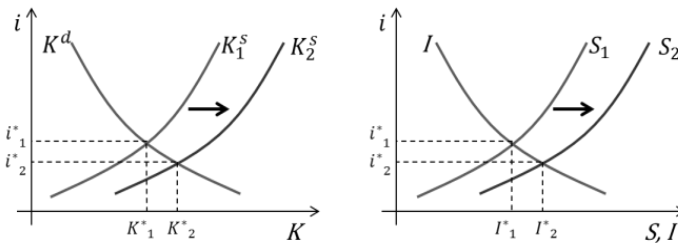


Chart 5. Keynesian reverse causal linkage: saving and capital supply variations, when investment and capital demand raise due to interest rate and income inequalities reductions

Source: author’s elaboration.

⁵ According to Keynes, even excluding acceleration mechanisms effects, propensity to save rises will lead to aggregate demand, production, income and employment reductions. The amount of saving will, thus, stay unvaried in level, being however greater if considered as a percentage of income due to the very reduction of income, that propensity to save increases will cause.

⁶ Under the quite realistic hypothesis that profit earners will be on average richer than wage earners.

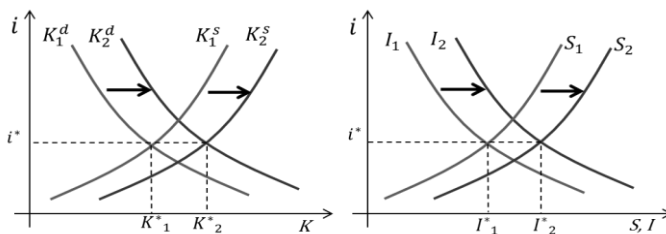


Chart 6. Keynesian reverse causal linkage and a first acceleration mechanism representation: saving and capital supply variations, when investment and capital demand increase although interest rate does not vary

Source: author's elaboration.

Considering the whole set of Keynesian arguments, moreover, it can be pointed out that, as shown in Chart 6⁷, in Keynesian theory income inequalities and capital share reduction are not incompatible with rate of profit and total profit invariance in absolute terms. On the basis of effective demand theory, indeed, production level and both capital and labour endowment utilization cannot be assumed to be necessarily equal to maximum potential levels. Through their effects on average propensity to consume, changes either of income inequalities and/or of profit and wage earners relative income shares affect, moreover, aggregate demand, production and labour and capital endowment utilization level.

Initial income inequalities reduction, labour share increases and profit rate reductions will, thus, lead first of all to increases of consumption demand and employment. Increased sales connected with higher level of aggregate demand will in turn, on one hand, lead to capital endowment utilization rate increases (without any need for additional capital endowment)⁸ and, on the other hand, they will generate additional profits. Profit rate can be, then, expected to be increasing after its initial reduction. In consequence, it is possible to conceive numerical simulations in which,

⁷ A short explanation of one of the various ways in which it is possible to come to a representation as the one presented in this chart will be presented will discussing Keynesian acceleration mechanisms in next part of current section [Cf. p. 13–16]. Other mechanisms could, however, lead to the same graphical result independently of acceleration principle. The latter has to be, thus, considered as a particular case of more general possibilities (present in Keynesian theory on the basis of Say's law rejection) which would lead the very same graphical result.

⁸ Such a consideration derives from the fact, that if, in accordance with effective demand theory, it is assumed that increased aggregate demand will allow efficiently employing (on the basis of currently available productive techniques and without any need of capital endowment enlargement) additional workers formerly unemployed, this means that existing capital endowment was formerly not-fully utilized as well. The present capital endowment can, thus, be readily employed to produce volumes of production higher than those which were produced before aggregate demand increases had been registered. In consequence, production increases do not necessarily require enlargement of existing productive capacity. In such a framework whatever increase of aggregate demand and capital endowment utilization rate will thus increase total profits and profit rate, as well.

at the end of process of simultaneous change of absolute value of both production and distributive shares to which demand and sales variations are leading through the multiplier, initial wage and labour share increases exert a positive or null final effect on profit rate. It can be thus argued that in a Keynesian framework there is not any strict need for a trade-off between labour share increases (deriving from both employment and unitary wage increases) and the level of both total profit levels and profit rate⁹. In empirical econometrical analysis conducted by heterodox authors, it has been, moreover, already demonstrated that such effects actually take in many cases place in real economies [Onran & Stockhammer, 2001a; 2001b; Onran & Galanis, 2012; Lavoie & Stockhammer, 2012].

After Keynes, some heterodox authors argued, moreover, that, once effective demand and Say's law rejection are assumed to hold in the short run, Say's law cannot be valid in the long run as well [Garegnani, 1962, 1992; Petri, 2013]. In consequence, similarly to the arguments presented by Keynes in the case of investment and saving, capital demand cannot be limited by capital supply and it is independent of it. Heterodox authors' reasoning is based on three elements. The first is the particular nature of investment demand which is considered to be a variable affecting both capital accumulation rate both aggregate demand. Investment demand thus exerts positive effects on both potential and actually reached levels of output and capacity availability and rate of utilization¹⁰. The second element is the fact that, according to heterodox authors, capital endowment cannot be assumed to be generally fully utilized in production nor in the long nor in the short run¹¹. Thirdly, according to them, neither capital endow-

⁹ With a metaphor, it can be argued that, since, in a Keynesian theory, the income "pie size" cannot be assumed to be given or generally limited by productive factors availability, variations of both the absolute and relative size of workers and entrepreneurs initial "pie slice" cannot be contraposed among themselves. Increases of Pareto efficiency are, then, possible through parallel variations of absolute "pie size" (due to aggregate demand variations) and relative and absolute "pie slices" (respectively capital and labour shares and total wages and profits).

¹⁰ Heterodox authors distinguish between capital endowment (or capacity maximum level of utilization) and potentially reachable production (and income) level, on one hand, and effectively registered capacity utilization and production level, on the other hand. They assume that those two sets of variable are not generally equal one with the other in the short as well as in the long run. In particular, potentially reachable level of production (conceived as the maximum level of output which will be possible to produce on the basis of the most productive available techniques with the full-utilization of capital and labour available in the economy), will be equal to effectively registered output level only if aggregate demand shortages will not be registered in any of short run periods falling inside the long run timespan considered. On the basis of various arguments, capital endowment is, instead, argued to be never fully utilized in production both in the long and in the short run, so that the capacity utilization rate is generally strictly minor than one.

¹¹ A detailed analysis of the arguments supporting such an assumption seems to be behind the scope of present paper, some of them relays however on:

a) the fact that once capacity is installed, it is normally employed in production longer than just one period. Being production needs normally increasing through capital goods life-span due to

ment level and utilization rate, on one hand, nor potential and effectively output evolution, on the other hand, are invariant with respect with short run business cycle fluctuations and investment demand variations.

