

CAPITAL, GROWTH AND INEQUALITY IN PIKETTY'S APPROACH. A CRITICAL REVIEW

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SUNTO. – Il lavoro è una nota critica sul volume di Piketty “Il capitale nel XXI secolo”. Le 950 pagine della versione originale in francese, e le 696 pagine della traduzione in inglese, contengono un numero così elevato di argomentazioni, approfondimenti e osservazioni che riguardano quasi tutte le sfere dell'economia, che nessuna rassegna è in grado di riassumerli. La nota discuterà quindi, principalmente, i fattori che possono spiegare le tendenze della concentrazione della ricchezza e della distribuzione personale del reddito. Verranno presentate e discusse anche alcune caratteristiche del quadro teorico ed alcuni degli aspetti del testo che possono essere considerati meno robusti o non del tutto chiariti da un punto di vista analitico-metodologico. Piketty utilizza modelli economici molto semplificati per studiare le modalità secondo le quali il rapporto tra il tasso di risparmio ed il tasso di crescita dell'economia determini il rapporto capitale-prodotto, e di conseguenza la quota dei redditi da capitale sul reddito nazionale. Quando il tasso di rendimento del capitale aumenta più rapidamente del saggio di crescita dell'economia nel suo complesso e le imposte sul capitale sono basse, si instaura un circolo vizioso di natura dinastica di trasmissione della ricchezza: cioè “Il capitale cresce perché la crescita dell'economia è bassa”. Utilizzando i migliori dati storici disponibili, Piketty dimostra come il rapporto capitale-reddito, la quota dei redditi da capitale sul reddito nazionale e il tasso di rendimento del capitale si sono modificati nel corso del tempo: egli discute i cambiamenti osservati, le principali forze sociali ed economiche all'origine del mutamento, le ragioni per cui queste forze cambiano nel tempo, e quali sono le previsioni circa l'evoluzione del tasso di rendimento del capitale nel ventesimo secolo. I capitoli conclusivi sono dedicati a discutere alcune proposte di politica economica. Piketty sostiene che la disuguaglianza è il risultato delle politiche e che solo le “buone” politiche sono in grado di invertire un trend di crescente disuguaglianza: queste sono di varia natura e per di più alternative, dal momento che la composizione della ricchezza è eterogenea. Piketty suggerisce l'introduzione di un'imposta

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sul patrimonio progressiva su scala globale, basata sullo scambio automatico delle informazioni bancarie. L'introduzione di una tassazione progressiva sulla ricchezza a livello mondiale sarebbe quindi considerarsi non solo come una "utile utopia", ma come una seria proposta su cui riflettere e discutere.

ABSTRACT. – The paper is a critical review of Piketty's book "Capital in the XXI Century". The 950 pages of the French original, and the 696 pages of the English translation, are packed with so many topics, insights, comments and observations that affect almost all spheres of economics, that no single review can summarize them. This review will focus mainly on the factors which can explain the trends regarding the concentration of wealth and of personal income distribution. It will also present some features of the theoretical framework and discuss some of the aspects which can be considered weak from an analytical and methodological point of view. Piketty uses simple economic models to investigate how the ratio between the saving rate and the growth rate of the economy determines the capital-output ratio, and consequently the share of capital in the national income. When the rate of returns on capital rises more quickly than the overall economy and taxes on capital remain low, a vicious circle of ever-growing dynastic wealth, and growing inequality takes place. "Capital is back because low growth is back". Using the best available historical data, Piketty shows how the capital-output ratio, the capital share in national income, and the rate of return on capital, has evolved over time. Piketty discusses the changes observed, what the main social and economic forces at work are, why these forces change over time, and what we can predict about how the rate of return on capital will evolve in the twenty-first century. The last chapters discuss some policy proposals. Piketty claims that inequality is the result of policies. Only "good" policies can reverse a trend of rising inequality. It is necessary to introduce alternative policies because the composition of wealth is heterogeneous. Piketty suggests a progressive wealth tax on a global scale, based on the automatic exchange of bank information, not only as "useful utopia", but as a proposal to think about and to discuss. In particular it would be necessary to adopt a progressive taxation on wealth on a worldwide level.

1. INTRODUCTION

"Capital in the Twenty-First Century" is an impressive empirical research on inequality and on its persistence over time, with particular reference to the "sustainability" of capitalist systems in which inequality is increasing. An empirical analysis of inequality in the distribution of wealth and income, in the long run, had never been made before. Piketty's book, therefore, has already encouraged, and will continue to promote a very intense and innovative debate. Piketty's work has placed the issue of inequality and its perpetuation through generations along the hereditary transmission of capital (productive, land and estate) and finan-

cial at the center of the economic and political debate. The functional distribution of income between capital and labor has once again become a central theme of economic analysis as it used to be in the nineteenth century. The topic of inequality was released from the agenda of economic research, also as a result of the growing influence of neo-classical thought. Robert Lucas (2004, p.15) claimed 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”.

The great success of Piketty's book can be mainly explained by the interest and the concern towards issues such as increasing poverty and increasing inequality in income and wealth distribution. These are some of the critical issues facing the world today. There are numerous factors that have contributed to the increase in inequality over the last years. Some are specific and endogenous to the different national contexts, others are exogenous. In industrialized countries, factors such as the decay of labor unions and collective bargaining, the erosion of minimum wages, the increase in the relative weight of capital compared to labor, the increasing weight of top incomes from labor, unequal access to education, regional dualism, as well as demographic and fiscal factors, redistributive and monetary policy, are all considered sources of inequality. However, these factors alone cannot explain the rise in inequality in recent decades. The opening and the liberalization of national and international markets, the increasing globalization and influence of Information and Communication Technology (ICT) are certainly among the most important external factors that have contributed to the increasing inequality.

Thomas Piketty has summarized the content of *Capital in the XXI Century* and the main features of its extensive and well-documented analysis in a series of interviews and conferences. He claims that this work is primarily an economic, social and political history of the evolution of income and wealth. It is both an empirical and a normative study. Thanks to the cumulative efforts of dozens of scholars a relatively large historical database on the structure of national income and national wealth, on the evolution of income and wealth distribution has been collected, over three centuries and across twenty countries. The economic, social and political processes that can account for the many evolutions that we have observed in the various countries since the Industrial Revolution have been analyzed (Piketty, 2015a, p. 1). The result has been a revolution in the understanding of long-term trends in inequality.

In the 950 pages of the French original, and in the 696 pages of the English translation, are packed so many topics, insights, comments and observations that affect almost all spheres of economics, that no single review can summarize them. In this review I will focus mainly on the factors which can explain the trends of the concentration of wealth and personal income distribution. I shall also present some features of the theoretical framework and discuss some of their aspects which can be considered weak from an analytical and methodological point of view.

2. THE ANALYTICAL FRAMEWORK

Capital in the Twenty-First Century provides a general theory of the functioning of a capitalist economy. Issues on inequality are only one aspect of that general theory. The setting can be called “classic” in the wake of Smith, Ricardo and Marx. However Piketty is not interested in explaining the role of capital accumulation *on* economic growth, but rather the inverse relation, that is, the role of economic growth *on* the returns to capital, on the concentration of wealth and of the inequality of income in capitalist economies. To a certain extent both Marx and Kuznets were wrong. A forty-year trend of increasing inequality, in many advanced economies, deserves the search of forces which are deeply rooted “within modern industrial capitalism” (Solow, 2014, p. 2). Piketty claims that inequality in personal income distribution does not follow a deterministic process. The forces that shape the concentration of income are economic but also political and institutional such as wars, taxation, and inflation (Milanovic, 2014, p. 529).

Piketty attempts to answer some very important questions. Do the dynamics of private capital accumulation inevitably lead to the concentration of wealth in even fewer hands? Or do the balancing forces of growth, competition, and technological progress lead, in later stages of development, to reduced inequality and greater harmony among the classes? (Piketty, 2014a, p. 11). Piketty finds the answers to these questions in the endogenous factors which determine the accumulation of capital and the changes in the shares of capital and labor in national income. Inequality in the personal distribution of income combines forces arising from the inequality in the functional distribution of income (Piketty, Saez, 2014, p. 842). The link between these two kinds of distribution is very well documented by the empirical findings for

the USA and other western countries. In a society where “patrimonial capitalism” prevails wealth concentration mainly contributes to the inequality in the distribution of personal income. When the percentage of people who do not need to work in order to earn their living (the rentiers) goes up, the distribution of personal income will become even more unequal. Historical movements of income concentration are discussed by Piketty not only as important empirical findings, but, rather, they are set within an overall economic framework.

