



**United Nations Development Programme  
Regional Bureau for Latin America and the Caribbean**

**Research for Public Policy  
Inclusive Development**

**ID-05-2009**

**The Dynamics of Income Concentration over the Twentieth Century:  
The Case of Advanced Economies<sup>♦</sup>**

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**Key words:** income distribution, taxation, advanced economies, public policy

**JEL Codes:** D31, H21, I32, J18, O12

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<sup>♦</sup> Document prepared for UNDP Project on “Markets, the State and the Dynamics of Inequality: How to Advance Inclusive Growth” (Co-funded by RBLAC and BDP-Poverty Group).

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Please cite this document as: Alvaredo, F. and T. Piketty (2009) “The Dynamics of Income Concentration over the Twentieth Century: The Case of Advanced Economies”, Research for Public Policy, Inclusive Development, ID-05-2009, RBLAC-UNDP, New York

# **The Dynamics of Income Concentration over the Twentieth Century The Case of Advanced Economies**

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## **Abstract**

This paper offers an overview of the main findings of a collective research project on income distribution in the long run in advanced countries. The decline in income concentration that took place during the first half of the twentieth century was mostly accidental, and does not seem to have much connection with a Kuznets-type process. Top capital incomes were hit by major shocks between 1914 and 1945, and were never able to fully recover. We argue that the introduction of progressive income and estate taxation during the second half of the twentieth century played a key role in the non-recovery phenomenon. The last thirty years tell a different story. In continental Europe there was a period of falling shares in the 1960s and 1970s followed by a relative stability over the last twenty years. On the contrary, English-speaking countries have displayed a remarkable convergence up to the 1970s to the bottom of a long-run U-shape, followed by a substantial increase in top shares since the 1980s, mainly driven by large increases in top wages.

## 1. Introduction

The evolution of income and wealth inequality during the process of development has attracted enormous attention in the economics literature. A number of recent studies have constructed series for shares of income accruing to upper income groups for various countries using income tax statistics. The book recently edited by Atkinson and Piketty, 2007a, where most of those studies are gathered, is an example of such interest. The countries considered are Anglo-Saxon countries (United Kingdom, Ireland, United States, Canada, New Zealand and Australia) and continental Europe countries (France, Germany, the Netherlands and Switzerland).<sup>1</sup> Atkinson and Piketty, 2007b, provide a comparison of results.<sup>2</sup> Research has also been done on the experiences of Argentina, Spain, Italy, Portugal, India, Japan, Sweden, Finland, Norway, China and Indonesia, and the outcomes are expected to be published in a second volume also edited by Atkinson and Piketty.<sup>3</sup>

The primary objective of this paper is to summarize the trends in income concentration in advanced countries during the twentieth century based on most of the works cited above.<sup>4</sup> Did income distribution become more unequal or more equal over the course of the years? When did income inequality increase and when did it decrease? What income fractiles were most affected by these trends? Which are the differences and similarities across countries?

The second objective is to understand these facts. What are the economic mechanisms and processes that allow us to understand the way income concentration evolved? Following the framework of the project ‘Markets, the State and the Dynamics of Inequality’ (Lustig,

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<sup>1</sup> Atkinson, 2005, Atkinson and Leigh, 2007 a,b, Dell, 2007, Dell, Piketty and Saez, 2007, Nolan, 2007, Piketty, 2001, 2003, Piketty and Saez, 2003, Saez and Veall, 2005, Salverda and Atkinson, 2007. Other works on income and wealth concentration in the same countries include Atkinson and Harrison, 1978, Atkinson and Leigh, 2008, Kopczuk and Saez, 2004, Landais, 2007 and Piketty, Postel Vinay and Rosenthal, 2006.

<sup>2</sup> See also Leigh, 2008 and Piketty and Saez, 2006.