If capital demand and supply functions are, then, respectively conceived as to represent the whole available capacity and to be linked to potential output level, heterodox authors argue, first of all, that additional investment will increase capital accumulation [Cf. p. 4–5 and Woźniak, 2008, p. 109]. If investment demand rises in a given short period, also long-run capital endowment available in the future will in consequence increase. A greater amount of capital goods will be, then, available in the economy so that, whatever the evolution of technical change and the techniques employed in the economy, even potential production and income will be higher. Due to this, if additional capital endowment becomes available on the basis of short run investment demand increases, full-employment potential capital supply corresponding to whatever level of propensity to save will be in the end higher.

Secondly, heterodox authors consider the effects of effective demand and investment variations on effectively registered levels of long run capital endowment utilization and output, and thus the case in which capital demand and supply functions are seen respectively as a representation of effectively registered level of capacity utilization and as a representation of capital supply available on the basis of effectively reached long-run output level. With regards to such a representation, they argue in particular that, since General Theory publication, even *mainstream* authors generally admit that capacity utilization and production level can be lower than their potential level in the short run. In a large part of economic literature, moreover, aggregate demand increases are generally assumed to exert a positive effect on production level and capacity utilization in the short run. Having to be conceived as an average of formerly registered short

economic growth, productive capacity will be, then, normally under-utilized in the first years following its installation. Productive capacity renewal is, moreover, continuously taking place through time. Idle capacity will be, then, always available in the long as in the short run, due to the fact that, in whatever long run timespan considered, “new” or recently created productive plants will always exist;

b) presence of seasonal short run peaks of demand and production, determining idle capacity availability on yearly basis;

c) very probable systematic overshooting of productive capacity availability in market economies due to uncertainty of future demand and production needs variations when demand crises take place;

d) need of dissuasive extra capacity availability at single firm level during periods of unexpected demand peaks, as to avoid losses of market shares in favour of current and potential competitors.

A synthetic presentation of those and further heterodox arguments can, moreover, be found in a former paper from the author [Valente, 2016], which will be available by the time current paper gets published, and in heterodox literature [Garegnani, 1992; Petri, 2003, 2013]

run levels of capacity utilization and output, they conclude then, that the long run capacity utilization and effectively registered output levels will be positively affected by aggregate demand short run increases and thus by investment increases as well. As in the case of potential levels of output and similarly to Keynesian short run theory, then, effectively registered capital supply availability will accommodate to higher levels of capital demand rather through increases of output than through variations of interest rate. No need for an initial increase of saving or capital supply though income inequalities and propensity to save raises can be considered after all to be strictly necessarily to increase long run capital endowment and output. On the basis of such and other arguments, then, representations of variations of equilibrium between capital demand and supply functions on the basis of long-run output level changes as those reported in the left side of Chart 5 and 6 are justified. Keynes arguments about effects of investment demand changes on saving supply on the basis of Say's law rejection can be thus extended to long run and applied to capital demand and supply functions as well.

As shown in Chart 7, then, according to heterodox authors, increases of actually registered capacity utilization rate, capital endowment availability and effectively reached and potential levels of production are perfectly possible when investment demand increases are registered in the short run independently of income inequalities and propensity to save increases.

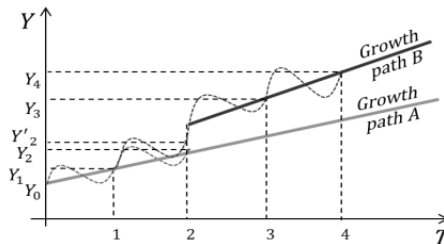


Chart 7. Keynesian potential and registered output levels path-dependency from effective demand evolution

Source: author's elaboration on the basis of Figure 2a.3 in: [Garegnani, 1983, p. 77].

For a second set of arguments which lead to divergence between *mainstream* and heterodox theory, moreover, such a situation can be expected to take place exactly when income inequalities will be reduced.

A second point of divergence between the heterodox and *mainstream* theoretical apparatus can be, indeed, found in Keynesian and Post-Keynesian arguments which support the positive dependence of capital accumulation (and thus long run economic growth) upon aggregate demand increases and/or income inequalities reduction through variously conceived and justified acceleration mechanisms. This set of arguments, thus, does not only, as it was in the case of

formerly considered arguments supporting Say's law of rejection, negate the existence a positive linkage between income inequalities and propensity to save increases and capital accumulation and economic growth. It, indeed, supports also the complete reversion of the key *mainstream* assumption which, justifying the existence of a trade-off between income inequalities reduction and high capital accumulation and economic growth, discourages active income redistribution policies. As a matter of fact on the basis of this second set of arguments, heterodox authors argue that situation as the one formerly presented in Chart 6 or in the below presented Chart 8 do actually take place exactly in consequence of initial income inequalities reduction and/or labour share and unitary wage increases.

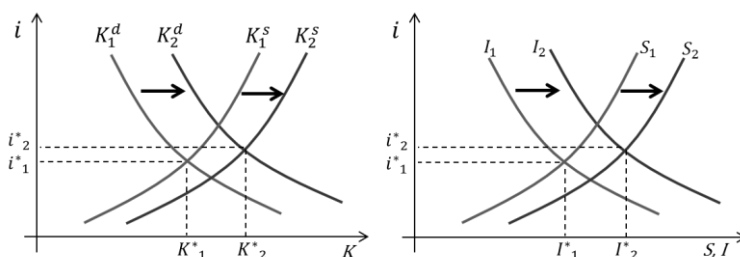


Chart 8. Kaleckian acceleration mechanism representation: saving and capital supply variations, in response of investment and capital demand increase caused by positive effects of income inequalities initial reduction on both total profits and profit rate

Source: author's elaboration.

Income inequalities reduction can be, thus, expected to positively affect capital accumulation and economic growth, so that if income redistribution takes place at time 2 investment will increase due to investment demand curves rightward movements as those reported in Chart 6 and 8. This will moreover lead to increased capital accumulation and positively affect, as in Chart 7, both registered levels of production and growth rate since then on registered.

The heterodox authors' reasoning leading to such a conclusion can be tracked down to two of the forefathers of Keynesian and Post-Keynesian thought: John Maynard Keynes and Michał Kalecki. Although arguments presented by those two authors were, at first, partially different, more recent theoretical and empirical elaborations of their thought by the hand of latter economists seem to converge and to allow integrating the two approaches. The key justification, presented by Keynes and latterly adopted in more Keynes based heterodox authors work, is that propensity to consume increases lead to investment demand rises. Basing on Kalecki work [Kalecki, 1956; Bhaduri & Marglin, 1990; Onran & Stockhammer, 2001a, 2001b; Lavoie & Stockhammer, 2012] it can be, instead, pointed out that, since investment demand is positively dependent upon either total profits or rate or profit and in the short run both of those

variables can be considered to be positively affected by aggregate demand increases, labour share and unitary wage increases can be expected to increase investment due to the fact that, increasing consumption demand, they cause aggregate demand and profits rises as well.