Piketty uses simple economic models to explain what is happening. He reverses the relationship between income distribution and growth as it had been interpreted in the traditional Keynesian models. Such models explain the growth rate of the economy as a consequence of the ratio between the saving rate and the capital-output ratio. Piketty, instead, investigates how the ratio between the saving rate and the growth rate of the economy determines the capital-output ratio, and consequently the share of income from capital in the national product. The analytical framework consists of two models: i) the first is a standard Harrod-Domar-Solow macro model aimed at determining the capital-income ratio and the share of income from capital on national income in the long run; ii) the second is a sub model “rather mathematical in nature” aimed at linking the concentration of wealth to economic growth. This sub model was developed in detail in Piketty and Zucman (2015). The definition of capital follows the SNA guidelines. It includes all forms of assets (housing, land, machinery, financial assets in the form of cash, bonds and shares, intellectual property) that generate a return/rent as the result of the functioning of a “pure and perfect” market for capital. Durable goods are not included. This is why, according to Piketty’s estimates, 50% of the population does not own any kind of wealth.

The “first fundamental law of capitalism” links α (the capital share on national income) to the capital-output ratio β and to the average rate of return to capital r where $\alpha=r \times \beta$. The capital-output ratio (K/Y), that Piketty calls β , measures the overall importance of wealth in a given society, as well as capital intensity of production (Piketty, Saez, 2014, p. 840). Assuming, as Piketty does, that according to the standard hypothesis of perfectly competitive markets r is equal to the marginal productivity of capital, it decreases when β increases. However, in more complex models, which are also more realistic, the rate of return on capital r may be higher or lower than the marginal productivity of capital. In a more complex economy, where there are many diverse uses of

capital, the marginal productivity of capital may be difficult to determine. In this case the rate of return on capital is determined by the following two forces: firstly by technology and secondly by the abundance of capital stock (Piketty, 2014a, p. 154). Secondly, the owner of capital who is in a monopolistic position can impose a rate of return greater than the marginal productivity of the capital itself.

The central question is then how much the rate of return on capital r decreases when the capital-income ratio β increases (Piketty, 2014a, p. 155). This depends on the elasticity of substitution (σ) between capital K and labor L in a CES production function where $Y=F(K, L)$. The standard assumption is that the production function is a Cobb Douglas and the rate of substitution σ is equal to 1. In this case as the stock of capital rises, the rate of return on capital r decreases exactly in the same proportion, so that α does not change (Piketty 2014a, p. 154). If the rate of return on capital r falls more than proportionately when the capital income ratio β increases, then the share of capital's income in national income decreases. In other words, the decrease in the rate of return on capital more than compensates for the increase in the capital-income ratio. On the other hand, if the rate of return r falls less than proportionately when β increases, then the capital share of income increases with β . The effect of the decreased rate of return on capital is simply to cushion and moderate the increase in α compared to the increase in the capital-income ratio β . Piketty introduces the hypothesis that the elasticity of substitution (σ) between capital K and labor L is greater than one ($\sigma > 1$) therefore a rise of the capital income ratio β also leads to a rise of the share of capital in national income. Intuitively, it makes sense to assume that σ tends to rise along with the development process, as there are more diverse uses and "forms" for capital and more possibilities to substitute capital for labor (Piketty, Saez, 2014, p. 841).

In a one-good model with perfect competition and high substitutability between capital and labor (which might happen because of the rise of new capital intensive technologies such as robots of various sorts) the rate of return r will decline relatively little as β rises. Also the net-of-depreciation capital share α in national income will rise. However Piketty claims that the one-good, perfect competition model is not a very satisfactory model, to say the least. In practice, the right model to think about rising capital-income ratios with capital shares is a multisector model (with a large role played by capital-intensive sec-

tors such as real estate and energy, and substantial fluctuations in *relative* prices) with important variations in bargaining power over time. In particular, intersectoral elasticities of substitution combining supply and demand forces can arguably be much higher than within sectors capital-labor elasticities.

The value of β in the long run is determined by the so-called Harrod-Domar-Solow formula. The hypothesis is that capital-income ratio converges towards $\beta=s/g$, where s is the long-run annual saving rate and g is the long-run total annual growth rate. The growth rate g is the sum of the population growth rate (including immigration) and the productivity growth rate (real income growth rate per person). This formula holds whether savings are invested in domestic or foreign assets (Piketty, Saez, 2014, p. 840). This is the “second fundamental law of capitalism”.

The higher the savings rate and the lower the growth rate, the higher the capital-income ratio β will be (Piketty, 2014a, p. 44). In a stagnant economy, where the amount of capital is high, the rate of saving exceeds the rate of growth, ($s>g$) so that β will be high and increasing. If both α and β are increasing, the concentration of wealth will also be high and increasing. At least this is what we observed in historical series. The tendency for capital to grow faster than the economy is also more likely when economic growth is relatively slow because both demographic or technical tendencies are weak.

If the rate of return on private wealth (defined to include physical and financial capital, land and housing) exceeds the growth rate of the economy, the share of capital in the national income will increase. If most of that increase is reinvested, the capital-income ratio will rise. This will further increase the share of capital income in the net income. When the rate of returns on capital rises more quickly than the overall economy and taxes on capital remain low, a vicious circle of ever-growing dynastic wealth takes place. This is what happened in the 19th century, a cycle broken only by wars and political revolutions in the first half of the 20th century.

The validity of Piketty's model depends crucially on two key propositions: i) the relative stability of rate of return on capital in the face of capital deepening; ii) a constant or rising saving ratio when growth is slowing down. Both hypothesis could be rejected on theoretical grounds. The answer to these questions cannot be given in abstract terms but only by looking at the empirical evidence. Piketty pioneered and clearly prefers this methodological approach.

3. THE “FUNDAMENTAL CONTRADICTION OF CAPITALISM”. THE INEQUALITY $r > g$ IN THE LONG RUN

Piketty claims that capitalists save a sufficiently large share of their returns to ensure that their capital will grow at least as fast as the economy. This is especially likely to be true for the extremely wealthy, who are also likely to enjoy the highest returns. People with inherited wealth need save only a portion of their income from capital to see that capital grow more quickly than the economy as a whole. Under such conditions wealth originating in the past automatically grows more rapidly than wealth stemming from work. This process tends to give lasting, disproportionate importance to inequalities created in the past, and therefore to inheritance (Piketty, 2014, p. 267). Inherited wealth will dominate over wealth amassed from a lifetime’s labor by a wide margin, and the concentration of capital will reach extremely high levels (Piketty, 2014a, p. 25). These levels are incompatible with the meritocratic values and the principles of social justice prevailing in modern democratic societies. When capital grows faster than the economy, that is when $r > g$, capital accumulation generates changes in the functional distribution of income in favor of capital. This inequality is the fundamental contradiction of patrimonial capitalism (Piketty 2014a, p. 298). Since incomes from capital are more concentrated than incomes from labor, the personal income distribution will also become more unequal. A vicious circle of ever-growing dynastic wealth starts, which cannot be reduced by an additional level of competition. How wealth is accumulated and distributed involves forces pushing towards divergence and towards an extremely high level of inequality.

Piketty does not believe that $r > g$ is the only or even the primary tool for explaining changes in capital income and wealth inequality. Institutional changes and political shocks, which can be considered endogenous to inequality and to the development process itself, are also very important (Piketty, 2015a, p. 48). In the real world, many shocks to the wealth trajectories of families can contribute to make the wealth distribution highly unequal. These shocks are related to financial or estate rates of returns, demographic factors, differences in saving behavior, differences in propensity to invest, differences in taste parameters, in labor market features, in the institutional and political setting. Differences in earnings to be saved and cumulated are also important shocks. Wealthier people can obtain higher average rates of returns than less wealthy people. Unequal rates of returns on capital are then a divergent force which

significantly amplifies and aggravates the effects of the inequality depending on $r > g$ (Piketty, 2015a, p. 50). These shocks will ensure that there is always some degree of downward and upward wealth mobility, so that wealth inequality remains bounded in the long run.

The gap between r and g is certainly not the only determinant of a steady-state wealth inequality. It is, however, one important determinant. For a given structure of shocks, the long-run magnitude of wealth inequality will tend to be magnified by a higher gap $r - g$ for a given variance of other shocks. Over a wide range of models, the long-run magnitude and concentration of wealth and inheritance are a decreasing function of g and an increasing function of r (Piketty, Zucman, 2015, p. 1343-1344). Under fairly general conditions, if the shocks take a multiplicative form, the top tail of the distribution of wealth converges towards a Pareto distribution. This is approximately the form that we observe in real world distributions, which corresponds to relatively flat upper tails and a large concentration of wealth at the very top. The inverted Pareto coefficient (an indicator of top-end inequality) increases sharply with the gap between r and g . What is very important is the *interaction* between the $r - g$ effect and the institutional and public policy responses including the progressive taxation of income, wealth, and inheritance; inflation; nationalizations, physical destruction, and expropriations; estate division rules (Piketty, 2015b, p. 75-76). The distributional effects of the $r > g$ inequality are deleterious for society as a whole: they favor property-owners over labor, not working over working, they make a mockery of equal opportunities and meritocracy, and they undermine democracy as the rich use their money to foster policies in their own interests.

