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# Capital, Growth and inequality in Piketty's approach. A critical review.

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# Capital in the 21st century

"Capital in the Twenty-First Century" is, mainly, an empirical research on:

i) wealth's and income's inequality trends,

ii) on growing inequality through the generations along the hereditary transmission of different forms of physical (productive, land and estate) and financial capital,

iii) on the "sustainability" of a capitalist system in which inequalities are increasing.

Growing inequalities, some of the critical issues facing the world today, are estimated and discussed in Piketty's work in an overall economic framework.

Despite an impressive empirical evidence on growing inequality in income and wealth distribution, the subject has received little attention in public debate and in the academic research. It was been released from the agenda of the economic research because of, at least, three reasons:

i)As a result of the growing influence of neo-classical thought. Robert Lucas (2004, p.15) claimed “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”.

ii) On the ground that efficiency was the goal to be reached in the market equilibrium. Equality was considered only a subordinated restraint.

iii) The well-known Kuznets’ inverted U shaped curve (inequality increases at low income levels, peaks at some middling income, and diminishes as country becomes richer), was accepted as true.

Only recently inequality has become the focus of remarkably wide-ranging attention, from Davos "World Economic Forum" and the State of the Union Presidential address to Oxfam Reports and to, finally, also academic journals across a variety of disciplines. In some recent IMF's studies, high inequality is considered hampering and not stimulating growth.

With the progress in welfare economics, the trade-off between efficiency and equity has been questioned and their separability is no longer accepted.

Atkinson (2015) argues that total production is linked to and depends on the income's distribution. Income distribution is the core of the production process.

"To bring the study of income distribution in from the cold" is one of the main tasks of economics (Atkinson, 1997).

The great success of  Piketty’s book can be explained mainly by the interest and the worry toward issues as growing poverty and growing inequality.

Several daily and weekly newspapers have hosted reviews almost always very positive of the book (Krugman, 2014; Stiglitz, 2014a; Solow, 2014).

Only few have been negative (Giles, 2014). Criticism on the sources of data, however, do not appear to have significantly weakened the volume’s content.

Only recently the theoretical framework, the methodological approach, the concept of “capital” and of “saving rate” adopted by Piketty were challenged.

In some 950 pages of the French original, and in 696 pages of the English translation of *Capital in the 21st century* are packed so many topics, insights, comments and observations that affect almost all spheres of economics, than no single review can summarize them.

In this critical review I will focus mainly on the factors which can explain the trends of the concentration of wealth and of personal income distribution.

I will also present some features of the theoretical framework discussing some of the aspects that can be considered weak from the analytical and methodological point of view.

# The framework

Piketty's analysis can be considered "classic", only partially. Piketty is not interested in explaining the role of the (functional) income distribution *on* the accumulation of capital and growth. He is interested, instead, in the role of growth *on* wealth's and income's concentration.

The method, however, can be considered "classic", in the sense of building "a simple machine that captures the key features of a capitalist economy" (Helburn, 2015, p. 2).

Connecting with the classical tradition of Smith, Ricardo and Marx, Piketty traces capitalist development and distribution as it has evolved into the 21st century.

Piketty does not distinguish between capital as factor used to produce wealth or wealth. Capital and wealth are equivalent.

iketty concept of capital does’nt include durable goods. It includes, instead the value of real estate, which has also a speculative nature. This is why the increase in the value of capital of the last decades did’nt result in greater productivity. The value of land and real estate increased not the physical quantity of productive capital.

Piketty investigates how the ratio between the saving rate and the rate of growth of the economy determines the capital output ratio, and consequently also the share of capital in the national product.

When returns on capital rise more quickly than the overall economy, and taxes on capital are low, a vicious circle of ever-growing “dynastic wealth” starts.

# The model

The analytical framework for the empirical analysis of the past trends, which becomes also a tool for predicting rising inequality in the future, consists of one definitional relationship, two fundamental economic “laws” of capitalism, and a “fundamental inequality”.

i) the first model is a quite standard Harrod-Domar-Solow macro model aimed to determinate the share of capital on national income and the capital-income ratio in the long run;

ii) the second model rather “mathematical in nature” is aimed at linking growing inequality to the gap between the growth of the economy and the rise of the rate of return of capital.

The definitional **identity** $K/Y = \beta$ links the stock of capital K (all forms of assets that explicitly or implicitly give a return) to the flow of income Y.

The **"first fundamental law of capitalism"** links $\alpha$ (the share of capital's income) to the capital-income ratio $\beta$ and to the average return to capital $r$ where $\alpha = r \times \beta$. "we can consider this definition a "law" of capitalism in the sense that in a private capital economy the returns on capital are income of capital owners" (Milanovic, 2014, p.3).

This "law" defines the distribution of income in terms of shares going to capital and labor. But capital's share in national income has influence on personal income distribution only if capital is privately owned (Helburn, 2016, p.1).

The relation between $r$ and $\beta$ depends on the elasticity of substitution $\sigma$ between capital K and labor L in a Cobb-Douglas production function Y=F(K, L).

Assuming that $r$ is equal to the marginal productivity of capital it decreases when $\beta$ increases.

If $\sigma=1$, $r$ falls in the same proportion than the increases of $\beta$ so that $\alpha$ remains constant.

When $\sigma>1$, $r$ falls less than proportionately when $\beta$ increases and the capital's share increases.

However $r$ may be higher than the marginal productivity of capital because of

i) the relative bargaining power of the various parties involved or

ii) there is not a relation between the marginal product of capital and the values of wealth increasing because of speculative reasons (investments in housing, expansionary finance).

The **“second fundamental law of capitalism”** gives the long-run equilibrium condition. From basic growth theory according to “the so-called Harrod-Domar-Solow formula”, $\beta = K/Y = s/g$. In this model $s$ is the net-of-depreciation saving rate and $g$ is the economy’s growth rate (population + productivity).
Piketty assumes that $s$ is constant and positive, i.e. the economy increases its capital stock by an amount that is a constant fraction of (net) national income. In a stagnant economy $s$ exceeds the relative slow rate of growth so that $\beta$ will be high and increasing.

Milanovic (2014, p.4) notes, “the second law plays a rather subsidiary role in Piketty’s analysis and he resorts to it only when he considers where eventually β may settle in some (perhaps mythical) steady state. … If g declines close to 0, then in the long run β approaches infinity” and “however small r, the share of capital in total income will be high.”.

Piketty considers low growth inevitable once countries achieve a high level of income, reach the technological frontier and experience slow population growth.

The divergence $r > g$ is the **fundamental contradiction** of the patrimonial capitalism. This divergence plus an increasing β over time drives the share of capital income increasing, in some cases arbitrarily close to one. A vicious circle of ever-growing dynastic wealth starts, which cannot be reduced by an additional level of competition.

In Piketty's (2014, p.25) own words: "When the rate of return on capital is higher than the growth rate of the economy, logic dictates that inherited wealth is growing faster than GDP and personal income“.

As capital's share increases and owners save some of their income, they reinvest more. “The increased saving in turn makes the growth rate of capital exceed further the growth rate of national income and increases β. Thus the higher β implies an increase in capital's share that leads to a higher β, etc., etc.” (Milanovic, 2014, p.4).

This divergence produces a changing functional distribution of income in favor of capital, which is more concentrated than income from labor. Wealth’s inequality increases and also personal income distribution will become more unequal.

An increase in inequality creates political instability. The mass of poor could rebelling against the rich minority and, through democracy or violence, destroy the system.

This contraddiction can be solved taxing inheritances and capital, to break the dynasties of billionaires and their possible dominating the economy.

High taxes on the super rich will dissuade bankers and managers from asking for exorbitant rents. Capital taxation brings also increased transparency about company assets.