<sup>3</sup> Aarberge and Atkinson, 2008, Alvaredo, 2007, 2008, Alvaredo and Pisano, 2008, Alvaredo and Saez, 2008, Banerjee and Piketty, 2005, Leigh and van der Eng, 2007, Moriguchi and Saez, 2007, Piketty and Qian, 2006, Riihelä, Sullström and Tuomala, 2005, Roine and Waldenström, 2008.

<sup>4</sup> In this sense, we do not provide here new and original results. The interested reader should refer to the country-studies for methodological details and source documentation.

2007) we attempt to classify the underlying forces driving inequality changes into three dimensions: market forces, state policies and other historical and socio-political factors.

The rest of the paper is organized as follows. Section 2 refers briefly to methodological issues. Section 3 describes the dynamics of top income shares in the United States and France, while section 4 summarizes the findings for Canada, Australia, New Zealand, Japan, Germany, the Netherlands, Spain, Italy, Switzerland, Sweden and the United Kingdom. Sections 5, 6 and 7 make explicit reference to market forces, state policies, history and institutions in order to understand the observed facts. Section 8 is devoted to the conclusions.

## **2. Motivation, Methodological Issues and Warnings**

Household income surveys are a relatively recent venture: they virtually did not exist before 1950, and in most countries they were not available in a homogenous, machine readable format until the 1970s or 1980s. Consequently, the existent survey-based inequality data sets suffer from serious shortcomings: they display little homogeneity across countries and over time, they are not long run and they hardly offer any reliable decomposition of income between capital income and labor income sources. This latter feature is unfortunate, because the economic mechanisms at work can be very different for the distribution of labor income and the distribution of capital income. In addition, household surveys are generally not representative at the top of the income distribution, where non-sampling errors (under-reporting in particular) may play an important role. This is particularly relevant in the case of developing countries, where household surveys are often the unique data source to analyze income inequality in spite of the fact that high incomes and even moderately high incomes are generally not reported at all.<sup>5</sup>

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<sup>5</sup> See Szekely and Hilgert, 1999, who look at a large number of Latin American household surveys and find that that ten largest incomes reported in the surveys are often not very much larger than the salary of an average manager in the given country at the time of the survey. For a systematic comparison of survey and national accounts aggregates in developing countries, see Ravallion, 2001.

The only data source that is consistently available on a long-run basis is tax data. Progressive income tax systems were established in most Western countries at the beginning of the XXth century (1907 in the UK, 1913 in the US, 1914 in France) and in all countries the tax administration has compiled and published tabulations based on the exhaustive set of income tax returns. These tabulations generally report, for a large number of income brackets, the corresponding number of taxpayers, as well as their total income and tax liability. They are usually broken down by income source: capital income, wage income, business income, etc. One can then use standard Pareto interpolation techniques to compute top fractiles thresholds and average incomes using such data.<sup>6</sup> In order to construct top fractile income share series from top fractile income series, one needs a total income denominator, which can be computed using aggregate income sources (national accounts).

Tax statistics are not free of shortcomings. The definitions of taxable income and tax unit tend to change through time according to the tax laws. While there is a tendency to under-reporting certain types of income, taxpayers also undertake a variety of avoidance responses, including planning, renaming and retiming of activities to legally reduce the tax liability. Capital incomes and capital gains are taxed at different degrees in different countries. Notwithstanding such drawbacks, no other source of information allows for the study of the distribution of top incomes covering virtually the whole twentieth century. The use of tax information to analyze the shares of top incomes is not new: it was already present in the works of Bowley, 1914, Stamp, 1914, 1936, Clark, 1932, Champernowne, 1936, Kuznets, 1953 and, more recently, Feenberg and Poterba, 1993.