Starting from arguments presented by Keynes, it seems worth pointing out that he clearly considered that: “New capital-investment can only take place in excess of current capital-disinvestment if future expenditure on consumption is expected to increase. [...] A diminished propensity to consume to-day can only be accommodated to the public advantage if an increased propensity to consume is expected to exist some day. [...] The obstacle to a clear understanding is [...] an inadequate appreciation of the fact that capital is not a self-subsistent entity existing apart from consumption. On the contrary, every weakening in the propensity to consume regarded as a permanent habit must weaken the demand for capital as well as the demand for consumption”. [Keynes, 1936, p. 71]

Such Keynes conclusion can be better understood, considering the fact that, in accordance with more general heterodox authors’ arguments, whatever will be the real (or expected by entrepreneurs) evolution of autonomous aggregate demand components, an higher propensity to consume will increase the multiplier and will then generate higher total volumes of demand for firms products and better sales opportunities. Firms will be, then, experiencing on one hand an improvement of current sales and productive capacity utilization rate in the current period. As stressed by various authors on the basis of either Keynes or Kalecki considerations and coherently with short run assumption of productive capacity invariance, enterprises will, consequently, be producing and selling higher levels of production using part of the already available capital stock which was formerly laying at idle. Total profits and rate of profit will thus increase¹². On the other

¹² In accordance with a more Kaleckian scheme of thought, in the case in which propensity to consume increases derive from initial unitary wage and labour share increases, additional effects have to be taken into account. In particular it has to be considered if the variation of volume of production which income redistribution will generate through both direct and multiplicative effects it exerts on aggregate demand, will be high enough to counterbalance initial profit losses entrepreneurs experienced in consequence of income redistribution. If at the new capital share level aggregate demand increases will not allow at least recovering formerly lost profits, indeed, no inducement to invest increases can be expected to follow from income redistribution. It has, however, to be pointed out that, although such a case cannot be excluded to take place both in theory and practice and thus has to be taken into account, when both multiplicative and acceleration mechanisms are considered, initial wage increases seem to very often generate increases of both profits and investments in practice. Heterodox empirical studies which considered countries accounting for about 80 % of global production [Onran & Galanis, 2012; Lavoie & Stockhammer, 2012] point out, indeed, that both in the majority of developed market economies and for a relevant number of developing countries, initial wages increases can be expected to generate final profits and investment increases. Initial wage raises were, instead, shown to exert negative overall effects on profits, aggregate and investment demand only in the case of small (e.g. Netherlands) and particularly

hand firms will experience an expansion of future sales opportunities and production needs as well. In consequence, for the reasons according to which firms can judge convenient to keep a given part of productive capacity always unutilized¹³, firms can be expected to purposely want to enlarge productive capacity as to satisfy increased production needs and/or to do not renounce to market shares and profits in next periods. Both considering Keynesian direct dependency of inducement to invest upon propensity to consume increases, both considering Kaleckian positive linkage between profits level and investment demand, when propensity to consume raises, entrepreneurs' inducement to invest can be thus supposed to increase and, as a result, investment demand (corresponding to every interest rate level) will be higher as well.

It is now worth underlining, that income inequalities reduction actually causes propensity to consume increases. As first stated by Keynes and then generally accepted in both heterodox and *mainstream* economic theory, indeed, less affluent member of any society can be supposed to have always a higher propensity to consume than better-well-off members. On the basis of the here presented reasons, in Keynesian and Post-Keynesian theory, it can be, thus, argued that income inequalities reductions will increase investment demand, capital accumulation and long run economic growth¹⁴, due to their positive effects on propensi-

export oriented economies (e.g. China), for which negative effect on net export of competitiveness losses deriving from higher wages can be expected to be larger than wage increases positive effects on domestic aggregate demand.

¹³ Cf. note 12.

¹⁴ Reasons according to which higher level of short run investment demand can be assumed to positively influence capital accumulation, capital endowment and economic growth are mostly the same presented while discussing Say's law long run rejection. Those arguments will, then, not be repeated once again here. It seems, however, worth to additionally signalize that, since initial wage increases lead to increases of long-run capital endowment, whatever will be the technical change evolution, higher level of wage will not only positively affect short run level of employment but long run labour force full-employment level as well, affecting long-run potential and effectively registered output evolution, not only through their influence on capital endowment but through their influence on labour force evolution as well. If (as it is not possible to exclude in a heterodox framework on the basis of further presented Two Cambridges' Capital Controversy results) it is assumed that after income redistribution firms will be willing to employ in next periods exactly the same techniques of production as they would have employed if income redistribution did not take place, additional capital endowment, which has resulted from income redistribution and investment demand variation, will be sufficient to employ larger numbers of workers. Rather than being determined on the basis of demography, labour force growth rate can be thus considered to be positively influenced by income inequalities reductions and increases of aggregate demand, so that those exert, also through such a channel, positive effects on potential output. In comparison with the case in which income redistribution did not take place, after income inequalities reduction, moreover, number of workers effectively employed will be (due to increases of aggregate demand level caused by both propensity to consume and inducement to invest increase) higher as well. In consequence not only availability of workforce, but even its effective utilization will be higher and exert positive effects on effectively reached levels of production.

ty to consume and aggregate demand. In such a framework, then, rather a positive than a negative linkage between income inequalities reduction, capital accumulation and growth can be expected to prevail both in theory and practice. All at the opposite than in *mainstream* theory, moreover, income inequalities increases can be expected to hamper capital accumulation and growth.

Income distribution evolution is then considered to be one of the key factors influencing long- and short-run evolution of capital endowment and output in heterodox theory. Those three sets of variables are, moreover, considered to be not independent one of another and to be generally path-dependent upon both their own former level and other variables past evolution by Post-Keynesian authors. Additional elements according to which income distribution does not only influence aggregate demand but depends upon formerly registered levels of unemployment and aggregate demand as well, are, indeed, present in more recent Keynesian theoretical and empirical studies. It seems worth underlining, in particular, that in recent years the point of view according to which reduction (increase) of unemployment in a given period will lead to wage increase (fall) in the next period seems to prevail in Keynesian literature [e.g. Garegnani, 1983; Onran & Stockhammer, 2001a, 2001b]. Mechanisms according to which initial income distribution variations or other independent changes of aggregate demand will influence income distribution, factors endowment and output evolution not only in a given short period but in the long run as well, seem, thus, to be already present in Keynesian theory. This element seems to allow integrating here presented arguments with the very last set of arguments which in heterodox theory supports both the rejection of factors demand and supply curves and the adoption of a theory of income distribution, capital accumulation and economic growth determination which is strictly alternative to *mainstream* approach. Having until now considered arguments mostly linked with heterodox alternative theory of determination of capital accumulation and economic growth, it seems now worth focusing on heterodox arguments supporting alternative approaches to income distribution determination.