The *interaction* between $r-g$ and the institutional and public policy responses (progressive taxation of income, wealth, and inheritance; inflation; nationalizations, physical destruction, and expropriations; estate division rules) determines the dynamics and the magnitude of wealth inequality.

A higher $r–g$ tends to amplify initial wealth inequalities for a given variance of other shocks (demographic, saving and investing behavior, differences in taste parameters).

Relatively small changes in $r-g$ can generate large changes in the steady-state wealth inequality.

In the long-run magnitude and concentration of wealth and inheritance are a decreasing function of $g$ and an increasing function of $r$.

Under fairly general conditions, one can show that the top tail of the distribution of wealth converges toward a Pareto distribution, and that the inverted Pareto coefficient is a steeply rising function of the gap $r-g$.

The effect of a decline in the growth rate $g$ on the gap $r - g$ is ambiguous depending on how a change in $g$ affects the long-run rate of return $r$.

The "stickiness" of r is the weak point in Piketty's argument, which Piketty buttresses, arguing that increasing financial sophistication and international competition for capital will help keep $r>g$. Nevertheless, Piketty's long-run prediction rests on an empirical rather than a theoretical argument.

Of course $r>g$ is not the only condition explaining changes in income and wealth nor for explaining rising inequality in the distribution of labor income. Piketty (2015, p.49), answering to Mankiw claims: “the inequality r>g holds true in the steady-state equilibrium of the most common economic models, including representative-agent models where each individual owns an equal share of the capital stock”. However in the real world, many shocks to the wealth trajectories of families (demographic, saving and investing behavior, differences in taste parameters) can contribute to making the wealth distribution highly unequal.

Sala-I-Martin (2014, p.1) claims that $r>g$ is “a condition of economic efficiency”. If an economy has r<g is inefficient in the sense that it has been saved too much.

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 to explaining inequalities.

Piketty succeeded in answering to 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 return to capital, of the share of capital on national income, of inequality in the wealth and in the income distribution.

He documents how for the past 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, has sustained the growth of the middle class and the consolidation of democracy in all the western states. The relatively high degree of equality was also the result of the destruction of inherited wealth because of the war. This phase has been reversed since the end of last century.

The global rate of growth will slow again once emerging countries will finish to converge towards the countries which are leading the technological path.

Piketty shows, with an impressive amount of data, how *β, α,* and *r*, evolved over time and over countries.

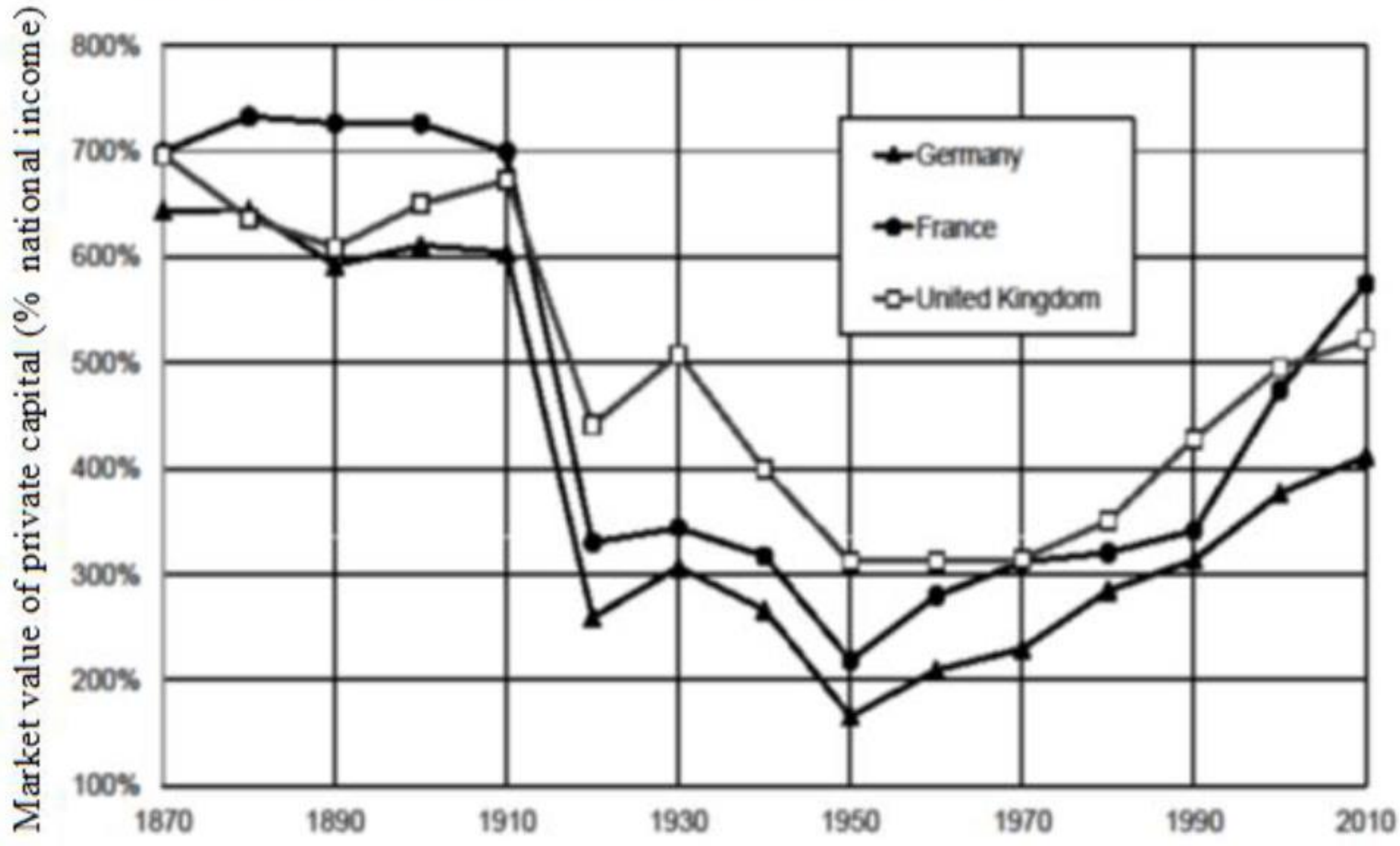
Capital income ratio in European countries (Germany, France, United Kingdom) presents a "U“- shaped curve.

It has been high during the eighteenth and nineteenth centuries, has fallen in the early twentieth century and recovered to high levels in early twenty-first century (Figure 1).

With reduced taxes on profits and income and quasi elimination of taxes on inheritance, the rebuilding of capital accelerated and *β* began its steady climbing.

# Figure 1

Figure 1, The private capital-income ratio in Europe, 1870-2010



U.S. shows also a slightly U-shaped curve much less marked than Europe (figure 2). The ratio $\beta$ in Europe has been rising above the U.S. levels because:

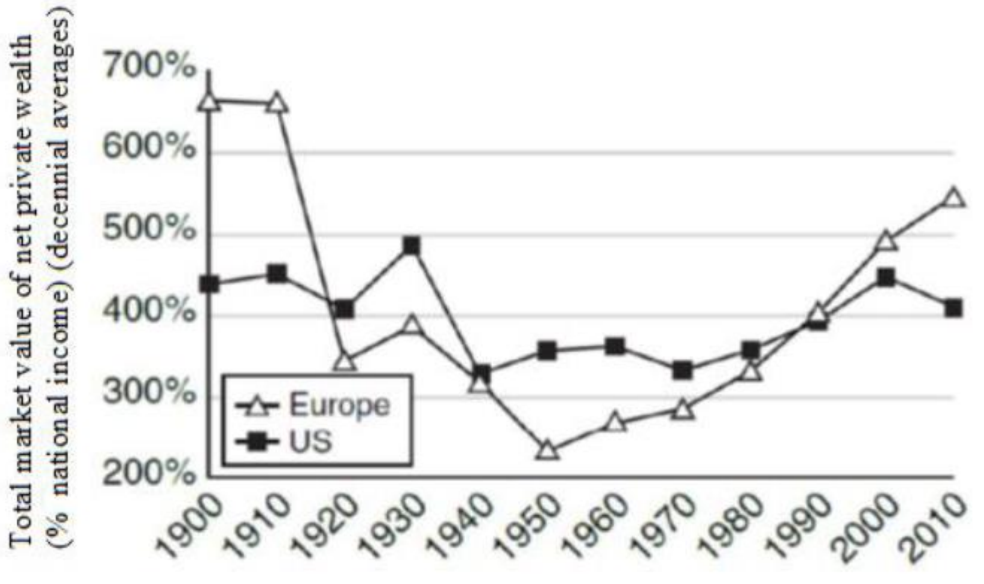
i) United States is a “wealth-young country”;

ii) land was cheaper;

iii) the lower capital-income ratio the higher level of productivity.