Prior to WWII, the proportion of individuals subject to progressive income taxation in most countries rarely exceeded 10%, so that one can only compute top-decile income shares series and above for the entire period. Therefore, long-run series are confined to top income (and wealth) shares and contain little information about bottom segments of the distribution. True, most research about inequality deals with the bottom of the income

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<sup>6</sup> Assuming that the distribution is Pareto in form has been the standard practice (see, e.g. Feenberg and Poterba, 1993 and Piketty, 2001). An alternative approach is based on placing upper and lower bounds, as described in Atkinson, 2005.

distribution. Notwithstanding this fact, the concentration of income at the top has significant consequences for economic and political power. The dynamics of income concentration are of utter importance as soon as one accepts that different parts of the distribution are interdependent and that individuals interact in society, in the market and in political decision-making. There are several reasons why the top of the distribution is of interest:<sup>7</sup>

(i) From the point of view of income as command over resources, it is worth knowing if the rich are numerous and rich enough to make a noticeable difference to the overall control of resources; this is strictly connected with tax and other public policies. Even when the number of well-off families or individuals may be regarded as very small when considered the whole economy, their history may explain changes in overall distribution. Consider, for example, an infinitesimal (in term of members) richest group who owns a finite share  $\phi$  of total income. The Gini coefficient turns out to be close to  $G \approx \phi + (1-\phi) G'$ , where  $G'$  is the Gini for the rest of the population (excluding the rich). In the case in which  $G'$  is 0.40, an increase of 8 percentage points in the share of the rich results in an increase of 4.8 percentage points in the Gini for the whole economy.<sup>8</sup> As Atkinson, 2007 points out, given that the increase in the overall Gini recorded in the US between the 1970s and the 1990s was of the order of 5 percentage points, what is happening at the top is potentially important as an explanation. Identifying the behaviour of the top incomes contribute to the understanding of the decomposition of inequality changes over the last century, and, in particular, help explain the rise in overall inequality observed during the last years. There is an additional important issue: we need to know whether an increase in taxes on the top income earners yield appreciable revenue that could be directed towards redistribution and public goods.

(ii) From the point of view of income as command over people, is it absolute or relative income that matters? Is it the absolute or the relative number of the rich? One way to

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<sup>7</sup> The following three paragraphs draw on Atkinson, 2007.

<sup>8</sup> This simply says that  $\Delta G \approx \Delta \phi - \Delta \phi G'$ . For an initial situation of  $G'=0.40$  and  $\phi=0.1$ , then  $G \approx 0.1 + (1-0.1) 0.40 = 0.46$ . After an increase in  $\phi$  from 0.1 to 0.18, then  $G \approx 0.18 + (1-0.18) 0.40 = 0.508$ . The difference between the two Gini coefficients is 4.8 percentage points.

answer these questions is based on the capability of the rich to insulate themselves and opt out of communal provision. The separation of the elites, whose members demand private provision of education, health care, gated communities and police services, is a standard feature in Latin America. It is a representation of the use of power in terms of the number of people than could be employed by a given income. Atkinson, 2007 argues that to the extent that those opting out have to finance public goods, then absolute numbers may be relevant; in terms of the impact on the rest of the society, relative numbers may be relevant.

(iii) From a global perspective, the relevant issue is to know which the quantitative significance of the rich on a world scale is. Does it matter if the share of top 1% in the US doubles? Rough estimates show that in 1992 there were 7.4 million individuals with incomes above 20 times the mean world income (\$100,000). More than a third of them were in the US. They constituted 0.14% of the world population and received 5.4% of total world income. Thus, the marked increase in income concentration observed in the US during the last years translated into a perceptible difference to the world distribution.<sup>9</sup>

### **3. Top Incomes: The Cases of France and the United States**

Most advanced countries covered by the cited research followed a general pattern: abrupt decline of top capital incomes during the 1914-1945 period; sudden rise of top wages in Anglo-Saxon economies and relative stability in continental Europe countries since the 1970s. We briefly describe the cases of the United States and France as representative examples of each of the two ‘groups.’ Then, we provide a comparative overview for the rest of the economies.