From a theoretical perspective the effect of a decline in the growth rate g on the gap $r - g$ is ambiguous: it could go either way, depending on how a change in g affects the long-run rate of return r . This depends on a combination of forces, including saving behavior, multisector technological substitution, bargaining power and institutions. Generally speaking, a lower g , due either to a slowdown of the population and/or to a productivity decrease, tends to lead to a higher steady-state capital-output ratio $\beta = s/g$ and therefore to lower rates of return to capital r (for given technology). The key question is whether the fall in r is smaller or larger than the fall in g . However, if one assumes a fixed, exogenous saving rate s , then the steady-state capital-output ratio β will rise even more sharply as g declines. There is no general reason why $r - g$ should increase as g declines: it could potentially go either way. Historical evidence and new technological devel-

opments suggest that it should increase. Low growth is inevitable once countries have reached a very high level of income. It is the “dead hand” of the past generations (high β ratio) and the high rate of returns on capital that destroy the fabric of today’s advanced capitalist societies. “The past devours the future” (Piketty 2014a, p. 942).

4. THE EMPIRICAL FINDINGS: TRENDS IN CAPITAL-OUTPUT RATIO β , IN THE CAPITAL SHARE α IN NATIONAL INCOME AND IN THE INEQUALITY $r > g$ IN THE LONG RUN

Using the best available historical data, Piketty shows how the capital-output ratio β , the capital share α in national income, and the rate of return on capital r , have evolved over time. Piketty discusses the changes observed, what the main social and economic forces at work are, why these forces change over time, and what we can predict about how the rate of rate of return on capital will evolve in the twenty-first century. The capital-output ratio β is measured by dividing wealth expressed in the local currency of the time by national income, also expressed in the local currency of the time. The capital-income ratio then has “years” as a dimension. This ratio rose in advanced countries starting from around 1700, moderately rising or remaining stable around a value equal to 6 to 7 “years of national income” from the end of the nineteenth century until the First World War (*Fig. 1*).

Piketty explains this rise as the outcome of a continuous high rate of return on capital acting upon a steadily accumulating capital in an environment that was institutionally favorable to capitalists rather than to workers. In some European countries (Germany, France, United Kingdom) β has followed a pronounced U-shaped pattern over the past century. After the period of the “Belle Époque” β declines precipitously in continental Europe, UK and Japan (less so in the US). It then fell to about 2 to 3 “years” of national income in the 1950s. It has been rising regularly since then, and it is now back to about 5 to 6 “years” of national income slightly less than the level observed in the eighteenth and nineteenth centuries and up to the eve of World War I. With reduced taxes on profits and income (a point which Piketty extensively documents), and the quasi elimination of taxes on inheritance, the rebuilding of capital accelerated and β began its steady climb, reaching values in the early 21st century which were very similar to those prevailing a century ago.

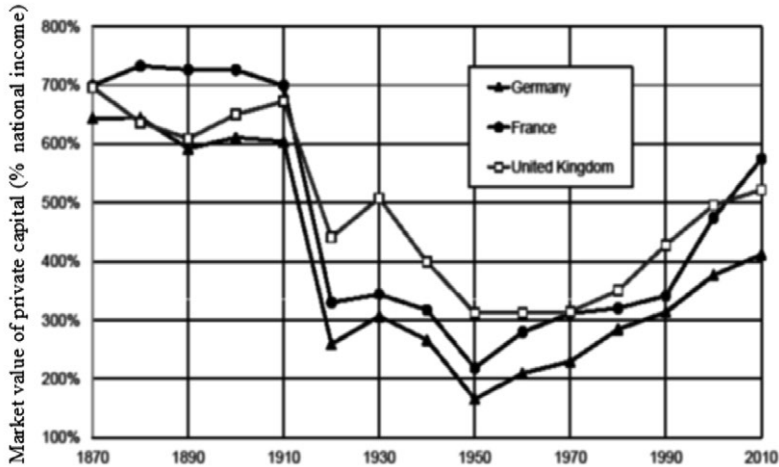


Fig. 1 – The private capital-income ratio in Europe, 1870-2010.

The private capital-output ratio β increased in all advanced countries. In Italy β increased more rapidly due to the rise of real estate prices, to the transfer of public capital into private hands and, finally, to the public debt placement (Fig. 2). In Italy, a comparison between the trends in private and public capital shows a decrease of public capital, in the period 1970-2010. Another similar trend is only observed in Canada.

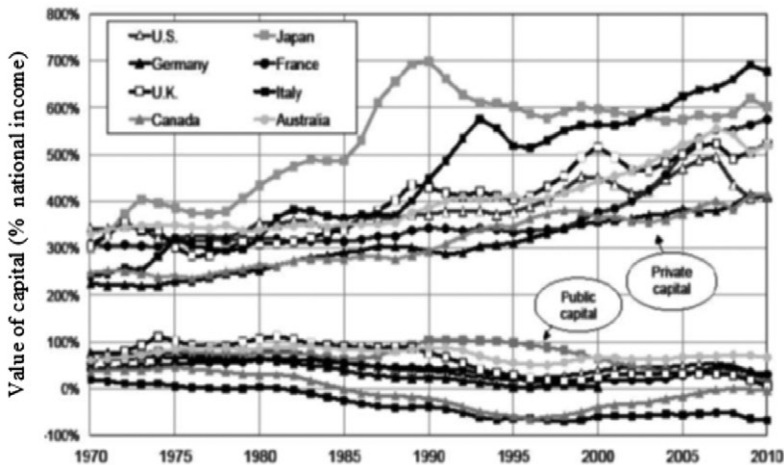


Fig. 2 – Private and public capital in rich countries, 1970-2010.

The US shows also a slightly U-shaped curve, with a capital-output ratio standing at a relatively lower level in the mid-20th century than at either ends of the century. In any case, this trend is much less marked than in Europe (*Fig. 3*) and the pattern is flatter (Piketty, Saez, 2014, p. 840).

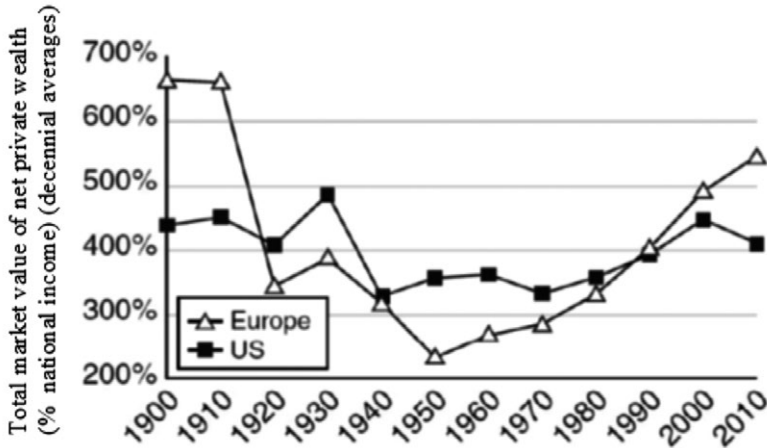


Fig. 3 – Wealth-Income ratios in Europe and the United States, 1900-2010, Market value of net private wealth (% national income).

At least three factors can explain the difference. The United States is an outlier because it was a “wealth-young country” where the weight of the “dead hand of the past generations”, that is of those who had accumulated capital in the past and transmitted it to the current generation, was relatively low (Milanovic, 2015, p. 522). Secondly, in the early years land, a component of capital, in the wide open spaces of North America was cheap. Thirdly, the lower capital-income ratio in the United States probably reflects the higher level of productivity. In this country, a given amount of capital could support a larger production of output than in Europe. The two world wars caused much less destruction and dissipation of capital in the United States than in Britain and France. In all three countries, and elsewhere, the private wealth-income ratio has been increasing since 1950, and is almost back to nineteenth-century levels (Solow, 2014, p. 5).

The fall of the private wealth-income ratios in Europe following the 1914-1945 capital shocks, can be well accounted for by three main

factors: direct war-related physical destruction of domestic capital assets and lack of investment. A large fraction of 1914-1945 private-saving flows was absorbed by the enormous public deficits induced by war financing. In some cases there was also a massive dissaving, *e.g.*, foreign assets were sold to purchase government bonds and the resulting public debt was eventually wiped away by inflation. Finally, there was a fall in asset prices. Real estate and stock market prices were both historically very low in the immediate postwar period, partly due to rent control, nationalization, capital controls, and various forms of financial repression policies (Piketty, Saez, 2014, p. 840).

The available data indicate that the capital share α in national income increased in most rich countries between 1975 and 2010 to the extent that the capital-income ratio increased (Fig. 4).

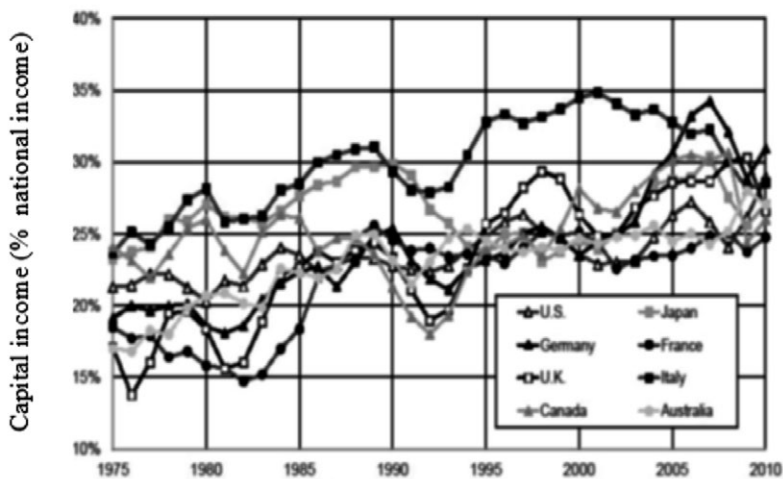


Fig. 4 – The capital share α in national income in rich countries, 1975-2010.