A very last point of disagreement between heterodox and mainstream literature can be, indeed, found in heterodox arguments negating general validity of typical neoclassical assumption according to which capital (and other factors of production) demand curves can be considered to be strictly monotonically decreasing functions of factors remuneration rate (e.g. profit rate and wage). This very last set of arguments supports, in particular, the rejection of *mainstream* approach to both capital accumulation and income distribution determination on the basis of supply and demand curves, supporting meanwhile also the adoption of alternative income distribution theory as the Classical-Sraffian one considered in this paper.

As stressed during Two Cambridges' Capital Controversy [Garegnani, 1966, 1978, 1979, 1983] and admitted even by *mainstream* representative in the quarrel [Samuelson, 1966], it is possible to point out that the typical neoclassical

representation of investment and capital demand curves as decreasing functions of interest (or profit) rate value is based on an improper extension of arguments at first presented by Classical English School economists in the case of productive factors which were measured in term of physical quantities independently of price system variations (e.g. land and labour). Having to be conceived as a vector and to be measured in monetary terms, however, when, as it is normally in practice, multiple and heterogeneous capital goods are available in the economy and employed in the productive process, capital endowment value it is not independent of price system [Garegnani, 1966, 1979b; Hennings, 1987; Pasinetti & Scazzieri, 1987]. Prices in turn vary when interest rate and income distribution changes, so that it can first of all be pointed out that it is impossible to “*add up the values of capital objects to get a common quantity without a prior rate of interest*” [Galbraith, 2014]. According to *mainstream* theory, moreover, interest rate has to be set through demand and supply function on the basis of capital endowment value, which was indeed the very same variable we were looking to determine at first. *Mainstream* theory can be, thus, secondly argued to be reasoning in circle in the case in which heterogeneous capital goods are considered and capital endowment has to be conceived as a vector.

Even leaving aside this first inconsistency and circularity of *mainstream* reasoning, it has been, moreover, demonstrated that, as shown in Chart 9, when profit rate rises, nothing ensures that the price of a good, whose production requires initially a more capital intensive technique, will rise more than the price of a good, which is produced with a less capital intensive technique [Garegnani, 1966].

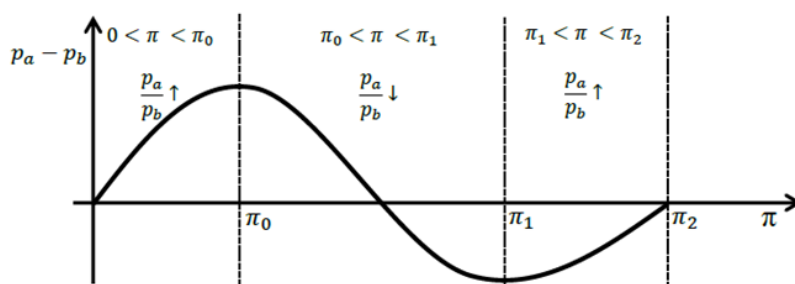


Chart 9. Profitability of more and less capital intensive techniques when profit rate $[\pi]$ changes: relative production price $[p_a/p_b]$ of different goods or of the same good with different techniques evolution

Source: author's elaboration on the basis of [Sraffa, 1960].

Both considering principle of substitution between available techniques of production of the same good both considering principle of substitution between different goods whose production requires more or less capital intensive techniques, then, “*as the rate of interest falls, there is no systematic tendency to*

adopt a more “capital-intensive” technology, as the neoclassical model supposed” [Galbraith, 2014] nor the reverse tendency to adopt less capital-intensive techniques when interest (or profit) rate rises can be expected to be generally valid.¹⁵ It has, then, been demonstrated that, when multiple and heterogeneous capital goods are present in the economy, *re-switching* of techniques is possible and that, considering *re-switching* effects on capital (and other factors of production) demand, capital (and other factors) demand functions cannot be generally excluded to look as those presented in Chart 10 [Garegnani, 1983].

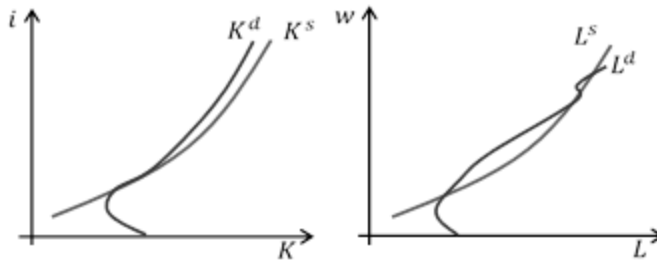


Chart 10. Re-switching of techniques and factor demand and supply curves

Source: author’s elaboration on the basis of [Garegnani, 1983, figure 2a.2, p. 72].

The fact that, as agreed by *mainstream* authors as well¹⁶, such paradoxes cannot be excluded to take place leads, then, some heterodox authors to the conclusion that it is necessary to leave aside neoclassical income distribution deter-

¹⁵ More subtly it can be argued that, since also different capital goods relative price is subject to variation as those reported in Chart 9, the same grade of relative capital-intensity of different techniques is dependent upon interest rate (and relative prices) level and changes, so that a univocal classification of capital (or labour) intensity of techniques of production which will be independent of income distribution cannot be expected to exist and the same concept of capital (or labour) intensity of techniques is then without sense.

¹⁶ It is worth underlining that, after Two Cambridges Capital Controversy conclusion, *mainstream* authors do not negate the fact that re-switching, and thus such bad-mannered factors demand functions, can both theoretically and practically show up in the economic system. They, however, hold that re-switching rarely takes place in reality, so that, although not generally valid and incorrect in theory, the simplifying neoclassical income distribution determination presented in the first section of the current paper will be in practice not so often in contradiction with empirical evolution of data [cf. Samuelson, 1966, Petri, 2003, 2011; Cohen & Harcourt, 2003]. Recent heterodox authors’ empirical inquiry of changes of techniques of production in various leading economies between the 80-ies and 90-ies [Han & Schefold, 2006] shows, however, that:

- a) re-switching of techniques was taking place in at least 11% of cases;
- b) neoclassical assumptions were verified in just about 80% of effectively registered in practice changes of techniques of production;
- c) a residual part of technical change could not be explained on the basis of both re-switching phenomena and changes justified on the basis of *mainstream* theory.

mination on the basis of factor demand and supply curves and look somewhere else for the determination of profit rate and wage [cf. e.g. Garegnani, 1983, p. 73]. Those authors propose in particular a return to English Classical School theory of distribution and prices as reworked by Sraffa, which avoids problems of under-determinacy and circularity in the case in which multiple and heterogeneous capital goods are present in the economy and does not recur to neoclassical concepts of both capital demand and supply curves and of equilibrium between factors demand and supply as the main determinant of distribution. Although a detailed discussion of this alternative approach to income distribution and price system determination is behind the scope of present paper, it seems, then, worth presenting in short some of the main features and results which characterize it, as to point out main differences with *mainstream* income distribution theory results, underlining meanwhile possibilities of integration between Classical and Sraffian approach and formerly presented Keynesian and Post-Keynesian arguments.