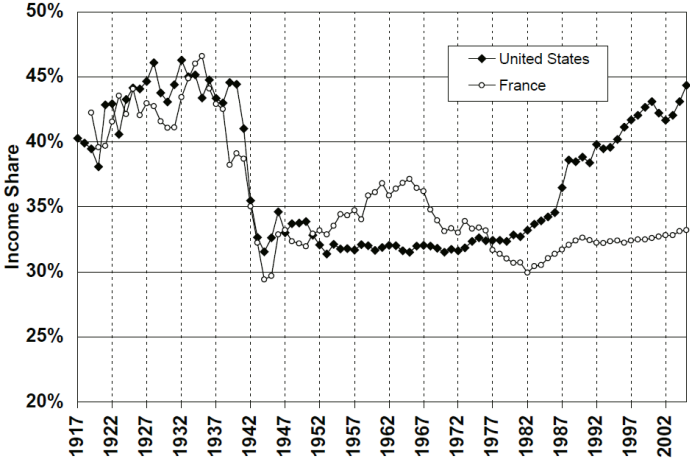
Figure 1 presents the income shares of the top decile in the United States and France over the twentieth century. In the US, the overall pattern of the top decile share is *U-shaped*. It fluctuates around 40-45% during the interwar period, it declines substantially to just above 30% during World War II and stays more or less flat at 31-32% until the 1970s. After decades of stability in the postwar period, the top decile share has increased dramatically

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<sup>9</sup> Estimates taken from Atkinson, 2007

over the last 25 years and is now at a level close to the pre-war level. This timing raises serious doubts about (and it is difficult to reconcile with) a Kuznets' type explanation. If the decline in income inequality was due to a continuous reallocation process from a low productivity to a high productivity sector (e.g. from rural to urban activities as in Kuznets' original model), then it is hard to understand why the timing of the fall has been so particular.

**Figure 1**  
**Top 10% Income Shares in the United States and France**



Sources: Piketty, 2001 and Piketty and Saez, 2003.

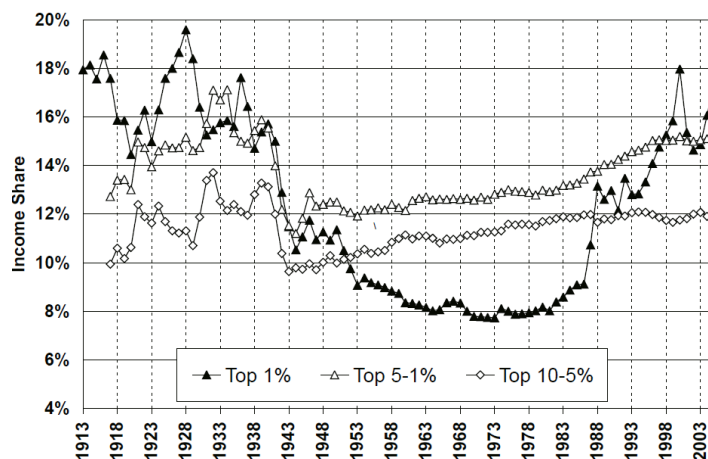
The decline in top income shares witnessed by Kuznets, 1953, 1955 for the US and confirmed by Piketty and Saez, 2003, also took place in France, and it came to an end right after WWII. Such a reduction was experienced during a very chaotic period, 1914-1945 (and especially during both World Wars and the early 1930s). As Figure 1 shows, the share of total household income received by the top 10% in France dropped from about 45% in the 1920s to about 32% in the 1990s. In other words, the average income of the top 10% was about 4.5 times larger than the average income of the entire population at the beginning of the century and it was about 3.2-3.3 times larger in the 1990s. Such a secular decline has been far from steady. The top decile income share dropped during WWI, and subsequently recovered during the 1920s and the first half of the 1930s. In 1935, at the height of the Great Depression in France, the top 10% share was slightly below 47%. It then started to



fall sharply in 1936 and even more so during WWII. During the postwar, three subperiods need to be distinguished. The top 10% income share increased from 1945 (29-30%) to 1967-1968 (36-37%). Then it declined until 1982-1983, when it reached 30-31%. It has then increased somewhat since the early 1980s. Note however that in France (as in other continental Europe countries) most of the action took place before 1945. Since WWII, income inequality, as measured by the top decile income share, appears to have been fluctuating around a constant mean value of about 32-33% with no trend.