# Figure 2

Figure 2, Wealth-Income ratios in Europe and the United States, 1900-2010, Market value of net private wealth (% national income).



Between 1975 and 2010 the capital's share of income $\alpha$ increased in most of the rich countries (figure 3) following the same U-shaped curve as the capital income ratio.

The upward trend of $\alpha$ is consistent with the hypothesis of:

i) an increase in capital's bargaining power vis-à-vis labor.

ii) a $\sigma$ greater than one. It is always possible to find new and useful uses of capital.

The evolution of a decreasing rate of return on capital significantly reduces the amplitude of this U-curve for $\alpha$.

# Figura 3

Figure 3, The capital share $\alpha$ in national income in rich countries, 1975-2010

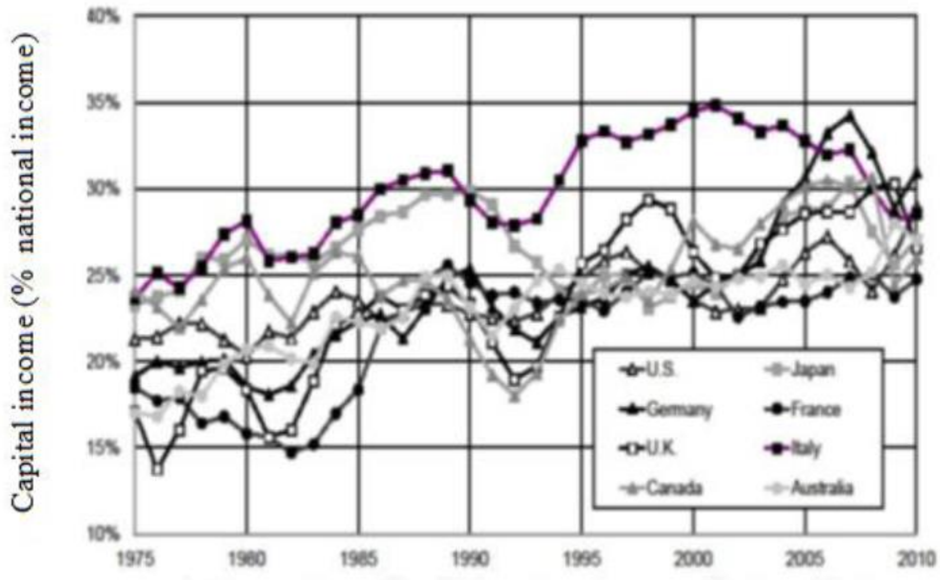


Figure 4 shows a huge positive gap between $r$ and $g$ $(r>g)$ from Antiquity to the early 20th century.

Shows its inversion ($g>r$) for the most of the 20th century, and then recently a reemergence.

Large capital shocks during the 1914–1945 period, including destruction, nationalization, inflation, high growth during the reconstruction period and demographic transition reversed the relation between $r$ and $g$.

In the future, several forces as the slowdown of population growth and financial globalization might push again toward higher $r - g$ gap, higher wealth inequality, and a slowing growth.

# Figura 4

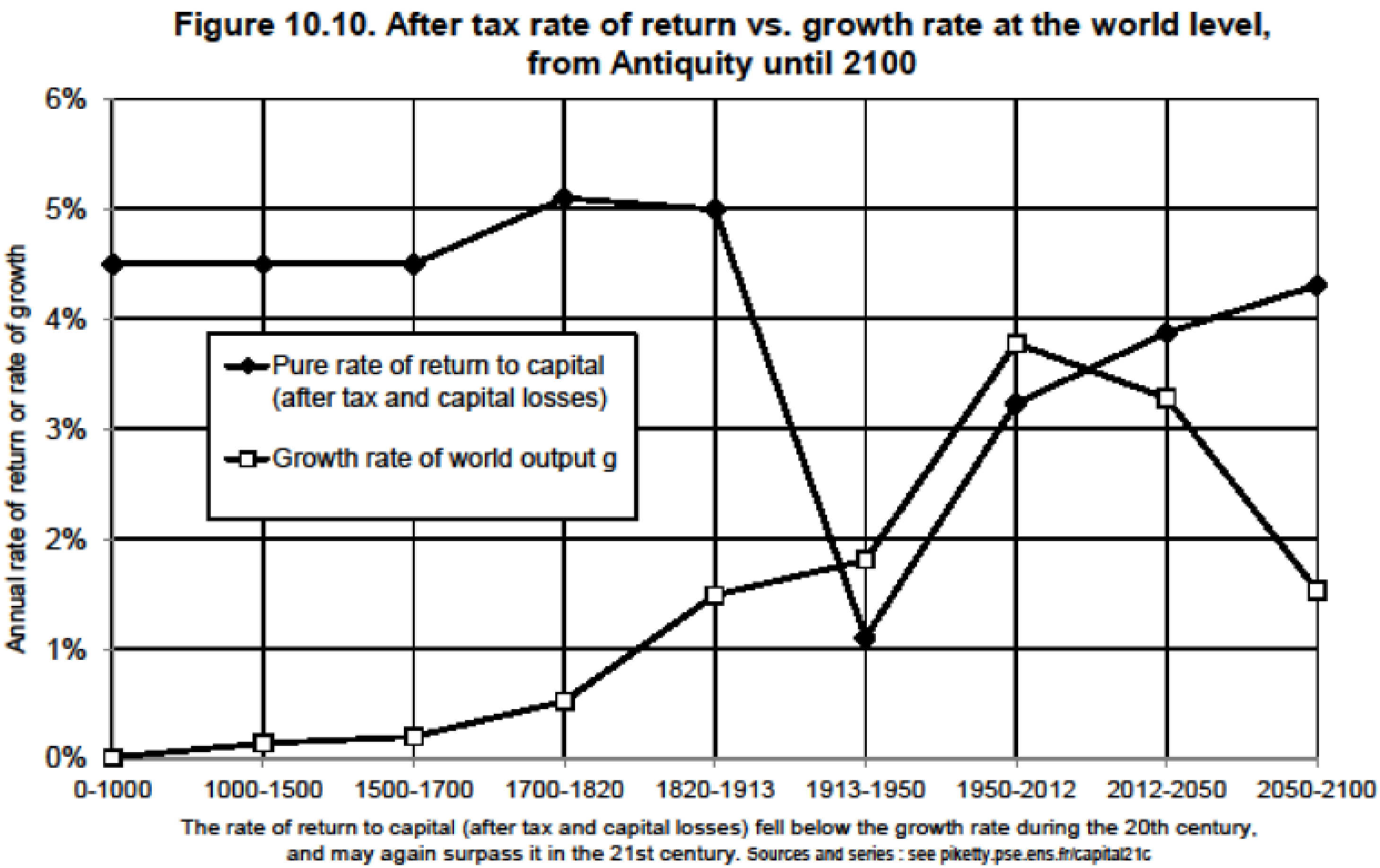


Figure 10.10. After tax rate of return vs. growth rate at the world level, from Antiquity until 2100
6%
5%
4%
3%
2%
1%
0%
Annual rate of return or rate of growth
Pure rate of return to capital (after tax and capital losses)
Growth rate of world output g
0-1000
1000-1500
1500-1700
1700-1820
1820-1913
1913-1950
1950-2012
2012-2050
2050-2100
The rate of return to capital (after tax and capital losses) fell below the growth rate during the 20th century, and may again surpass it in the 21st century. Sources and series : see piketty.pse.ens.fr/capital21c

In collaboration with other authors Piketty uses very detailed fiscal data to trace the evolution of the distribution of wealth and income in different countries.