It is, now, possible to point out that, differently than in *mainstream* approach, in Classical theory production level, income distribution and price determination are not simultaneous. In particular the Classical-Sraffian approach relays on the former determination, on the basis of a wider set of socio-political, historical and economic factors, of a distributive variable (e.g. either profit rate or level of wage) outside of price system determination and before production level will be set¹⁷. Subsequently level of production has to be set, without any strict need for it to be necessary equal to any full-employment level of either work or capital and, thus, possibly on the basis of Keynesian effective demand theory¹⁸. Finally price system and other distributive variables can be determined together on the basis of the formerly determined levels of the first distributive variable and of volume of production.

Due to the absence of mechanisms acting via factors demand and supply functions which in *mainstream* theory lead through counterbalancing market forces to increased stability of income distribution, it is moreover worth underlining that in such an approach there is no need to distributive variables to revert to marginal productivity levels or to be particularly stable through time. In an

¹⁷ It is worth pointing out that, although the choice of first distributive variable often leads to the fixation of wage level as a variable negatively dependent upon level of unemployment registered in former periods, the choice of interest rate as first (and price system independent) distributive variable is also possible [Sraffa, 1960]. Although often signaled in heterodox authors works, however, up to date the author could not find any concrete example of determination of interest rate as the independent variable.

¹⁸ On the basis of literature analysis it is possible to underline that modern authors, who adopt such an approach to income distribution and price system determination, indeed, accept Keynesian theory long and short run validity too. Classical income distribution theory is nonetheless compatible with Say's law acceptance as well. As a matter of fact, while Malthus and Marx negated Say's law Ricardo accepted it. Say's law rejection or acceptance can be argued to do not cause any significant change in income distribution and price system determination theory in those different authors' approaches [Garegnani, 1978, 1979a, 1979b].

integrated Classical-Keynesian framework of analysis as the one presented in this section, indeed, mechanisms reinforcing initial shocks registered can be expected to exist. If, indeed, wage level is supposed to be positively dependent upon former levels of employment on the basis of Classical theory, while, on the basis of Keynesian theory, aggregate demand and employment are supposed to be positively dependent upon present wage level, initial exogenous wage or aggregate demand and employment positive or negative variations can be expected to cause variations of the other variables in the same direction either in the current period and/or in next periods. Income inequalities level can be then expected to be path-dependent from its own former level and less stable than it was considered to be in neoclassical approach.

Summing up the whole set of arguments presented in the current section it is, then, possible to point out that, in an integrated Keynesian-Classical approach high capital accumulation and economic growth can be expected to show up when low income inequalities are registered, being meanwhile low level of income inequalities expected to fallow from high levels of capital accumulation and economic growth. On the basis of arguments presented in the former section, in accordance with *mainstream* theory high levels of growth and capital accumulation can be expected to follow from higher levels of income inequalities, being however income inequalities evolution mostly stable through time due to the fact that income distribution is fixed on the basis of productive factors marginal productivity and capital marginal productivity negatively dependent upon high levels of capital endowment. Considerations as those presented in the Table 1 can be, thus, argued to sum up the linkages between economic growth, capital accumulation and income inequalities in the heterodox and *mainstream* approaches.

Table 1. Mainstream and heterodox approach main results comparison

Mainstream approach	Keynesian-Classical approach
- Economic growth and capital accumulation – both in value and physical terms – are positively (negatively) dependent upon income inequalities increases (reductions)	- Economic growth and capital accumulation – in physical terms – are negatively (positively) dependent upon income inequalities increases (reductions)
- Income distribution depends mainly on factors marginal productivity evolution	- Income distribution depends upon socio-political historical and economical phenomena
- Income distribution is stable through time and independent of aggregate demand evolution	- Income distribution is path-dependent and not particularly stable in time
- Mechanisms counterbalancing and correcting initial income inequalities reduction and/or increases can be expected to be at work	- Mechanisms reinforcing initial income inequalities reduction and/or increases can be expected to be at work in next periods
- Capital endowment increases in term of value is expected to be generally linked with positive variations of capital endowment in physical terms	- It is not possible to univocally link variations of capital endowment value with variation of capital endowment in physical terms

Source: author's elaboration.

To conclude the theoretical part, it seems, thus, worth pointing out that in accordance with heterodox theory significant long-run income distribution changes can be expected to take place in consequence of relevant historical, political and economic shocks. Shocks positively (negatively) affecting income inequalities levels will moreover not only affect income distribution in the short run but support the affirmation of similar and long lasting tendencies of further increase (reduction) of income inequalities in the long period as well. Income inequalities increases will, in the end, support the affirmation of comparatively lower capital accumulation (in physical terms) and GDP growth rate, while lower income inequalities can be expected to support the affirmation of higher capital accumulation and economic growth rates.

On the basis of *mainstream* theoretical elaboration, instead, income distribution will be comparatively more stable and less dependent on historical, political and economic shocks. If the marginal productivity of the factor whose remuneration has increased cannot be supposed to have meanwhile increased as well due to technical change, initial income inequalities increases or reductions due to capital and labour remuneration rate changes will be moreover contrasted and counterbalanced by opposite tendencies in the long period. Higher capital accumulation (in both value and physical terms) and economic growth rates can be in the end expected to be recorded when higher income inequalities are registered, while comparatively lower rate of capital accumulation and economic growth can be expected to prevail when income inequalities are lower.

INCOME INEQUALITIES, “CAPITAL” ACCUMULATION AND ECONOMIC GROWTH: THE 20TH AND 21ST CENTURY EVIDENCE

Having already given a detailed presentation of different results which, in accordance with the two approaches, can be expected to prevail in the long run when income inequalities level changes, current section will present an introductory data analysis of trends registered in main market economies in the period 1900-2010 with the purpose to assess with which of the two approaches effectively registered trends seem to be more in line. In particular, here presented data will regard income inequalities, capital accumulation and economic growth evolution in France, Germany, United Kingdom and United States during the whole 20th century and in the first decade of the 21st.