Based on historical evolutions observed in Britain and France, the capital share in national income follows the same U-shaped curve as the capital-income ratio β with a high level in the eighteenth and nineteenth centuries, a drop in the middle of the twentieth century, and a rebound in the late twentieth and early twenty-first centuries. However, the evolution of the rate of return on capital r significantly reduces the amplitude of this U-curve. The rate of return on capital was particularly high after World War II, when capital was scarce, in line with the principle

of decreasing marginal productivity. But this effect was not strong enough to invert the U-curve of the capital-income ratio, β , and transform it into an inverted U curve for the capital share α in national income (Piketty, 2014a, p.156).

The increase in the capital-income ratio β followed by a slight increase in α , and vice versa corresponds to a situation in which there are many different uses for capital in the long run so the elasticity of substitution between capital and labor σ is greater than one. The observed historical evolutions suggest that it is always possible, at least up to a certain point, to find new and useful things to do with capital (Piketty, 2014a, p.157-159). Moreover productivity growth has been running ahead of real wage growth in the American economy for the last few decades so that the capital share has risen and the labor share has fallen. The Cobb-Douglas hypothesis ($\sigma=1$) could be a good approximation for certain sub periods or sectors and, in any case, it is a useful starting point for further analysis. But this hypothesis does not satisfactorily explain the diversity of the historical patterns that we observe over the long, short, or medium run, as the data collected by Piketty show. Historical reality is more complex than the idea of a stable capital-labor rate of substitution suggests. (Solow, 2014, p.7).

The upward trend of capital share on national income is consistent not only with an elasticity of substitution between capital and labor greater than one but also with an increase in capital's bargaining power vis-à-vis labor over the past few decades, resulting from the increased mobility of capital and heightened competition between states to attract investments. It is likely that the two effects have reinforced each other in recent years, and it is also possible that this will continue to be the case in the future. No self-corrective mechanism exists to prevent a steady increase of the capital-income ratio, β , together with a steady rise in capital share on national income α . Whether the capital share α will keep rising in future decades is an open question. It depends on technological forces, on the bargaining power of capital and labor and on the collective institutions regulating the capital-labor relationship (the simple economic model with perfectly competitive markets seems excessively naïve) (Piketty, Saez, 2014, p.841).

Fig. 5 compares the net rate of return r (after taxes) with the rate of growth g for the period 1000-2100. In particular capital losses due to destruction of property in the period 1913–1950 are estimated. A huge positive gap between r and g ($g > r$) from Antiquity to the early 20th

century, an inversion ($g > r$) for most of the 20th century, and then, recently a positive gap appears once again. Piketty shows that r has generally been stable over the last two centuries despite massive changes in the β ratio. He also argues that, even if we go further back into the past, to the Roman times, r was steady at around 5-6%.

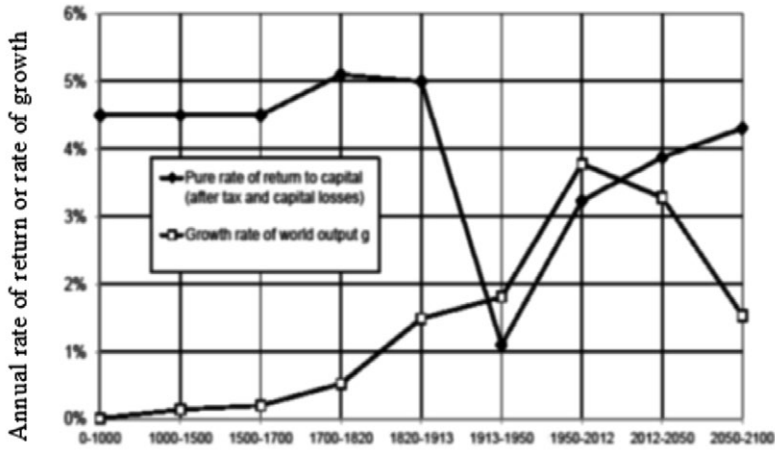


Fig. 5 – After tax rate of return vs. growth rate on a world-wide level from Antiquity until 2100.

The gap $r - g$ appears to be smaller when the growth rate is higher. This would tend to support the view that lower growth rates in the 21st century (in particular due to the projected decline of population growth) are likely to contribute to a rise of $r - g$. After World War II European economies, the US and Japan expanded faster than they ever had before. The European economies and Japan almost fully caught up with the United States in terms of worker's per-hour productivity, the private capital-output ratio and the net rate of return on capital were low, taxation was high, the functional distribution shifted in favor of labor, and the personal income distribution became more equal. An increasing growth rate of the population also drove g even higher (note that g is the sum of population growth and the growth of per capita income). On the other hand, institutional factors, including high taxation and the threat of Communism (which Piketty does not mention) kept r low, and thus uniquely in the history of capitalism reversed the inequality $r > g$. However, all signs are that the gap $r - g$ will become positive again. This

period called “the Golden Age” was a very special and unrepeatable phenomenon in the history of capitalism. But with the Thatcher-Reagan revolutions in the late 1970s capitalism reverted to the form it had in the late 19th century. Simple simulations show that this effect is sufficiently important to explain why wealth concentration did not go back to pre-WWI levels in the postwar period. Rising inequality rests primarily on the ability of the economy to absorb increasing amounts of capital without a substantial fall in the rate of return.

The inequality $r > g$ has clearly been true throughout most of human history, right up to the eve of World War I. The rate of return on capital was almost always at least 10 to 20 times greater than the rate of growth of output (and income). Indeed, to a great extent, this lays the foundation of a capitalist society. It is what allowed a class of owners to devote themselves to something other than their own subsistence. In the future, several forces might once again push towards a higher $r - g$ gap (particularly the slowdown of population growth, and an increasing global competition to attract capital) and higher wealth inequality. Economic policies and in particular the taxation of profits, have changed. Also, demographic transition (low rate of population growth), which of course reduces g further, now affects all European countries, and to a lesser extent the United States. Future trends, however, will depend on the shocks which capital is subjected to, on the rate of technological progress as well as on what public policies and institutions are introduced to regulate the relationship between capital and labor (Piketty 2014a, p. 254). Interestingly, Piketty sees today’s processes of growing financial sophistication and international competition for capital as helping to keep r high. Ultimately, which forces prevail is relatively uncertain.

The fact that the rate of return to capital r is permanently higher than the economy’s growth rate g does not in itself imply anything about wealth inequality. Many other forces might have led to a greater concentration of wealth in the 21st century, including a rise in the variance of shocks to demographic factors, to rates of return on capital, to labor earnings, to tastes for saving and bequests, and so on (Piketty, 2015b, p.79). Other factors might also have played a role. For instance, the rise of a wealthy middle class might partly come from the fact that the growth of incomes and living standards induced the rise of middle class savings. However, this process does not seem to have taken place in pre-WWI Europe, because of the powerful unequalizing impact of

the $r - g$ factor. To the extent that population growth (and possibly productivity growth) will slow down in the 21st century, and after-tax rates of return to capital will rise (due to rising international tax competition to attract capital, and maybe also to changing technology), it is likely that $r - g$ will increase again in the 21st century, which could lead to a structural rise in wealth concentration.

Finally, the last reason (and arguably the most important one) why $r - g$ might be high in the 21st century is due to the unequal access to high financial rates of returns. That is, even though the gap between the average rate of return r and the growth rate g is not particularly high, it could be that potentially large financial portfolios have access to substantially higher rates of returns than smaller ones. Financial deregulation might have contributed to such an evolution. According to *Forbes* rankings, for instance, the wealth of top global billionaires seem to be rising much faster than average wealth. This evolution cannot continue for too long, unless one is ready to accept an enormous increase in the share of world wealth belonging to billionaires (and a corresponding decline in the share going to the middle class). Overall, substantial uncertainty remains about how far wealth inequality might rise in the 21st century. More transparency and better information about wealth dynamics are needed.

5. THE EMPIRICAL FINDINGS. WEALTH AND INCOME INEQUALITIES

Piketty has revolutionized all research on income distribution by his use of fiscal sources and his focus on top income shares. In collaboration with Facundo Alvaredo, Anthony Atkinson and Emmanuel Saez (2014) he uses very detailed fiscal data to trace the evolution of income and wealth distribution in different countries. This choice is in line with the previous research carried out by Simon Kuznets who first used tax data, instead of household surveys, to study the links between economic growth and personal income distribution in the 1950s. The revolution that Piketty and his coauthors have brought to the field has certainly made everybody much more sensitive to the need to combine (nobody yet knows how) household surveys, that provide reasonably reliable income estimates for the bulk of the population, with fiscal data that are undoubtedly better suited for the very top of the income distribution (Piketty, 2014b).