This choice is in line with the previous researches of Simon Kuznets, who first, used fiscal data, instead of household’ surveys, to study the links between economic growth and personal income distribution in the 1950s.

Household surveys provide reasonably reliable income estimates for the bulk of the population, but fiscal data are better suited for the very top of the income distribution.

The advantages of fiscal data can be easily mentioned: long-term series (century or more in developed countries), ability to focus on top incomes and to capture them much better than household surveys.

Some “caveats”, however,  must be stressed:

i) historically, income tax returns have been filed by a small percentage of the population even in today’s rich countries so the long-term series can be of dubious quality

ii) incentive to underreport income because in the past some particularly rich classes were exempt from taxation.

The income that is reported to tax authorities is fiscal income, not economists’ concept of income. It does’nt include some items.

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 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 have become more redistributive. It could even happen that disposable income inequality declines.

Wealth inequality, measured as the share of wealth's decile in total wealth, is currently much less extreme than a century ago.

It decreased steadily from 1910 to 1930 in U.S., and from 1910 to 1970 in Europe. Then it increased steadily from 1970 to 2010 showing higher values in U.S. in comparison to Europe.

In the United States, the top 10 percent owns about 70 percent of all the capital, half of that belonging to the top 1 percent.

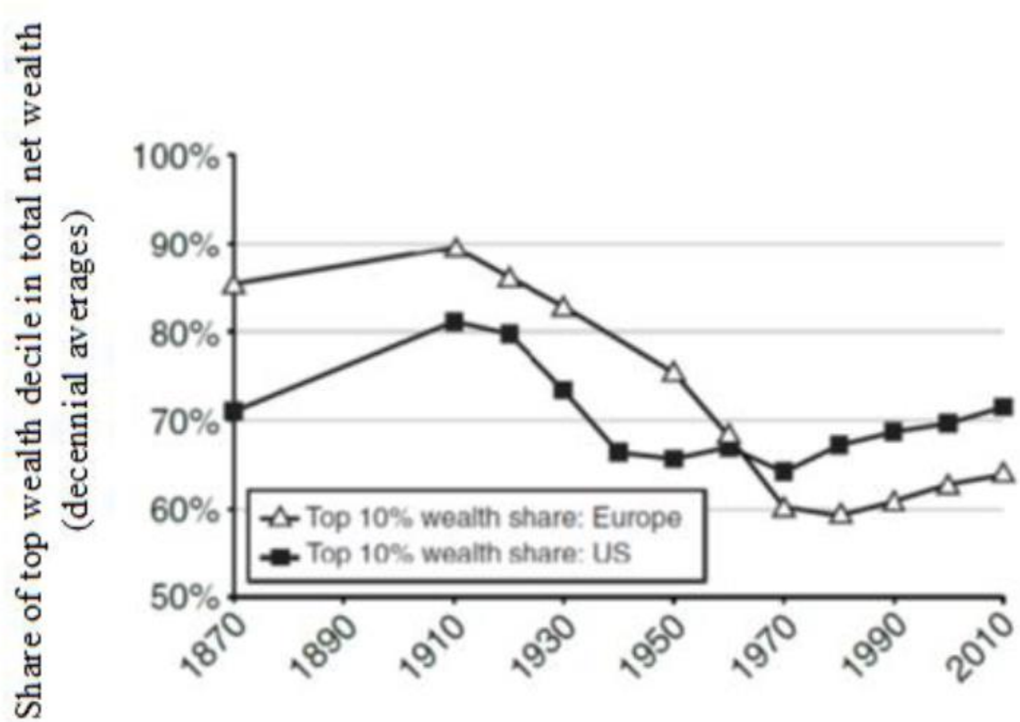
The typical European country is a little more egalitarian: the top 10 percent owns about 63 percent of all the capital (Figure 5).

The next 40 percent— who compose the "middle class"—own about a quarter of the total and the remaining half of the population owns about 5 percent of total wealth.

Income from wealth is probably even more concentrated than wealth itself.

# Figure 5

Figure 5, Wealth Inequality: Europe and the United States, 1870-2010



The empirical evidence for income inequality in the U.S. shows an inverted U-curve only in a first period, between 1910 and 1940 (figure 6).

After a long period of stability during the Golden Age (1942-1970) inequality has started to grow systematically since the early 70.

Subsequently, since 1970, the share of the last decile is again grown to a rather high level, around 50%, in 2010.

# Figure 6, Income Inequality in the United States, 1910-2010


The top decile share in U.S. national income dropped from 45-50% in the 1910s-1920s to less than 35% in the 1950s (this is the fall documented by Kuznets); it then rose from less than 35% in the 1970s to 45-50% in the 2000s-2010s. Sources and series: see piketty.pse.ens.fr/capital21c.

The findings for the second period contradict the Kuznets hypothesis. In his monumental study of income distribution in the United States Kuznets (1953) had observed a big fall in the income share of the richest for the period between 1929 and 1946.

The turnaround since 1970 is due not only to the Reagan and Thatcher policies that lowered taxes on the rich, but also to the entrance of Asians in the labor markets of rich Countries, depressing the wages of unskilled workers, and also to the baby boom.

Piketty criticizes the well-known Kuznets' 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 on several grounds.

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. The data show that this is not the reason that explains the decline of income inequality in developed countries during the first half of the 20th century.

i) Kuznets is criticized for not using sufficient empirical evidence or reading too much in the very few data points. Piketty rightly points out that the data available to Kuznets were minimal.

ii) Piketty thinks that Kuznets misinterpreted a temporary slackening in inequality after World War II as a sign of a more benign nature of capitalism, while it was, Piketty argues, due to the unique and unrepeatable circumstances.

There was no “structural transformation” of capitalism. Piketty does not see any spontaneous forces in capitalism that would drive inequality of incomes down; rather, the only spontaneous forces will push concentration of incomes up.

iii) Piketty thinks that Kuznets' theory owes its success in part to the optimistic message that it conveyed during the Cold War. Firstly that poorer capitalist economies were not forever condemned to high inequality. There was the light at the end of the tunnel: if you followed the Washington prescriptions long enough, not only mean income will grow but inequality will become lower;

Secondly Kuznets' overly optimistic theory could be a weapon in the ideological fight between the market economy and socialism.