Starting from data concerning income distribution, it is, first of all, possible to point out that, as evident in Chart 11 and 12, where it is presented population wealthiest 10 % income share as percentage of total income earned in different

countries as reported in Piketty [2014], significant variations of income inequalities have been registered in all the economies taken into account.

On the basis of the data considered it seems worth pointing out that, as already stressed by Piketty [2014], income inequalities were, although with minor differences at single country level, high in the first half of the 20th century. It was then registered a significant fall of income inequalities during the 40-ies, which lead to their reduction. After Second World War income inequalities stabilized during the 50-ies, the 60-ies and the 70-ies, although with both temporal and geographical variations, on much lower levels. They, then, started growing during the 80'ies, reaching, with the exception of France¹⁹, the highest level ever registered after Second World War in 2006 or 2007.

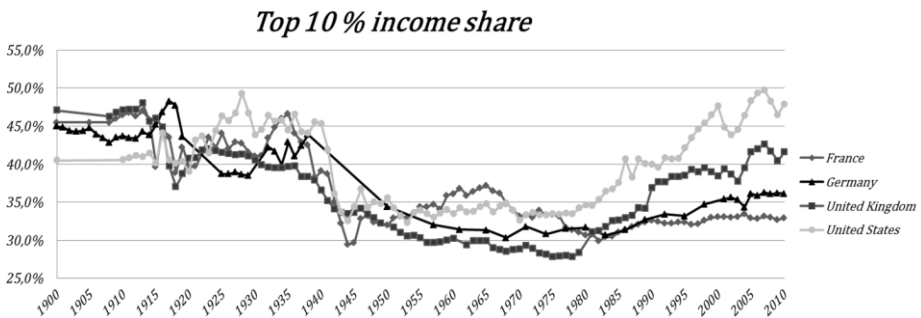


Chart 11. Top 10 % income share as percentage of total income: short run data

Source: author's elaboration on the basis of [Piketty, 2014].

As for the further presented data concerning capital accumulation rate and economic growth rate, the presentation of a chart reporting average calculated for the periods 1900–1949, 1950–1979 and 1980–2010 seems useful to easily extrapolate out of richer data sets long run tendencies reported in Chart 12.

¹⁹ Among the four economies considered France is clearly an outlier, when it comes to income inequalities trends. This is due mainly to the increases of income inequalities registered during the 60'ies, which are probably explainable considering Gaullism success in the decade. This higher level of income inequalities is paralleled however by high capital accumulation and economic growth which seem to be both in line with trends registered in other countries, giving the idea that, due to international trade, politico-economic climate in other countries is a relevant factor influencing, through its effects on global aggregate demand, capital accumulation and economic growth at country level. So that in the case of open economies both capital accumulation and economic growth can be considered to be partially independent of economic policies applied at single country level or at least to depend upon policies applied by its trade partners and at a global level as well.

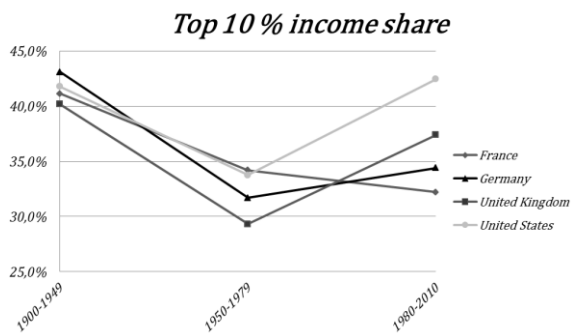


Chart 12. Top 10 % income share: U-shaped long run trend

Source: author's elaboration on the basis of [Piketty, 2014].

As already stressed by Piketty [2014], it is thus possible to point out that income inequalities evolution has been during 20th and 21st century U-shaped, with high levels of income inequalities and income shares of wealthiest 10% of population registered in the first half of 20th century, lower levels of income inequalities prevailing from the 50-ies till the end of the 70-ies and growing levels of income inequalities and top 10% income share since the 80-ies on. As pointed out by Piketty as well, moreover such an evolution seems to be in line with main historical and political turn points of economic history of the countries considered, as to say: the affirmation of Keynesian policies in the aftermath of Second World War till the end of the 70-ies, on one hand, and the dismissal of Keynesian oriented intervention policies, the affirmation of conservative revolution, monetarism and neo-liberism since the beginning of the 80'ies, on the other hand²⁰. It seems, moreover, worth pointing out that changes in income distribu-

²⁰ Data about capital endowment evolution were also considered during the analysis and, although changes in distribution seem to be rather respondent do heterodox assumption about historical, political and social shocks effects on its evolution, marginal productivity of capital (considered as rapport between national production and "capital" endowment) could be shown to variate in the same direction of income inequalities (higher in 1900–1949 period, lower in 1950–1979 period and again higher in 1980–2010 period). Since data for capital come from Piketty, 2014, who comprehends in his "capital" definition proper capital together with land and housing, measures all those kinds of assets at market value and reports data about "capital" endowment only as percent of national production, those data presentation was omitted in the current analysis. Data analysis seemed, indeed, inconclusive to asses which of the two approaches considered in the paper it is the more respondent to explain income distribution evolution. As already pointed out in the literature [e.g. Galbraith, 2014], being measured at market value Piketty "capital" seems to be potentially affected exactly by the kind of perverse effects considered to possibly take place during Two Cambridges Capital Controversy by heterodox authors. It can be, moreover, argued that increases of land and housing value expressed as percentage of production level, being larger that proper capital variation, can be indeed a very significant signal that perverse price effect do actually took place on a general scale among periods considered. Per capita land and housing endowment can be, indeed, assumed to do not significantly vary through time and to do not need to be necessarily

tion where paralleled by changes in capital accumulation, which in turn generated significant effects on average rates of growth of GDP.

It is, indeed, possible to stress that, although as it seems logical, capital accumulation rate²¹ registered significant short run fluctuations during the 20th and 21st century, which for European countries were particularly evident in the World Wars periods, averaging the trends registered in different decades for the same periods considered for income distribution evolution (1900–1949, 1950–1979 and 1980–2010), a clear linkage between income inequalities and capital accumulation evolution emerges.