It is instructive to decompose the top decile into the top percentile (top 1%), the next 4% (top 5-1%) and the bottom half of the top decile (top 10-5%). Figure 2 presents the results for the US while Figure 3 refers to the case of France.

**Figure 2**  
**Decomposing the Top 10% Income Shares in the United States**

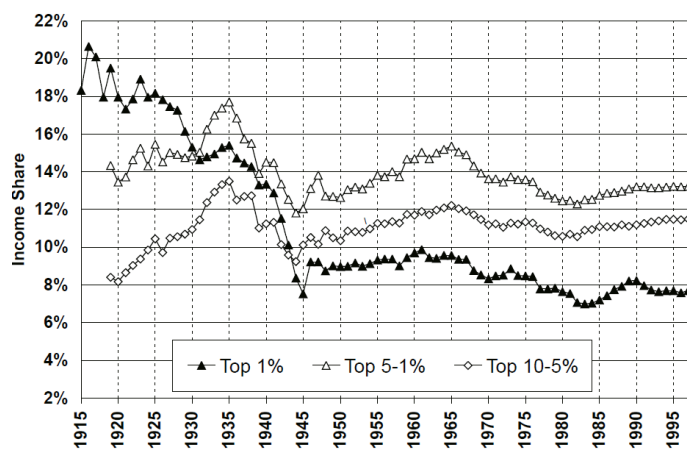


Source: Piketty and Saez, 2003

Figure 2 shows that most fluctuations of the top decile in the US are due to fluctuations within the top percentile. The drop in the top 5-1% and top 10-5% shares during WWII is far less dramatic, partially reverses relatively quickly and does not increase much in recent decades. In contrast, the top percentile in the US has gone through enormous fluctuations along the course of the twentieth century, from about 18 percent before WWI, to about 8% during the 1960s and 1970s, and back to almost 17% by 2000. The top percentile share

declined during WWI, recovered during the 1920s and declined again during the Great Depression and WWII.

**Figure 3**  
**Decomposing the Top 10% Income Shares in France**



Source: Piketty, 2001.

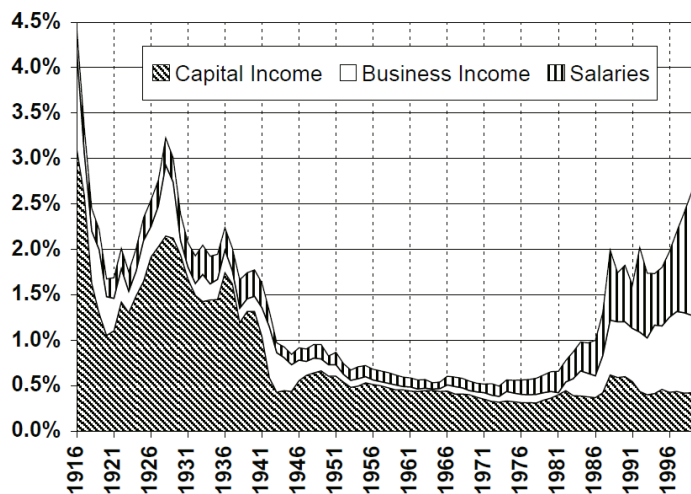
Figure 3 for France tells also that the income share of top 10-5% group has been extremely stable in the long run: between 1900 and 1998, that share has always been fluctuating around a mean value of 11-11.5% of total household income (which means that these households always get about 2.2-2.3 times the average income). The income share of the top 5-1% has experienced a modest secular decline, from about 15% of total household income at the beginning of the twentieth century to about 13% during the 1990s, i.e. a drop of about 10%. The top percentile income share has dropped by more than 50%. The share of total income received by the top 1% was about 20% at the beginning of the twentieth century, and it was only about 7-8% during the 1990s. In other words, the average income of the top 1% was about 20 times larger than the average income of the entire population at the beginning of the century, and it was 7-8 times larger at the end. Results show that the higher you go within the top percentile of the income distribution, the larger the secular decline. The most extreme case is that of the top 0.01%: their income share has dropped from about 3% to about 0.5-0.6% since 1945. Even more: the average real income of the top 0.01% has not increased at all during the twentieth century, while the average real income of the entire population has been multiplied by 4.5. Almost 90% of the secular