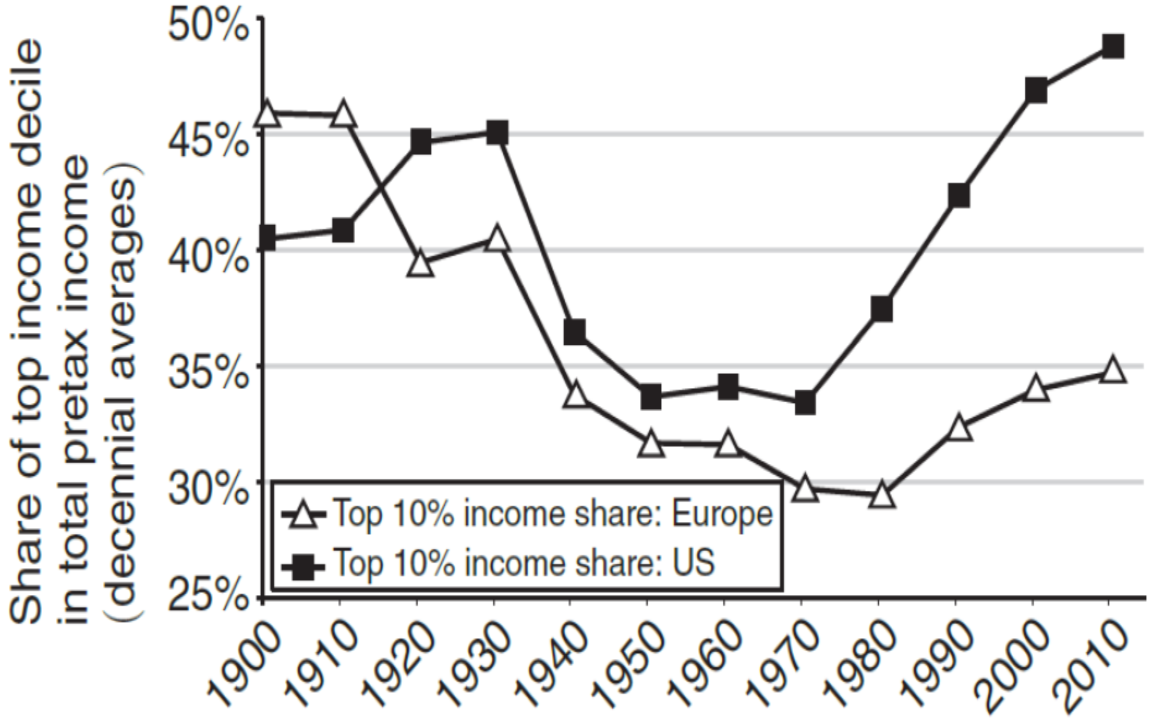
Inequality in total income is now substantially higher in the U.S. han in Europe, while the opposite was true until World War I (Figure 8). At that time, high inequality was mostly due to extreme concentration of capital ownership and capital income.

Over the 1980–2010 period, instead, the rise of top income shares in the United States in comparison with Europe, is due for the most part to rising inequality of labor earnings explained by a mixture of two groups of factors

i) rising inequality in access to skills and to higher education over this time period in the United States

ii) exploding top managerial compensation.

# Figure 8, Income Inequality: Europe and U.S., 1870-2010



The level of inequality and income polarization in U.S., not only is, now, the highest among industrialized countries, but also it has grown systematically.

The disposable income of the wealthiest earners grew at a rate well above that of any other group.

In parallel of the progressive enrichment of the last percentile and of the last decile of the distribution occurred not only an impoverishment of the bottom decile, but also of the "middle class". In 2012 this group received a share of income well below its weight on the total earners. Median income has dropped since 2007, when it reached a peak.

Obama himself in his State of the Union address last January highlighted as a priority goal of the economic policy to curb the reduction in disposable income of the middle class.

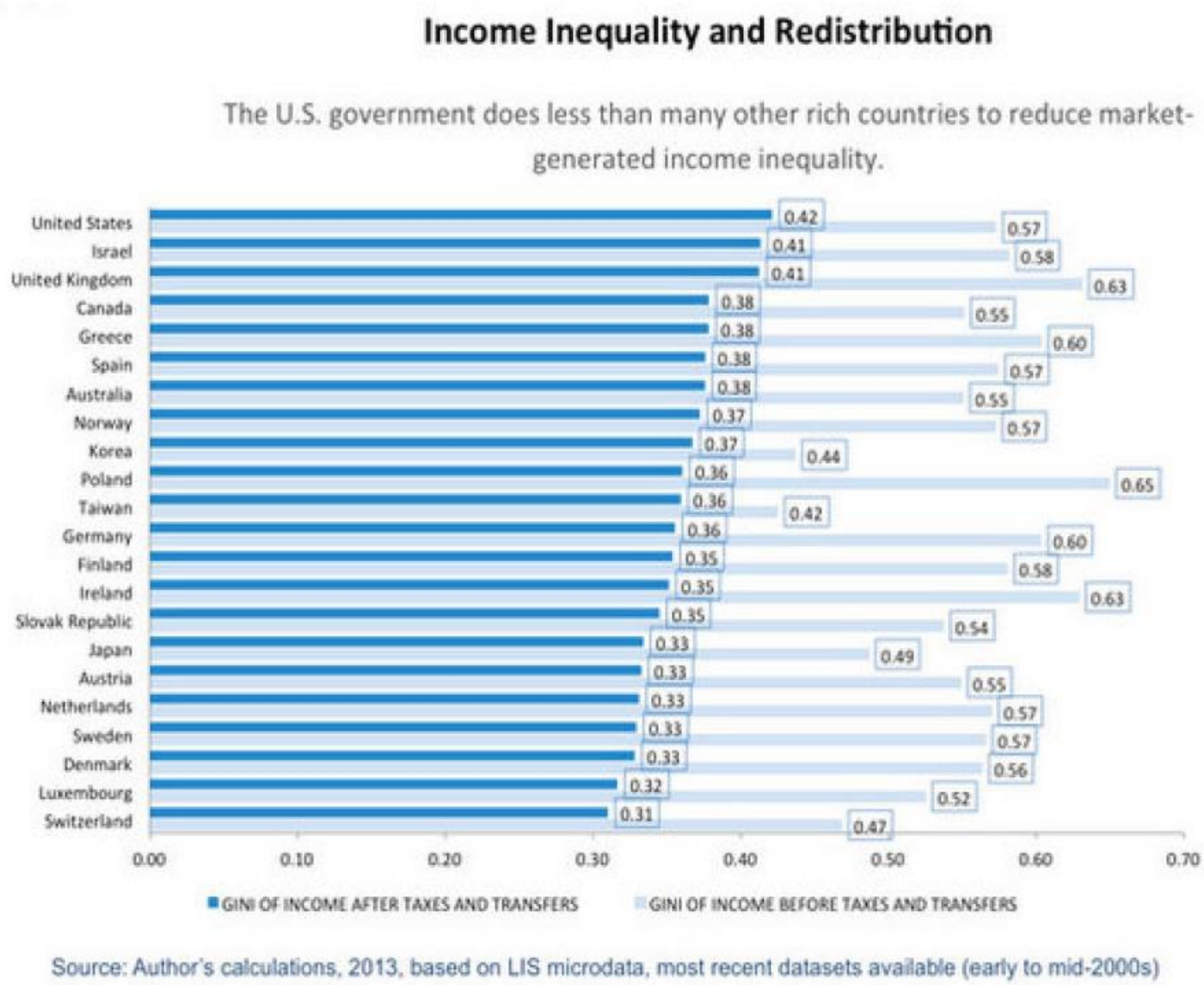
An important aspect of inequality in the U.S. is the role of redistribution. The policy of social transfers is effective against the poorest, but not to reduce the high level of inequality.

In comparison to other countries inequality in U.S. is higher in the distribution of disposable income, not so much in the distribution of "primary income" from the market.

The Gini index calculated on the market income distribution is not much higher than that of Spain or of the Scandinavian countries, but lower than that of many other European countries such as Germany, Britain, Greece and Ireland.