However, the use of fiscal data as the sole (or even the best) approach to the analysis of income distribution is questionable. Its advantages are easy to point out: long-term series (centuries or more in developed countries), ability to focus on top incomes and to capture them much better than household surveys. Some “caveats” relating to any use of fiscal data must be stressed. Historically, individual income tax returns have been filed by a small percentage of the population even in today’s rich countries, so the long-term series could be of dubious quality. The same is now true in developing countries. At best we might know something about the top of an income distribution (the richest tax-filers) but we don’t have any information about the bulk of the population. Whether the highest tax-filers are really the richest people is also questionable. Not only because of the obvious incentive to under-report income or because in the past some particularly rich classes were exempt from taxation. There is also an important, even if technical, detail. Taxes are paid by fiscal units, not by individuals: so the richest fiscal units may change depending on the tax rules (*e.g.*, whether it is more advantageous to file jointly or separately). Moreover, the income that is reported to tax authorities is the fiscal income, not the concept of disposable income.

Even if we disregard these problems, Piketty’s calculations refer mostly to market income that is income before government transfers and taxes. The concentration of market income among fiscal units may, or may not, tell us much about the inequality in the distribution of disposable income among individuals, which is ultimately the concept we are interested in. It is quite possible that an increased concentration of market income (such as Piketty and Saez report for the United States) is not followed by an increased concentration of disposable income if taxes and transfers are more redistributive. It might be that inequality in disposable income declines. It did not happen in the case of the United States. But such a divergent movement cannot be excluded in principle. Piketty (pp. 440; pp. 520ff) mentions some of these caveats but essentially he ignores them.

It is striking, although not altogether surprising, to read a book which dedicates a large part to inter-personal income distribution, but does not contain a single reference to household surveys or to the Gini coefficient. In fact, the latter is dismissed as an “aseptic” measure of inequality because of its lack of intuitive meaning (what does a Gini of 0.45 mean to an average person?). Piketty argues that it conveys very lit-

tle information about income distribution. Piketty thinks that such a very “aseptic” feature has contributed to Gini’s popularity with statistical offices and politicians. On the other hand, income shares are intuitive and meaningful. Piketty’s preference is to split the distribution into four parts: bottom 50 percent, the next 40 percent, top decile and, as a part of it, top 1 percent. Piketty focus on what he calls “concentration” of wealth and incomes rather than inequality. Trends of the concentration in the distribution of income are measured by the value of the share owned (wealth) or earned (income) by the last decile of the population.

Available micro-level evidence on wealth dynamics for Europe and the United States, reported in *Fig. 6*, shows that wealth inequality is currently much less extreme than a century ago. The high gap between r and g presented in previous *Fig. 5* is one of the main reasons why wealth concentration was so high during the eighteenth–nineteenth centuries and up until World War I (Piketty 2014a) in pretty much every society. In this period the rate of return r was decreasing, but it was higher than g . After 1910 the inequality became $g > r$ bringing a decrease in wealth concentration. After 1950 the fundamental inequality $r > g$ started to increase again, and consequently wealth concentration also rose.

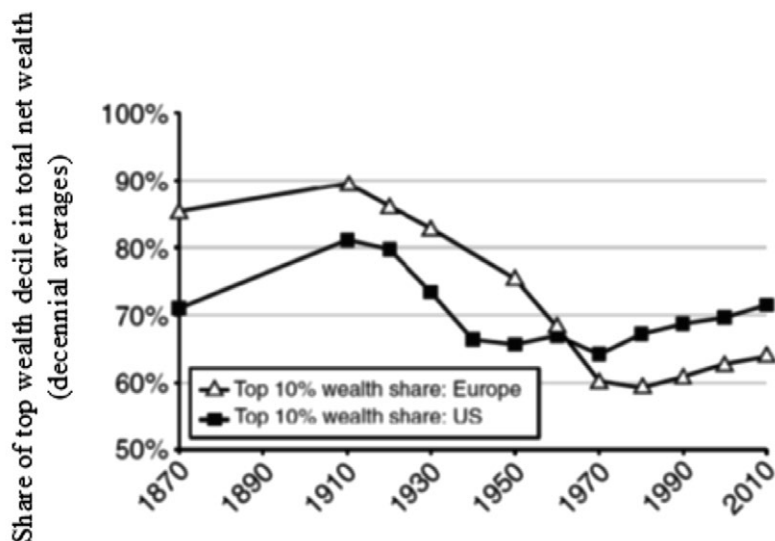


Fig. 6 – Wealth Inequality: Europe and the United States, 1870-2010.

Wealth concentration decreased steadily from 1910 to 1930 in the US and from 1910 to 1970 in Europe. Then it increased steadily from 1970 to 2010 showing higher values in the US compared to Europe. In the United States, the top 10 percent owns about 70 percent of the whole capital, half of that belonging to the top 1 percent; the next 40 percent — who make up the “middle class” —owns about a quarter of the total (much of that is housing), and the remaining half of the population owns next to nothing, about 5 percent of total wealth. (Solow, 2014, p.10). The typical European country is a little more egalitarian: the top 10 percent owns about 63 percent of the whole capital. The top 1 percent owns 25 percent of the total capital, and the middle class 35 percent (a century ago the European middle class owned essentially no wealth at all). According to Piketty high β does not mean exactly the same thing today as it did more than 100 years ago. We are indeed living in a phase of “patrimonial capitalism” (a new term coined by Piketty to designate the heritance-based capitalism), but with lower concentration of property at the top and with property that has penetrated much more deeply into the middle classes.

Empirical evidence on income inequality in the United States shows an inverted U-curve in the first period, between 1910 and 1940 (*Fig. 7*). After a long period of stability during the Golden Age (1942-1970) inequality started to grow systematically from the early '70s and subsequently, the share of the last decile grew to a rather high level, around 50%, in 2010 (Piketty, 2014, p.48). The turnaround is due not only to the Reagan and Thatcher policies that lowered taxes on the rich, but also to the arrival of Asians onto the labor markets of rich Countries, depressing the wages of unskilled workers, and also to the baby boom. The findings for this second period contradict Kuznets' well-known inverted U shape curve of income inequality according to which inequality increases at low income levels, peaks at some middling income, and diminishes as country becomes rich (Kuznets, 1955). In his monumental study of income distribution in the United States (1953) Kuznets observed a big fall in the income share of the richest for the period between 1929 and 1946, but this result was true only for the first period.

Piketty criticizes the Kuznets curve on several grounds. i) firstly Kuznets is criticized for not using sufficient empirical evidence or reading too much into very few data; ii) secondly, Piketty does not see any spontaneous forces in capitalism that would drive inequality of incomes down; rather, only spontaneous forces will push the concentration of

incomes up. Kuznets posited that income inequality first rises with economic development when new, higher productivity sectors emerge (*e.g.*, manufacturing industry during the industrial revolution) but then decreases as more and more workers join the high-paying sectors of the economy. Piketty's data show that this is not the reason why income inequality declined in developed countries during the first half of the 20th century; iii) thirdly, Piketty thinks that Kuznets misinterpreted a temporary slackening in inequality after World War II as a sign of a more benign nature of capitalism. Piketty argues this was due to unique and unrepeatable circumstances. There was no "structural transformation" of capitalism. iv) fourthly, he thinks that Kuznets' theory owes a part of its success to the optimistic message that it conveyed during the Cold War, namely that poorer capitalist economies were not condemned to high inequality; v) finally, Kuznets' overly optimistic theory of a natural decline in income inequality in market economies largely owed its popularity to the Cold War context of the 1950s as a weapon in the ideological fight between the market economy and socialism (Piketty, Saez, 2014, p. 842).



Fig. 7 – Income Inequality in the United States, 1910-2010.

Inequality in total income is now substantially higher in the US than in Europe, while the opposite was true until World War I (*Fig. 8*). At that time, high inequality was mostly due to the extreme concentration of capital ownership and capital income. In 1932, despite the eco-

conomic crisis, income from capital still represented the main source of income for the top 0.5 percent of the distribution. However, if we look at the composition of the top income group today, we find that a profound change has occurred. Today as in the past, income from labor gradually disappears as one moves towards higher income deciles. Income from capital becomes more and more predominant in the top centiles and thousandths of the distribution. Today one has to climb much higher in the social hierarchy before income from capital outweighs income from labor. Currently, income from capital exceeds income from labor only in the top 0.1 percent of the income distribution (Piketty, 2015b, p. 77).