decline of the top 10% income share is due to the top 1%, and more than half of the top 1% drop is due to the top 0.1%.

The timing of the fall of very top incomes is also striking in France. Between 1945 and 1998, the income share of the top 1% has been fairly stable. The secular fall took place exclusively during the 1914-1945 period, and especially between the Great Depression and WWII. It is interesting to note that the deflationary years of the Great Depression had a very different impact on moderately high incomes and on very top incomes. While the income shares of the top 10-5% and the top 5-1% (the 'upper middle class') increased sharply during the early 1930s, the income shares of the top 1% and above (the 'rich') fell.

Figure 4 displays the share and composition of income in the US from 1916 to 2000 for the top 0.01%. Until the 1970s, very top incomes were composed primarily of capital income (mostly dividend income) and to a smaller extent business income, the wage income share being very modest.

**Figure 4**  
**The Top 0.01% Income Share and Composition in the US**



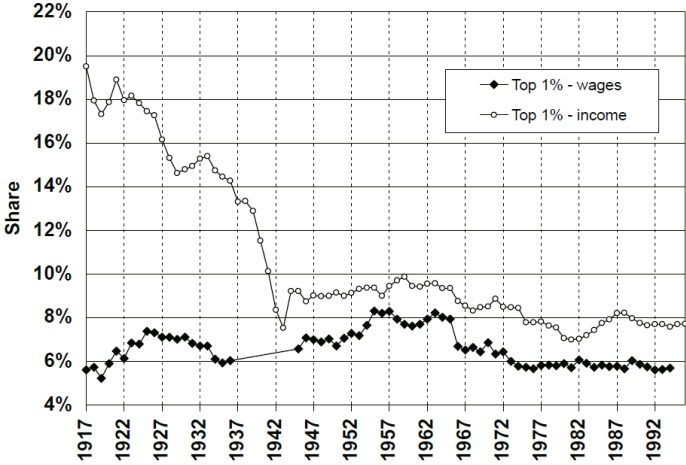
Note: The Figure shows the top 0.01% income share (top curve) and its composition (excluding capital gains).  
Source: Piketty and Saez, 2003.

Figure 4 confirms that the large decline of top incomes observed during the 1914-1945 period is predominantly a capital income phenomenon. It also shows that the income

composition pattern at the very top changed remarkably between 1960 and 2000. Salary income has been driving up top incomes and has now become the main source of income at the very top. The dramatic evolution of the composition of top incomes seems robust. National accounts data show that the share of capital income in aggregate personal income has been stable in the long run. Therefore, the secular decline of top capital incomes is the consequence of a decreased concentration of capital income and not a decline in the share of capital income in the economy as a whole.

The fact that the 1914-1945 drop in top income shares is entirely due to the fall of top capital incomes also arises from the French experience: Figure 5 plots the top 1% income share and the top 1% wage share (wage distribution). Top wage shares actually did not decline at all. One gets the same picture by using other inequality measures or by looking at the top decile share rather than the top percentile share.