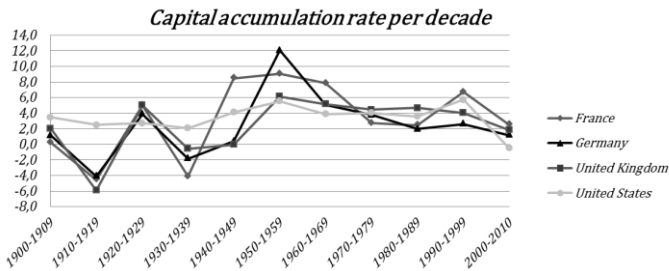


Chart 13. Capital accumulation rate per decade

Source: author's elaboration on the basis of own calculations out of [Piketty, 2014] and Maddison project datasets.

higher than GDP growth rate on any solid theoretical basis. Since, however, higher values of land and housing were exactly registered in correspondence of higher income inequalities levels it can be supposed that, as already stressed in the literature [e.g. Homburg, 2014; Rognlie, 2015], their value variations are rather due to appreciation than to variation of their physical quantities. Capital is, indeed, not only a factor of production but, as evident if saving nature and final aim is considered, an instrument of wealth and income inequalities intertemporal transfer as well [e.g. Geregnani, 2011; Piketty, 2014]. Since in financial market price of assets, allowing financing expenses sustained by firms to constitute physical capital endowment by them employed in real production, can be expected to have registered variations similar to those evidently registered in housing market (appreciation), current stability of value of proper capital endowment could, thus, be due to simultaneous rises of average price of capital goods and reduction of capital endowment in physical terms. Due to the fact that during last decades, as well as before 1929 Great Crisis, significant assets prices bubbles were registered, capital endowment value evolution, and in consequence capital marginal productivity evolution, could be in line with both heterodox and *mainstream* assumptions. In author opinion, then, together with further evidences derived from other data analysis, the fact that in consequence of political and historical shocks income distribution did variate exactly in the direction supposed by heterodox theorists seems to overall support, although with caution, the conclusion that through the 20th and 21st century income distribution evolution can be better explained on the basis of a heterodox theory based reasoning.

²¹ Capital accumulation rate was obtained, multiplying Piketty data about average "capital" dotation as percentage of national income per decade by average level of GDP in the same decade obtained on the basis of yearly data given by Maddison project database [<http://www.ggdc.net/maddison/maddison-project/home.htm>]. Difference between value of "capital" endowment in two subsequent decades was then divided by "capital" endowment level in the former of the two decades, divided by 10 and multiplied by 100 percent as to get average annual capital accumulation rate per decade.

Already considering data reporting the annual growth rate of average capital endowment available per decade in different countries it is, indeed, evident that the high capital accumulation rate were registered in the 50-ies, the 60-ies and in some cases in the 70-ies. With the exception of the United States, where, although high capital accumulation rate in the 50-ies was also recorded, the highest capital accumulation rate was registered in the 90-ies, in all the countries, moreover, capital accumulation rates prevailing in the 50-ies and/or the 60-ies were the highest ever registered in the whole timespan considered. In the 50-ies, indeed, capital accumulation rate per year was around 12% per year in Germany and above 8% per year in France, while the highest ever registered capital accumulation rate recorded out of the 1950–1979 period were respectively about 4 and 6% per year in those country. A clear tendency to the prevalence of a positive linkage between lower income inequalities and higher capital accumulation rates and between higher income inequalities and lower accumulation rates is perfectly evident, where, as shown in Chart 14 the long run accumulation rate are calculated per period.

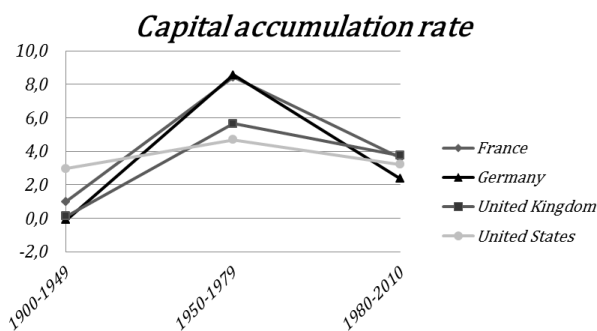


Chart 14. Capital accumulation rate: reverse-U-shaped long run trend

Source: author’s elaboration on the basis of own calculations out of [Piketty, 2014] and Maddison project datasets.

On the basis of data it is possible to point out that when income inequalities were lower (e.g. in 1950–1979 period) capital accumulation was higher. In periods in which income inequalities were higher (both 1900–1949 and 1980–2010 period), instead, lower capital accumulation rates were registered. It seems, then, that income inequalities and capital accumulation evolution registered in the 20th and 21st century followed an evolution, which is in accordance rather with heterodox approach than with the *mainstream* one. Economic growth, moreover, registered an evolution which seems to parallel capital accumulation trends as well.

Considering GDP growth rate calculated year per year on the basis of Maddison project database and then at first averaged per decade and secondly for the longer periods formerly considered for income distribution and capital accumulation, it is, indeed, possible to obtain the following Chart 15 and 16.

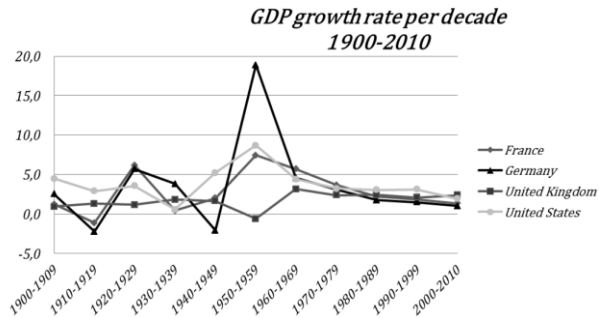


Chart 15. GDP growth rate per decade

Source: author's elaboration on the basis of own calculation out of Maddison project dataset.

Commenting decennial data, it is first of all, possible to point out that, although significant variation of GDP growth rate were recorded decade by decade especially in the first half of 20th century, with particularly significant reductions taking place during World Wars decades in European countries and in the decade following the 1929 Great Crisis in the United States, the highest levels of economic growth ever recorded during the whole timespan considered have been registered in the 50-ies in France, Germany and United States and in the 60-ies in the United Kingdom. In addition, it seems worth underlining that in France, Germany and the United States economic growth was on mostly unmatched historically high levels during the 60-ies. Although the 70-ies could be expected to be the worst decade in the low inequalities period due to negative effects of oil shock on GDP and economic growth, moreover, economic growth during this decade kept on levels similar to those registered in connection with higher income inequalities in the 1980–2010 period, even in comparison with decades during which (as for example in the case of the 80-ies) more expansive than recessive overall tendencies can be surely assumed to have took place.

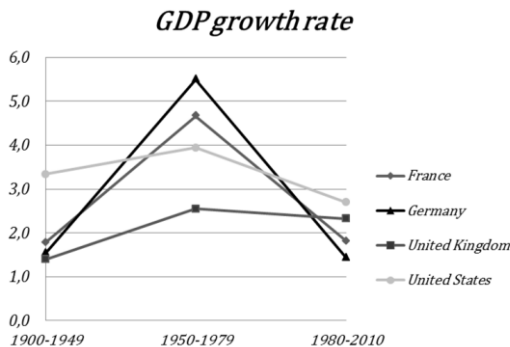


Chart 16. GDP growth rate: reverse-U-shaped long run trend

Source: author's elaboration on the basis of own calculation out of Maddison project dataset.