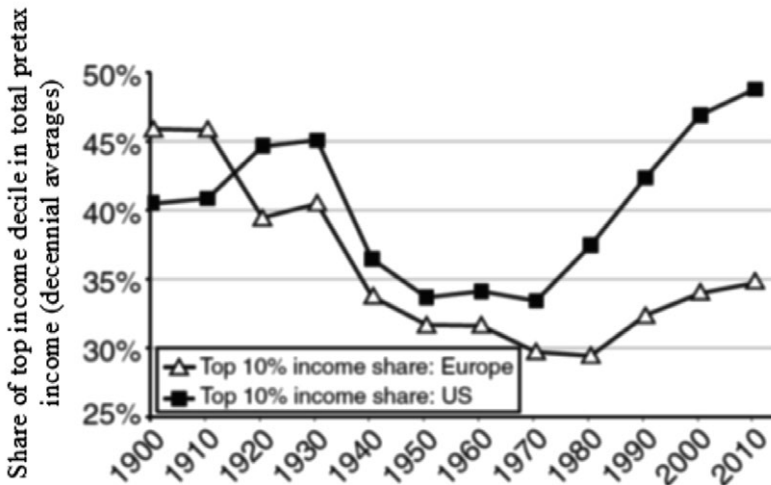


Fig. 8 – Income inequality: Europe and the United States, 1870-2010.

Over the 1980-2010 period the rise of top income shares in the United States in comparison with Europe is mostly due to rising inequality of labor earnings. About 60 percent of the income of the top 1 percent in the US today is labor income. This is a fairly recent development. In the 1960s, the top 1 percent of wage earners collected a little more than 5 percent of all wage incomes. This fraction has risen pretty steadily until nowadays. Piketty attributes this to the rise of what he calls “super managers”. The very highest income class to a great extent consists of top executives of large corporations, with very rich compensation packages (a disproportionate number of these, but by no

means all of them, come from the financial services industry). With or without stock options, these large pay packages get converted into wealth and future income from wealth. But the fact remains that much of the increased income (and wealth) inequality in the US is driven by the rise of the earnings of these super managers (Solow, 2014, p. 10).

This rise of top labor's income is clearly a very important historical development which can itself be explained by a combination of two factors: rising inequality in access to skills and higher education during this period in the United States and exploding top managerial incomes. If the large increase in the US labor income inequality in recent decades could be explained by insufficient educational investment for large segments of the US labor force, an evolution which might have been exacerbated by rising tuition fees and insufficient public investment, massive investment in higher education would be the right policy to curb rising income inequality. However, although the race between education and technology is very appealing, it fails to explain the unprecedented rise of top labor incomes that has occurred in the United States over the past few decades. This is largely due to the rise in top executive compensation in large US corporations (both financial and nonfinancial) itself probably stimulated by changing incentives and norms and by large cuts in top tax rates (Piketty 2014a, ch. 14; Piketty, Saez, and Stantcheva 2014). Piketty doubts that labor incomes of bankers and financiers could be determined by marginal productivity according to the level of human capital. He cites evidence to show that such top earnings depend mostly on chance events which have nothing to do with the quality of the management. Their high wages are the product of a collusive agreement between themselves and the boards.

The boundaries between the various subgroups that make up the top decile of the income hierarchy have changed over time: income from capital used to predominate in the top centile but today it only predominates in the top thousandth. Labor incomes received by top managers and bankers place them, alongside the "rentiers", in the top 1%. The members of this group who "cohabit" are the "coupon-clipping rentiers" and the "working rich". Essentially, modern "patrimonial capitalism" has succeeded in spreading modest property across the entire top half of the income distribution (as opposed to the top 5% in the early 1900s) and in creating high labor incomes. However the ownership of capital, often through inherited wealth, still remains crucially important. Piketty shows that the annual flow of inheritance as a share

of national income in today's France, UK and Germany is about the same as it was one century ago that is, between 8 and 12 percent of the national income.

In conclusion, Piketty claims that today's "patrimonial capitalism" is not exactly the same it was as a century ago. It has a broader base and the concentration of wealth at the top is lower. High labor incomes are more frequent. Moreover, income from wealth is probably even more concentrated than wealth itself because, as Piketty notes, large "blocks" of wealth tend to earn higher rates of returns than smaller ones. "Some of this advantage comes from economies of scale, but more may come from the fact that very big investors have access to a wider range of investment opportunities than smaller investors" (Solow, 2014, p.10). But the key feature of "patrimonial capitalism, which is its ability to generate a satisfactory income without the pain of work, is still there. A society of super-rentiers has been substituted by a less extreme form of rentier society, with a better balance between success through work and success through capital. Societies, however, where the ratio between capital and income β is high, and the rate of return on capital exceeds the rate of growth of the economy, will always tend to convert entrepreneurs into "rentiers". In such societies the idea that free competition will put an end to a heritage-dominated society and "will lead to an ever more meritocratic world is a dangerous illusion" (Piketty, 2014a, p.299).

6. REMARKS ON PIKETTY'S APPROACH

Several daily and weekly newspapers have hosted reviews of "Capital in the Twenty-First Century", which have almost always been very positive (Krugman, 2014; Stiglitz, 2014a; Solow, 2014). Few reviews have been critical. Firstly, they limited themselves to criticizing the reliability of the sources used and the estimates presented (Giles, 2014). Criticism on the sources, however, do not appear to have significantly weakened the volume's content. Piketty succeeded in answering all the questions raised in the "Introduction" from the empirical point of view estimating, in the long run, the trends of capital-output ratio, of the rate of return to capital, of the capital share on national income, of inequality in wealth and income distributions. Criticisms were followed by several articles in Piketty's defense. The author himself replied by

pointing out that the results obtained, showing an increasing inequality, and the consequent negative effects in terms of growth, based on empirical evidence, can only be the result of an imperfect inference, as always happens in social sciences. As Amartya Sen (2014) claimed, “in any study of this kind you have to use diverse sources of data, and it is inescapable that you have to establish certain linkages on which it is possible to have debates”.

More recently, the theoretical framework, the methodological approach and in particular the concept of “capital” and of the “saving rate” adopted by Piketty have been challenged. French economists, especially, criticized this approach (Aghion, 2014). Piketty replied to the numerous and different remarks on his book writing by some new papers. He argued that the main topics of the book had been “simplified in the telling and retelling” so that the original messages had been misunderstood. The messages, however, are very clear. There are many factors that generate inequality in income and wealth: institutional, socio-economics and demographic. The factors which explain the dynamics of wealth (accumulation of capital) are different from those which explain the dynamics of labor income (demand and supply of skills, education and technology). It is very difficult, therefore, to reach a consensus on a shared theory of personal income distribution.

At least eight issues deserve deeper discussion and some critical remarks.

i) Is the definition of “capital as wealth” compatible with an approach based on a CES production function? Piketty’s definition of capital as being “interchangeable” with the concept of wealth has been criticized as being too heterogeneous and ambiguous. Capital, in the Piketty approach, is any asset that gives rent to its owners. Rent, therefore, must be considered not the result of any imperfection in the market, but as the consequence of a “pure and perfect” market for capital. It has absolutely nothing to do with the problem of imperfect competition or monopoly. Piketty argues that he is interested in a concept of capital which can be linked to the personal income distribution. Therefore, the inclusion in capital-wealth of any kind of asset owned is justified. This is a different perspective from the traditional one in which capital is a factor of production. In that case, capital would be linked to the output and not to the owner’s income.

If capital is not the traditional neo-classical factor of production, it is difficult to justify the use of a CES function as a tool for estimating the

share of capital on national income, depending on the value of the elasticity of substitution between capital and labor. Wealth includes assets that have value but which do not produce output (precious metals, works of art). The owners of wealth can obtain rent of returns as financial gains, rent from an apartment, which become income. These incomes are not the result of a relation between capital, labor and output. It would then be necessary to build models suitable to estimate the links between returns and different kinds of capital, and not only returns resulting from the modeling of a production function. It is not a simple task, of course, but a clearer distinction between the two concepts of capital as a factor of production and capital as wealth need to be assessed.

ii) Is the definition of “capital” and “rent” introduced by Piketty the right concept to analyze the trend of inequality in income distribution in the long run? What about the value of real estate and financial assets? The choice to include houses in total capital has been questioned. The value of housing capital if estimated on the basis of house prices is not necessarily correlated with the share of income it generates in national income. In fact, this value has rapidly progressed in several countries over the last decades, but the corresponding share of income, on the other hand, has only progressed slowly or remained stable as in France, or even decreased as in Japan. Housing is a very particular component of capital and does not provide a good measure of the actual rate of return on capital (Bonnet *et al.*, 2014).

The rate of returns on housing capital (the key ingredient in Piketty’s model) should be measured by the “monetary rent” on housing that owners-landlords receive, or by the “implicit” rent that owner-occupiers have. These are the source of income and of the accumulation of capital, rather than the house prices which have been *over* their long run value for more than a decade (Trannoy and Wasmer, 2013). Housing capital based on house prices (overvalued or undervalued) is generally “disconnected” from the value of rents which are factors of the inequality generating process. The prices of real estate follow trajectories that are independent from economic growth and they can fluctuate more than national income. It has been shown by Bonnet and his coauthors (Bonnet *et al.*, 2014) that real estate capital does not reflect long-term trends, particularly because it incorporates the phenomena of real estate bubbles. The value of real estate, if based on current prices, incorporates a speculative component which influences the monetary value of capital. This is why the value of capital-output ratio has increased in the last

decades without a parallel rise in the productivity level. The value of housing capital would be consistent with the Piketty's theoretical analysis, only if this value corresponded to an actualized value of rent and did not rely on housing prices (Bonnet *et al.*, 2014).