However, the reduction of the Gini index after the redistribution is much lower than that which is realized in all other European countries considered (Figure 9)

# Figure 9


Income Inequality and Redistribution
The U.S. government does less than many other rich countries to reduce market-generated income inequality.
United States 0.42 0.57
Israel 0.41 0.58
United Kingdom 0.41 0.63
Canada 0.38 0.55
Greece 0.38 0.60
Spain 0.38 0.57
Australia 0.38 0.55
Norway 0.37 0.57
Korea 0.37 0.44
Poland 0.36 0.65
Taiwan 0.36 0.42
Germany 0.36 0.60
Finland 0.35 0.58
Ireland 0.35 0.63
Slovak Republic 0.35 0.54
Japan 0.33 0.49
Austria 0.33 0.55
Netherlands 0.33 0.57
Sweden 0.33 0.57
Denmark 0.33 0.56
Luxembourg 0.32 0.52
Switzerland 0.31 0.47
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70
GINI OF INCOME AFTER TAXES AND TRANSFERS
GINI OF INCOME BEFORE TAXES AND TRANSFERS
Source: Author's calculations, 2013, based on LIS microdata, most recent datasets available (early to mid-2000s)

A level of inequality so high, that affects the middle class can become a brake for growth. It means fewer opportunities for future generations.

The gap in test results (test scores) between rich and poor children is nowaday 30-40% larger than it was 25 years ago.

The access to higher grades education is expensive and not only the poorest but also a large part of the 'middle class', are excluded. The measures of social mobility show levels lower than those of many European countries.

Over the past three decades the share of income going to labour has been declining in most countries around the world, while the capital share has been rising.

On the opposite for capital owners and executives the rewards continue to grow. The gap between the richest and the rest continues to grow. The big winners in our global economy are those at the top. Our economic system is heavily skewed in their favour, and arguably increasingly so.

Over the 1980–2010 period the rise of top income shares in the U.S., is due mostly to rising inequality of labor earnings. The rise of labor income inequality was relatively limited in Europe (and Japan) compared to the U.S., despite similar technological changes.

The most widely used economic model for explaining changes and inequality in labor’s income, based on the idea of a race between education and technology, doesn’t explain the gap between managers returns and the other workers.

As the overall share of income going to wages is shrinking, within that share top executives are receiving larger amounts.

About 60 percent of the income of the top 1 percent in the U.S. today is labor income. Only when you get to the top tenth of 1 percent does income from capital start to predominate.

A very large part of the rise in the top 10% income share comes from the top 1% (or even the top 0.1%). This is largely due to:

i) the rise of top executive compensation in large U.S. corporations (both financial and nonfinancial) itself probably stimulated by changing incentives and norms,

ii) and by large cuts in top tax rates.

Earnings at the top depend mostly on chance events which have nothing to do with the quality of management and with their marginal productivity. High wages are the product of a collusive agreement between themselves and the boards. With or without stock options, these large pay packages get converted to wealth and future income from wealth.

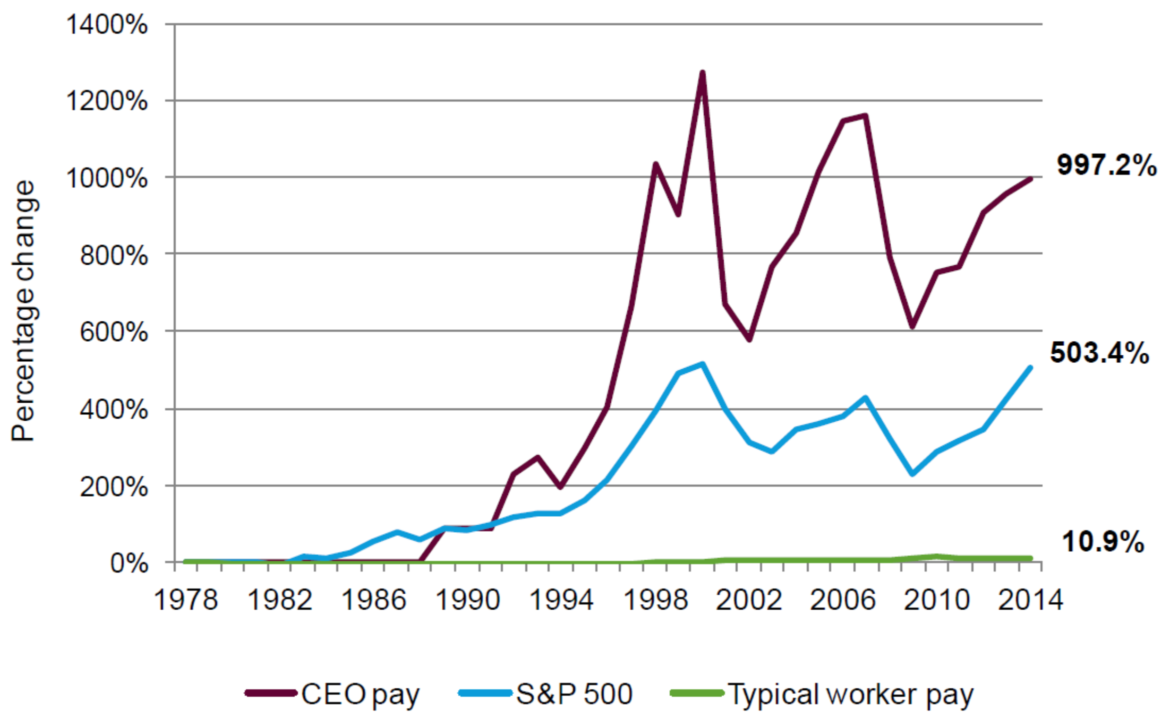
High CEO salaries have had a spillover effect, increasing the pay of other executives and managers (figure 10).

Falling marginal tax rates have been found to have a significant association with higher pretax income shares both in the US and across countries. They provide a greater incentive for high earners to devote more energy to shifting more income to their personal pay packets when the opportunity presents itself.

In U.S. a society of rentiers has been progressively substituted by a society of managers.

# Figure 10

**Figure 5: In the US, pay rises for CEOs are far outstripping increases for average workers**




Source: Reproduced from L. Mishel and A. Davis (2015) 'CEO Pay Has Grown 90 Times Faster than Typical Worker Pay Since 1978' EPI. http://www.epi.org/publication/ceo-pay-has-grown-90-times-faster-than-typical-worker-pay-since-1978/ 80

In conclusion, Piketty agrees, that, today's "patrimonial capitalism" is not exactly the same as a century ago: it has a broader base and the concentration of wealth at the top is less; high labor incomes are more frequent. But its key feature—ability to generate a satisfactory income without the pain of work—is still there.

The ownership of capital, often through inherited wealth, still remains crucially important. Piketty shows that the annual flow of inheritances as a share of national income in today's France, UK and Germany is about the same as a century ago.

Societies where the ratio between capital and income $\beta$ 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."

# Main reviews of Piketty’s book

Several daily and weekly newspapers have hosted reviews of "Capital in the Twenty-First Century”, almost always very positive.

Few reviews have been critical. Firstly they limited themselves to criticizing the reliability of the sources used and of the estimates presented. Criticism about the reliability of the data had been solicited by an author responsible for the economic part of the Financial Times, Chris Giles.

Criticism on the sources, however, do not appear to have significantly weakened the volume’s content. Howard Reed (director of "Research Consultancy Landman Economics") answered with a paper claiming that Giles failed to correct the existing discontinuities in time series from different sources.

He reestimated available data and concluded that the results of Piketty are substantially correct.

The factors that generate inequality, in income and wealth, are many, institutional, socio-economics and demographic.

The factors which explain the dynamic of wealth (accumulation of capital) are different from that which explain the dynamic of labor income (demand and supply of skills and education, technology).

It is very difficult, therefore, to reach a consensus on a shared theory of personal income distribution, and to agree on all the aspects of the Piketty's approach.

More recently, some of these aspects were challenged.

# The definition of capital

i)Piketty’s definition of capital “interchangeable” with the concept of wealth has been criticized as too ambiguous. Wealth is a very heterogeneous concept and includes assets that have value but does not produce anything (precious metals, works of art).