Such an analysis seems then to confirm that, as expected on the basis of heterodox authors considerations, higher levels of economic growth result from lower levels of income inequalities. This conclusion it is more over confirmed on a general basis once long-run economic growth rate registered during the 1900–1949, 1950–1979 and 1980–2010 macro-periods and reported in Chart 16 are considered.

Chart 16 shows, indeed, that in all the countries considered higher levels of growth were registered in the 1950–1979 period, while before and after this period lower growth rate were experienced together with generally higher levels of income inequalities.

Summing up, it seems then possible to conclude that during the 20th and 21st century low income inequalities were linked with higher levels of capital accumulation and economic growth, while higher income inequalities were linked both in the first half of the 20th century both in the last part of 20th century and the beginning of the 21st with lower capital accumulation rate and lower economic growth rate. It seems, then, possible to point out that, although introductory and surely largely improvable present data analysis shows that heterodox theoretical approach better fits income distribution, capital accumulation and economic growth evolution through the whole 20th and 21st century.

FINAL REMARKS AND CONCLUSIONS

On the basis of both theoretical considerations and data analysis presented in the paper according to the author it seems important to point out that renewed interest for income distribution evolution which is recently arousing as a consequence of Piketty seminal work should not be limited to the study of income inequalities as an independent and isolated sector of economic inquiry. Current paper has tried in particular to give arguments according to which the study of income distribution and income inequalities evolution has to be seen as a determinant part in both capital accumulation theory and economic growth study, overall supporting the point of view that, as it was at first according to the author correctly assumed by political economy founding fathers, this three very relevant spheres of economic inquiry cannot be considered one separately from another. Both through different approaches presentation and through data analysis, in current paper it has been moreover pointed out that *mainstream* assumptions concerning income distribution, capital accumulation and economic growth linkages, which are too often considered as starting point both for further studies in other fields of economic research and for practical policies formulation in economic policy, are nor so uncontroversial in theory, nor particularly respondent to long run evolution of the relevant variables which was in practice registered in the main market economies during the whole 20th and 21st century. To the author it seems then possible to point out that a large

field of research and further analysis in the integrated study of income distribution, capital accumulation and economic growth evolution can be considered open for economists who would like to engage themselves either in theoretical studies or empirical analysis. Moreover, since, both according to heterodox theoretical considerations and data analysis, different ways of distributing current production do actually seem to affect the potential of increasing production in the future, all at the opposite than Lucas was assuming, economists cannot abstract from income distribution matters and it is possible to conclude that “of the tendencies that are harmful to sound economics, the most seductive, and [...] the most poisonous, is” [Lucas, 2004, p. 8] to ignore income distribution effects on capital accumulation and growth.

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Summary

In present article both different theoretical approaches to linkages between income distribution, capital accumulation and economic growth and an introductory analysis of those variables evolution during 20th and 21st century in main market economies were presented. In first section *mainstream* approach to income distribution and capital accumulation was analysed, pointing out that according to this school of thought a positive linkage between high income inequalities, high capital accumulation and high economic growth can be expected to exist. Second section considered heterodox arguments contesting various *mainstream* arguments based on the role of capital (or investment and saving) supply and demand functions. It was, then, pointed out that, in an integrated Keynesian-Classical approach, rather a positive linkage between low income inequalities, high capital accumulation and high economic growth can be expected to exist. Third section presented data about income inequalities, capital accumulation and economic growth evolution in France, Germany, United Kingdom and United States in the period 1900–2010. Basing on data it was possible to point out that low income inequalities registered in the 1950–1979 period were paralleled by high capital accumulation and economic growth. Higher income inequalities registered in the 1900–1949 and 1980–2010 periods coupled, instead, with lower capital accumulation and economic growth. Heterodox authors’ reasoning was, then, argued to be more in line with 20th and 21st century experience. In the conclusions, integrated inquiry of income distribution, capital accumulation and economic growth linkages and parallel evolution was, thus, argued to be a very fruitful and particularly open to debate field for future researches.

Keywords: income distribution, capital accumulation, economic growth, Keynesian theory, Sraffian theory

**Akumulacja kapitału, wzrost gospodarczy i podział dochodu:
różne teorie a doświadczenia XX i XXI wieku**

Streszczenie

W opracowaniu przedstawiono zarówno różne podejścia teoretyczne dotyczące powiązania pomiędzy podziałem dochodu, akumulacją kapitału i wzrostem gospodarczym, jak i wstępną analizę danych dotyczących ewolucji tych zmiennych w ciągu XX i XXI wieku w najistotniejszych gospodarkach rynkowych. W pierwszej części przeanalizowano podejście głównego nurtu do podziału dochodu i akumulacji kapitału. Podkreślono, iż zgodnie z tą szkołą myśli istnieje pozytywne powiązanie pomiędzy wysokimi nierównościami dochodowymi, wysoką akumulacją kapitału a wzrostem gospodarczym. W drugiej części artykułu wzięte pod uwagę zostały heterodoksyjne argumenty, które kwestionują różne założenia głównego nurtu oparte na roli funkcji popytu i podaży kapitału (lub inwestycji i oszczędności). Zauważono, iż, zgodnie ze zintegrowanym podejściem Keynesowsko-Klasyycznym, jest możliwe istnienie pozytywnego powiązania pomiędzy niskimi nierównościami dochodowymi, wysoką akumulacją kapitału i wysokim wzrostem gospodarczym. W trzeciej części opracowania przedstawiono dane dotyczące ewolucji nierówności dochodowych, akumulacji kapitału i wzrostu gospodarczego we Francji, w Niemczech, w Wielkiej Brytanii i w Stanach Zjednoczonych w okresie 1900–2010. Na podstawie danych możliwe było podkreślenie faktu, że niskim nierównościom dochodowym, występującym w okresie 1950–1979, towarzyszyły wysoka akumulacja kapitału i wysoki wzrost gospodarczy. Wyższe nierówności dochodowe występujące w okresach 1900–1949 i 1980–2010 wiązały się natomiast z niższą akumulacją i niższym wzrostem gospodarczym. Stwierdzono zatem, że rozumowanie autorów heterodoksyjnych było bardziej zgodne z doświadczeniem XX i XXI wieku. W konkluzjach stwierdzono, że prowadzenie zintegrowanej analizy, zarówno powiązania pomiędzy podziałem dochodu, akumulacją kapitału i wzrostem gospodarczym, jak i równoległej ewolucji tych zmiennych jest polem dla dalszych badań, które mogą okazać się szczególnie owocne i otwarte dla debaty.

Słowa kluczowe: podział dochodu, akumulacja kapitału, wzrost gospodarczy, teoria Keynesowska, teoria Sraffańska

JEL: B22, E11, E12, E13, E21, E22, E25