Bonnet and his coauthors recalculated the value of housing capital estimating rent indices and considering these as the right measure. They found that the rise in the capital-income ratio has been modest over the recent period (Bonnet *et al.*, 2014, p. 3). When one corrects the measure of real estate capital at a macroeconomic level, the ratio between capital and income either stagnates or increases slightly instead of increasing steadily. In the longer run, however, a decline in the capital-income ratio rather than a U curve was observed, contradicting Piketty's thesis. The value of the real estate capital-output ratio drops slightly between 1950 and 1970, remains constant between 1970 and 2000 and increases only between 2000 and 2010. The rise in the prices of households did, however, have consequences from a microeconomic point of view, on the wealth trajectories of individuals and dynasties. In particular, it is increasingly difficult for an individual without initial wealth to become a homeowner in country like France.

iii) Is the concept of a net-of-depreciation saving rate s the right concept to be adopted? A radical critic of Piketty's "second fundamental law of capitalism" has been advanced by Krusell and Smith. They argue that this law is rather implausible. Though Piketty calls the second law an 'accounting equation', it really is more of a theory, because it is the result of a certain form of savings behavior. It says that if the economy keeps the savings rate, s , constant over time, then the capital to income ratio k/y must, in the long run, become equal to s/g , where g is the economy's growth rate. It suggests that were the economy's growth rate to decline towards zero, as Piketty argues it will, the share of capital on income could increase explosively (Krusell and Smith, 2015, p. 726).

Piketty's assumption that the net saving rate is constant is actually the same assumption made in the very earliest formulations of the neo-classical growth model, including the one elaborated by Solow (1956) in his original paper. But this hypothesis later has been changed. In the textbooks capital-to-income ratio is not s/g but rather $s/(g+d)$ where d is the rate at which capital depreciates. The gross savings rate, *i.e.* gross investment (including depreciation), and not the net saving rate s is considered constant. With the textbook formula, the capital-output ratio would increase much more modestly with growth in sharp con-

trast to Piketty's theory and contradicting the result that comes from $\beta=s/g$. The two formulas in Piketty's approach are not really inconsistent because income, y , is also the net income, that is, income net of depreciation (Krusell and Smith, 2015, p. 727).

Piketty and Saez (2014) illustrate the use of the second law in comparative statics. In the long run, they claim one can show that the wealth-to-income (or capital-to-income) ratio converges towards $\beta=s/g$ where s (the net saving rate) is the long-run annual saving rate and g is the long-run annual total growth rate of the net income. "The growth rate g is the sum of the population growth rate . . . and the productivity growth rate. . . That is, with a saving rate $s=10\%$ and a growth rate $g=3\%$, then $\beta \approx 300\%$. But if the growth rate drops to $g=1.5\%$, then $\beta \approx 600\%$. In short: Capital is back because low growth is back. . . . As long as there is a positive net saving rate $s > 0$, the quantity of accumulated capital K will go to infinity. . . . With positive but small growth, the process is not as extreme: The rise of β stops at some finite level. But this finite level can be very high" (Piketty, Saez, 2014, p. 840).

The hypothesis that market economies would accumulate as aggressively as implied by Piketty's theory of saving when growth falls seems implausible. In Piketty's model the net saving rate is kept constant at a positive value when growth falls. He asserts that the net saving rate and the growth rate are "influenced by any number of social, economic, cultural, psychological, and demographic factors" and are "largely independent of each other" (Piketty, 2014a, p. 199). Piketty treats the net saving rate as a free parameter, analogously to how Solow's textbook model treats the gross saving rate (Krusell and Smith, 2015, p. 742). However, in the standard theories of saving based on optimizing behavior and widely used in macroeconomics, gross saving moves positively with g . Furthermore, according to some sample data, the gross saving rate does not appear to be entirely independent from g . The second fundamental law is quite weak because historical data on the United States are in contrast with Piketty's hypothesis of a stable value of the saving rate which is independent from the growth rate of the economy. In post-war US data, with declines in growth, the net savings rate fell historically, and it is currently close to zero. Decadal averages of saving rates and growth rates, show a clear positive relationship. That s will remain constant and positive in the twenty-first century does not appear to be a good assumption at all (Krusell and Smith, 2015, p. 739).

A central issue, largely absent in Piketty's book, is the role of

depreciation that destroys capital and forces capitalists to devote resources to its accumulation. The formulation, in which gross saving instead of net saving appears, plays no role in the book. As a matter of fact gross saving should be put in relation to gross output rather than to net output. Piketty's predictions for the future depend critically on the saving theory that he employs and on the theory he uses. Solow's textbook model, which maintains a constant gross saving rate, "does a better job of matching past data, but models based on standard intertemporal utility maximization provide an even better match, since these predict falling net and gross saving rates as g falls, as it has been observed in long-run data. These models are also firmly grounded on empirical work documenting how households save" (Krusell and Smith, 2015, p. 747).

iv) If the capital-output ratio increases (so much), would the marginal rate return to capital r not go down? Stiglitz (2014b) proposes two alternative hypothesis regarding the drivers of inequality in today's US that can explain the "Piketty puzzle" of a rising wealth-income ratio together with a rise in r and stable wages. The first answer must be found in the role of Institutions and policies such as banking and finance. The banking system made credit easily available which in turn led to over-investment in housing and to the increase in the wealth-income ratio discussed by Piketty. This increase, however, did not led to greater productivity. The value of land and of real estate increased, not the physical quantity of productive capital. Instead of lending to companies to invest in new capital, banks lent money to people who spent it on housing and unproductive assets.

Stiglitz (2014b) also argues that the decline in interest rates, which recently followed expansionary policies, has exacerbated inequalities by increasing the value of stock options and other financial instruments available to those (entrepreneurs, managers) who belong to the richest classes of the population. In this case, growth, stimulated by policies especially when it is accompanied by lower interest rates, is a source of inequality, not the stagnation of economies. It is exactly the opposite of what is stated by Piketty.

v) How can we explain the changes in inequality within countries, particularly in the industrialized ones, without taking in account variables such as the institutions and the effects of different kinds of policies whether monetary, fiscal or redistributive ones? Acemoglu and Robinson (2015) claimed that Piketty did not take into account the role

of institutions in shaping inequality. Piketty's reply came in a paper he wrote in which he attempted to overcome the critics, arguing that in his book he had developed a new historical and political economic approach to the study of institutions (welfare state, free education, progressive taxation) and inequality dynamics. He emphasized the role of political conflict, wars and revolutions, as causes of inequality. On the other hand, steady democratic forces resulting from the extension of suffrage also played an important role in the rise of more inclusive social, educational, and fiscal institutions during the 19th and 20th centuries (Piketty, 2014c)

vi) What about the value of the elasticity of substitution between capital and labor? Some doubts have been advanced on the hypothesis that the elasticity of substitution between capital and labor is likely to remain higher than one, and that an increase in capital will not drive r down. This argument goes against one of the fundamentals of economic theory that rate of returns to an abundant factor of production are decreasing. Piketty is indeed critical of a blind belief that marginal rate returns always set the price for labor and capital, but these issues are not fully developed (Milanovic 2014, p.527).

vii) Is Piketty's approach the right one to explain not only trends in inequality, but also to enlighten factors behind the level of inequality? Pier Luigi Porta (2014, p.201) argues "Piketty's analysis has been justly praised from most quarters. But he risks focusing too much on the symptoms rather than going directly to the heart of the matter and curing the illness". Piketty innovatively links the rate of returns from capital to the growth rate of national income. On the basis of this relation he derives the value of capital concentration, of the inequality in the functional distribution of income and finally, of the inequality in the personal distribution of income. However, the levels of inequality are estimated separately for different variables and for different countries. The trends of the rate of returns to capital and of the growth rate g are compared but not really estimated together. The question is, also, how to link the value of endowments (different forms of capital and labor) to income, and once again to estimate the accumulation process from saving to capital and from investment to output in a circular loop.

viii) What are the links between the inequality $r > g$ and the concentration of wealth? Replying to Mankiw (2015) Piketty claims that "the inequality $r > g$ holds true in the steady-state equilibrium of the most common economic models, including representative-agent mod-

els where each individual owns an equal share of the capital stock...and does not entail any implication about wealth inequality” (Piketty, 2015a, p. 49).

Sala-I-Martin (2014) and Debraj Ray (2014) argue that the inequality $r > g$ is a condition of economic efficiency. An economy where $r < g$ is inefficient in the sense that it has been saved too much. Therefore the $r > g$ relationship does not tell us anything about increasing inequalities. Only a detailed study of inheritance can enlighten us as to whether inheritances are key factors in explaining inequalities.