Piketty’s perspective is different from the traditional one in which capital is defined as a factor of production. In that case it will be linked to the output and not to the income of the owner.

Piketty argues that he is interested in a concept of capital which could be linked to the personal income distribution. Therefore the inclusion in personal wealth of any kind of asset that gives a rent to its owners is justified.

Rent must be considered not the result of any imperfection in the market, but rather the consequence of a “pure and perfect” market for capital as financial gains, renting of an apartment.

Given his focus on income and wealth distribution, it is appropriate for Piketty to define capital as the market value of “the sum total of nonhuman assets that can be owned and exchanged in a market” (p. 46). These are assets *private individuals* can own and sell. They are any asset owned which generates a return. Therefore capital is’nt the traditional concept of factor of production and growth.

“Following SNA guidelines, assets include all the nonfinancial assets—land, buildings, machines, etc.—and financial assets—including life insurance and pensions funds—over which ownership rights can be enforced and that provide economic benefits to their owners” (Piketty, Zucman, 2015, pag. 1309).

Piketty, Milanovic (2014, p.533) concludes, has given us a framework that forces us to think of recent increases in income and wealth concentration and “to see rising inequality as part of a changing nature of modern capitalism”.

Piketty’s accomplishment is empirical. He has amassed the data necessary to make his argument, buttressed by useful descriptive detail. He makes no theoretical claims. In the 700 pages of the book, only two-and-a-half pages in chapter 6 are devoted to “growth theory”.

If capital is not the traditional neo-classical factor of production it is difficult to justify the use of a Cobb Douglas as a tool for estimating the share of income from capital, depending on the value of the elasticity of substitution between capital and labor.

It should be necessary, on the opposite, to find new kind of models suitable for estimating the sources of returns to different kind of capital, and not only the ones obtained by capital as a factor of production. It is not a simple task, of course, but a clearest distinction between the two concept of capital as factor of production and capital as wealth claims also for new models.

ii) The choice to include housing capital in total capital has been questioned. “Housing is a very particular component of capital and its interpretation has always been subject to complex discussions, even within the neo-classical world. In particular, housing capital does not provide a good measure of actual return on capital” (Bonnet et. al, 2014, p. 2).

The value of housing capital estimated at the price of housing is not necessarily correlated with the share of income it generates in national income. If this value has rapidly progressed in several countries over the last decades, the corresponding share of income, on the opposite, has only progressed slowly in the most extreme cases, or remained stable, or even decreased as in Japan.

Returns on housing capital (the key ingredient in the 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 precisely the source of the dynamics of accumulation of capital,

Housing capital based on housing prices can be overvalued or undervalued and it is generally disconnected from the value of rents that is from the inequality generating process that the author wants to establish.

The prices of real estates follow trajectories not linked to the growth of the economy and that can fluctuate more than national income. The value of real estate, if based on current prices incorporates a speculative component (bubbles) which influences the monetary value of capital. This is why the value of capital increased in the last decades without a parallel rise in the productivity level.

When one corrects the measure of real estate capital, for taking account of long time trends, the ratio between capital and income, either stagnated or increased slightly instead of increasing steadily. In the longer run a decline in the capital income ratio rather than a U-shaped curve has been observed, contradicting Piketty's thesis.

Recalculating (Bonet et. al., 2014) the value of the real estate, β remains constant between 1950 and 2010: drops slightly between 1950 and 1970, it remains constant between 1970 and 2000 and increases only between 2000 and 2010.

The rise in the prices of household had, however consequences 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 France.

iii) Some authors (Krusell, Smith) have advanced a radical critic toward the Piketty's "second fundamental law of capitalism".

Piketty claims that the capital to income ratio $\beta = k/y$ must, in the long run, become equal to $s/g$ where $g$ is the economy's growth rate, $\beta = k/y$, and $s$ is the net saving rate.

They claim that this formula is alarming because it suggests that when the economy's growth rate will decline towards zero, as Piketty argues it will, and the savings rate, $s$, stays constant over time, then capital output ratio could increase explosively.

Piketty claims that the net saving rate and the growth rate are "largely independent of each other" and are "influenced by any number of social, economic, cultural, psychological, and demographic factors". Therefore he keeps the net saving rate constant as growth declines.

The assumption that Piketty point out on the value of the net saving rate compared to the growth rate are not true. In the standard theories of saving based on optimizing behavior and widely used in macroeconomics net saving is not considered constant but comoving positively with g.

Piketty's assumption is the formulation made by Solow in his original paper. But this hypothesis has been changed in the textbook's version of the Solow model where the capital-to-income ratio is equal to $s/(g+d)$ instead of $s/g$ 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 $s$, must be considered constant. Under this assumption, as $g$ falls to zero, also $s$ falls to zero. When growth is decreasing the capital-output ratio increases only modestly.

Historical data on U.S. contrast with the Piketty's hypothesis of a stable value of saving rate independent from the rate of growth. Decadal averages of savings rates and growth rates, show a clear positive relationship.

Net savings rate have been falling with the decline in growth, and they are currently already close to zero. In this case $\beta = s/g$ cannot rise to the high levels Piketty claims.

Therefore, that $s$ will remain constant and positive in the twenty-first century, does not appear like a good assumption at all.

iv)If the capital/output ratio increases (so much), would not the marginal return to capital *r* go down?

Piketty argues that when growth is slow, it is almost inevitable that the return on capital is significantly higher than the growth rate, which automatically results in an outsized importance of inequalities of wealth accumulated in the past.

“The inequality $r > g$ in one sense implies that the past tends to devour the future: wealth originating in the past automatically grows more rapidly, even without labor, than wealth stemming from work, which can be saved” (Piketty, 2014, p. 267).

Forbes list, however, does not confirm the existence of these kind of dynasties.

Stiglitz (2014b) proposes an alternative hypothesis of the drivers of inequality in today's U.S. that can explain the "Piketty puzzle" of a rising wealth/income ratio together with a rise in *r* and stable wages. The answer must be found in the role of Institutions and policies as banking and finance.

The banking system made credits 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.

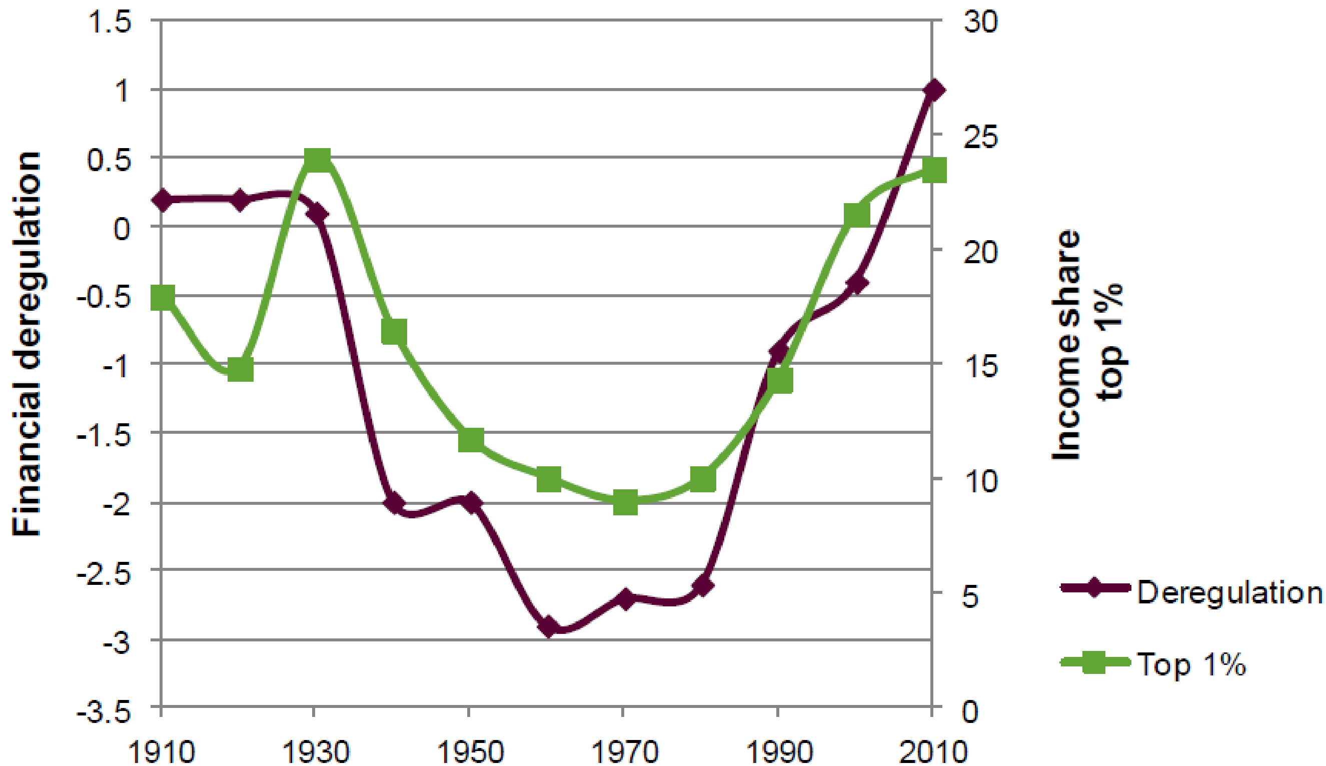
The value of land and of real estate increased not the physical quantity of productive capital. Banks, instead of lending to companies to invest in new capital, lent to people which spent the money on housing and unproductive assets.

Stiglitz (2014b) argues, also, that in the recent period, the decline in interest rates, which 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 population Figure 11).

In this case it is growth, stimulated by policies, especially when it is accompanied by lower interest rates, that is a source of inequality, not the "stagnation" of economies. It is exactly the opposite of what is stated by Piketty.

# Figure 11,The relation between financial deregulation and inequality

in the US




Source data: Financial Deregulation, http://www.nber.org/papers/w14644.pdf; Income share: Piketty and Saez (2003, 2012).

v) 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 is running against one of the fundamentals of economic theory: decreasing returns to an abundant factor of production. Piketty is indeed critical of a blind belief that marginal returns always set the price for labor and capital, but these arguments are not developed.

vi) Piketty answered to some critics on its analysis of the causes of inequality writing a paper in which he shows how to develop a new historical, political and economical approach to the study of institutions (welfare state, free education, or progressive taxation) and inequality dynamics.

He emphasized the role of political conflict, wars and revolutions in generating inequality. On the opposite steady democratic forces caused by the extension of suffrage played an important role in the rise of more inclusive social, educational, and fiscal institutions during the 19th and 20th centuries.

# Policy proposals

The last chapters of "Capital in the Twenty-First Century" are dedicated to discussing some policy proposals. According not only to Piketty, but also to other authors as Stiglitz (2014b), sources of inequality in the United States today are so profound that measure as the increase in minimum wage, better education, will not go to the root of the problem. More radical approaches are needed as capital taxes on highest incomes.

Social mobility must be increased by improving the quality of the school. U.S. is the country of the OECD where school performance depends greatly on the social origin of the pupil. Social mobility stimulates growth through innovation while it reduces income inequality. Taxation must be considered one tool among many to increase social mobility while stimulating growth through innovation.

The policy recommendation that has attracted most attention is Piketty's call for global taxation of capital. It follows directly from his concern with $r>g$ inequality. The only way to reverse it, if $g$ is exogenously given, is to reduce $r$. Nobody believes that it could be implemented *hic et nunc*, but it can be considered a "useful utopia".

The gap between $r$ and $g$ could be modified precisely by taxes on capital, whether in form of taxes on land or inheritance. They have a long history, probably the longest of all taxes, precisely because some forms of capital were difficult to hide. Extending this to include all forms of capital seems logically consistent.

Technical requirements for such a tax (which in a rudimentary form exists in most advanced economies) are not overwhelming.

Housing is already taxed; the market value of different financial instruments is easily ascertainable and the identities of owners known. The problems are, of course, political.

The application of such a tax by individual countries, even the most important, like the United States, can easily lead to the outflow of capital.

Thus, international collaboration is indispensable.

That collaboration is unlikely to be supported by the countries that currently benefit the most from the opacity of financial transactions and offer tax havens to the rich.

Moreover, some emerging market economies may be unwilling to subscribe to it too. But a more modest proposal built around the OECD members (or EU and the United States) is, Piketty argues, feasible.

He takes the recently passed U.S. legislation (Foreign Account Tax Compliance Act) as one of the first steps that could lead to regional taxation of capital.

Piketty admits of having, probably, devoted too much attention to progressive capital taxation and too little attention to a number of institutional evolutions that could prove equally important, such as the development of alternative forms of property arrangements and participatory governance.

Capital taxation is important because it can also bring increased transparency about company assets and accounts. In turn, increased financial transparency can help to develop new forms of governance; for instance, it can facilitate more worker involvement in company boards. But these other institutions also need to be analyzed on their own terms.

Piketty in the 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”.

# Conclusions

Piketty has written an important book of great impact. Acording to some authors, however, and in particular to Sala-I-Martin (2014) the intrerpretation of data “is biased”

During the last decades poverty rates were reduced in the world like never before, global inequalities are smaller and education indicators, mortality, life expectancy, health, freedom and democracy are better in almost every country.

Inequalities within countries have grown and economies have slow down. But we can not know for sure if these will perpetuate itself over time.

Although Piketty has clear where the future goes, unfortunately this is based more on ideology and his opinion on the data provided by him.

In a society where “patrimonial capitalism” prevail the “dead hand” of the past generations (high β ratio) and high *r* destroy the industrial setting. However an high r can be considered a risk premium during financial crisis.

a) Entrepreneurs convert themselves into “rentiers.” Productive investments and growth will decrease.

b) If β is high, and the taxes low, α will increase. If it is reinvested, β will rise further. If r>g, wealth’s inequality will increase. Forbes list does not confirm the existence of dynasties.
c)The middle class is shrinking, investments in human capital are decreasing, democratic Institutions become weaker.

e)Expansionary policies, accompanied by lower interest rates, exacerbate inequalities by increasing the value of stock options and of other financial instruments. Growth, not "stagnation“ is a source of inequality.

As Helburn (2016, p. 150) points out “A key element in 21st century capitalism is rentier behavior of “retired capitalists” and the rich, including us in the middle patrimonial class who are not generally motivated to maximize growth, just our own wealth. Realized profits are not automatically reinvested to expand productive capacity. Instead some falls out of “capital as process” involved in expanded reproduction, and becomes money capital in the circulation process and generates fictitious capital. Increasing wealth disparities are *inherent* in capitalism. Capitalism in the 21st century seems to be characterized by continued globalization of capital through exploitation of new labor pools and the expansion of money capital that provides new sources of riches for the rentier class. This expansion of money capital might also explain the declining rate of growth in developed capitalist economies”.

Piketty links in a very innovative way the returns from capital to the rate of growth of national income.

On the basis of this relation he derives the value of the concentration of capital, of the inequality in the functional distribution of income and finally of the inequality in the personal distribution of income.

However inequality’s measures are estimated for different variables and for different countries in a separated way. The trends of capital’s rent and of income’s rate of growth are compared but not really estimated together.

The question is how to link the value of endowments (different forms of capital and labor) to income, and again estimate the accumulation process from saving to capital and again to the output in a circular loop.

The basic question becomes: Is Piketty's approach the right one for explaining not only trends in inequality, but also for enlightening factors behind changes in the inequality?