7. ECONOMIC POLICY RECOMMENDATIONS

The last chapters of “Capital in the Twenty-First Century” discuss some policy proposals. According not only to Piketty, but also to authors like Stiglitz (2014b), the sources of inequality in the US today are so profound that policies like the increase of the minimum wage and better education will not go to the root of the problem. Social mobility can be increased most of all by improving the quality of schools. The US is the country of the OECD where school performance greatly depends on the social origin of the pupils. Taxation must be considered one tool among many others to increase social mobility while stimulating growth through innovation. “A well designed tax system can do more than just raise money—it can be used to improve economic efficiency and reduce inequality. Our current system does just the opposite” (Stiglitz, 2014c).

Piketty claims that it is necessary to prevent that only the richest group are able to gain prominent positions in the society. Therefore it is necessary to introduce alternative policies because the composition of wealth is heterogeneous. It is necessary to reform the tax system by adopting progressive taxation not only on income but also on different types of wealth. It would be especially necessary to introduce a progressive tax on estate and inheritances and to standardize the taxation of capital worldwide or at least on a European level in order to limit the high concentration of top incomes. Higher taxes on the super-rich will have minimal revenue effect, but they will dissuade bankers and managers from asking for such exorbitant remunerations. As Piketty points out, the role of “confiscatory” (marginal) taxation is not to collect revenue but to limit “socially unproductive” high incomes which are a

waste in the sense that they are not needed to produce greater output. Taxation is also needed to curb the political power of the richest.

The policy recommendation that has attracted greatest attention is Piketty's call for a global taxation of capital. The only way to reverse the $r > g$ inequality, if g is exogenously given, is to reduce r . A progressive wealth tax on a global scale, based on the automatic exchange of bank information, is suggested by Piketty not only as "useful utopia", but as a proposal to think about.

8. CONCLUDING REMARKS

Some results offered by the empirical research on trends in private capital-output ratio, rent on capital, share of capital in national income, rate of growth of the economy can be summarized. Piketty documents how for three decades, from the post-war reconstruction to the seventies (the so-called "golden age"), the rapid industrialization process, along with progressive fiscal policies and public spending, sustained the growth of the middle class, the consolidation of democracy and a high growth rate in all the western countries. This phase has been reversed since the end of the last century. Parallel to the increase in inequality a slowdown in growth, if not an actual decline has been observed, in at least some countries. An important finding is that the private capital-ratio in Europe has been rising above US levels. Another important finding is the recent big rise in the income shares of the top 1 per cent in English speaking countries (above all the US) since 1980.

An increase in inequality ends with slow growth rather than stimulating it. First of all there is no general tendency towards greater economic equality. Secondly, the relatively high degree of equality observed after World War two was partly a result of policy, especially progressive taxation, but even more so of the destruction of inherited wealth because of the war, particularly within Europe between 1914 and 1945. A further lesson is that "patrimonial capitalism" of the late 19th century could be reproduced, if fiscal and redistributive policies were not introduced. The last chapter of the book concludes: "Without real accounting and financial transparency and sharing of information, there can be no economic democracy. Conversely, without a real right to intervene in corporate decision-making (including seats for workers on the company's board of directors), transparency

is of little use. Information must support democratic institutions; it is not an end in itself. If democracy is someday to regain control of capitalism, it must start by recognizing that the concrete institutions in which democracy and capitalism are embodied need to be reinvented again and again” (Piketty, 2014a, p. 397).

REFERENCES

- Aghion P. (2014), La théorie de Piketty est contestable ainsi que l'analyse empirique qu'il utilise, *L'Opinion*, mai 13, at <http://www.scoop.it/t/pjse-umr8545/p/4022351794/2014/06/02/philippe-aghion-la-theorie-de-piketty-est-contestable-ainsi-que-l-analyse-empirique-qu-il-utilise>.
- Alvaredo F., Atkinson A., Piketty T. and Emmanuel Saez E. (2014), *The Top World Incomes Database*, at <http://topincomes.parisschoolofeconomics.eu/>
- Bonnet O., Bono P. H., Chapelle G. and Etienne Wasmer (2014), *Does Housing capital contribute to inequality? A comment on Thomas Piketty's Capital in the 21st Century*, Discussion Paper 2014-07, Department of Economics, Sciences Po, Paris <http://www.insee.fr/en/insee-statistique-publique/connaitre/colloques/acn/pdf15/ACN2014-Session5-4-texte-3.pdf>
- Giles C. (2014), Piketty findings undercut by errors, *Financial Times*, may 2014, at <http://www.ft.com/intl/cms/s/2/e1f343ca-e281-11e3-89fd-00144feabdc0.html#axzz3P0S4pQBY>
- Lucas R.(2004), The Industrial Revolution: Past and Future, *Federal Reserve Bank of Minneapolis*, may.
- Krugman P. (2014), Why We're in a New Gilded Age, *The New York Review of Books*, May 8 at <http://www.nybooks.com/articles/archives/2014/may/08/thomas-piketty-new-gilded-age/>
- Kuznets S. (1953), *Shares of Upper Income Groups in Income and Savings*, National Bureau of Economic Research, New York: NBER, at <http://www.nber.org/books/kuzn53-1>
- Kuznets S. (1955), Economic Growth and Income Inequality, *American Economic Review*, vol. XLV (1), march, pp. 1-28.
- Mankiw, G. (2015), “Yes, $r > g$. So what?”, *American Economic Review* 105 (5), pp.43-47, at <http://dx.doi.org/10.1257/aer.p20151059>.
- Milanovic B. (2014), The return of “patrimonial capitalism”: review of Thomas Piketty's *Capital in the 21st century*, *Journal of Economic Literature*, 52(2), pp.519-534, at https://www.gc.cuny.edu/CUNY_GC/media/CUNY-Graduate-Center/PDF/Centers/LIS/Milanovic/papers/2014/Piketty_book3.pdf
- Krusell P. and Anthony A. Smith Jr. (2015), Is Piketty's “Second Law of Capitalism” Fundamental? *Journal of Political Economy*, 123, (4), pp. 725-748, at <http://www.jstor.org/stable/10.1086/682574>
- Piketty T. (2014a), *Capital in the Twenty-First Century*, Cambridge, MA.: Harvard University Press.

- Piketty T. (2014b), Technical Appendix of the book “*Capital in the Twenty-First Century*”, march, Harvard University Press, at <http://piketty.pse.ens.fr/capital21c>
- Piketty T. (2015a), About Capital in the 21st Century, *American Economic Review: Papers & Proceedings 2015*, 105(5): 48-53, at <http://dx.doi.org/10.1257/aer.p20151060>
- Piketty T. (2015b), Putting distribution back at the center of Economics: Reflections on Capital in the Twenty-First Century, *Journal of Economic Perspectives*, Vol. 29 (1), pp. 67-88, at <http://piketty.pse.ens.fr/files/Piketty2015JEP.pdf>
- Piketty T. and Emmanuel Saez (2014), Inequality in the Long Run, *Science*, 344(6186): 838-43 at <http://eml.berkeley.edu/~saez/piketty-saezScience14.pdf>
- Piketty T., Saez E. and Stefanie Stantcheva (2014), Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities, *American Economic Journal: Economic Policy*, vol.6 (1), p. 230-271, at https://www.economicdynamics.org/meetpapers/2012/paper_78.pdf
- Piketty T. and Gabriel Zucman G. (2015), Wealth and Inheritance in the Long Run, in: Atkinson A. and François Bourguignon (eds.), vol 2, *Handbook of Income Distribution*, Elsevier, at <http://piketty.pse.ens.fr/files/PikettyZucman2014HID.pdf>
- Porta P.L. (2014), Distributive Justice versus Commutative Justice, *International Review of Economics*, 61(2):197-201.
- Ray D. (2015), *Nit-Piketty. A comment on Thomas Piketty's Capital in the Twenty First Century*, CESifo Forum, 1/2015, march, at <http://www.econ.nyu.edu/user/debraj/Papers/Piketty.pdf>
- Sala-I-Martin X. (2014), Piketty y “Capital en el Siglo XXI”, mimeo, at <http://salaimartin.com/randomthoughts/item/720>.
- Sen A. (2014), Inequality: Why Thomas Piketty is Mostly Right, *Social Europe*, june 13.
- Solow R.M. (1956). A Contribution to the Theory of Economic Growth, *The Quarterly Journal of Economics*, vol.70, n.1, pp.65-94.
- Solow R.M. (2014), Thomas Piketty is right, Capital in the Twenty-First Century’ by Thomas Piketty, reviewed, *New Republic*, April 22, at <http://www.newrepublic.com/article/117429/>
- Stiglitz J.E. (2014a), Democracy in the twenty-first century, *Project Syndicate*, December, at <http://www.project-syndicate.org/commentary/joseph-e-stiglitz-blames-rising-inequality-on-an-ersatz-form-of-capitalism-that-benefits-only-the-rich>
- Stiglitz J.E. (2014b), *Inequality in America: A Policy Agenda for a Stronger Future*, 2014 Moynihan Prize Lecture.
- Stiglitz J.E. (2014c), *In defense of capitalism*, Bill Moyers.com, August 2014, at <http://bill-moyers.com/2014/08/22/joseph-stiglitz-in-defense-of-capitalism/>