**Figure 5**  
**The Fall of Top Capital Incomes in France**

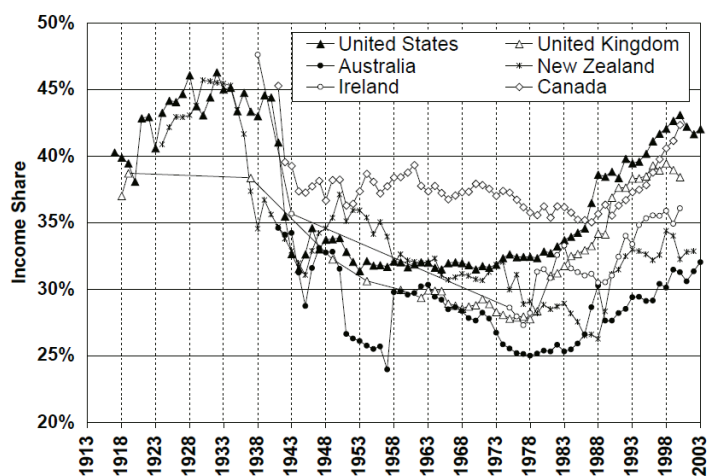


Source: Piketty, 2001.

#### 4. The Contrast between English-Speaking Countries and Continental Europe

Figure 6 shows the shares of the top 10% for six English-speaking countries: the US, the UK, Australia, Ireland, New Zealand and Canada.<sup>10</sup> It may be seen that most of the countries exhibit a U-shape over time, but that they differ considerably. In particular, they differ in the timing of the fall. In all cases, there was a fall in WWII, but in both Australia and New Zealand there was an immediate post-war recovery, influenced by the improvement of international prices of raw materials. In Canada and the United States, there was limited change in the period 1955-1975, whereas Australia, New Zealand and the United Kingdom all exhibited significant peacetime falls.

**Figure 6**  
**Top 10% Income Shares in Anglo-Saxon Advanced Countries**



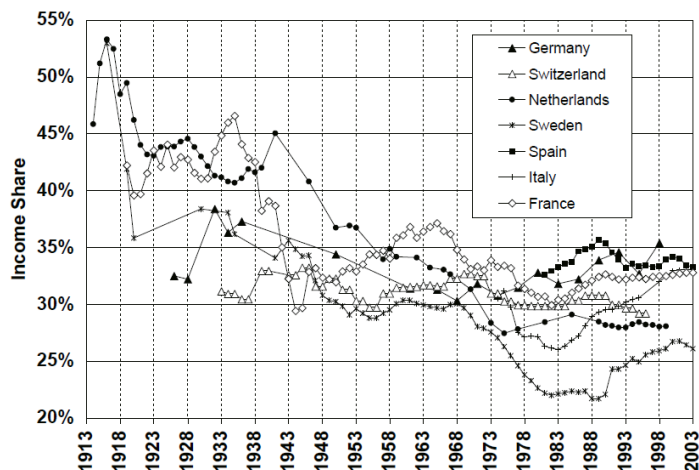
Sources: Atkinson, 2007, Atkinson and Leigh 2007a, 2007b, Kopczuk and Saez, 2004, Nolan, 2007, Piketty and Saez, 2003.

Figure 7 shows the share of the top 10% for seven Continental Europe countries (France, Germany, the Netherlands, Switzerland, Italy, Spain, and Sweden). The Continental European story is different. The top income shares did not fall in Switzerland during WWII, whereas the wartime fall appears to have been greatest in France. There was a period of falling shares in the 1960s and 1970s, except in Germany, but then broad stability over the past twenty years. *Most striking is what did not happen: in Continental Europe there has*

<sup>10</sup> In considering the results, the reader should bear in mind the warnings about comparability described in detail in Atkinson and Piketty, 2007.

not been a U-shape pattern over the twentieth century compared to the Anglo-Saxon economies.

**Figure 7**  
**Top 10% Income Shares in Continental Europe**



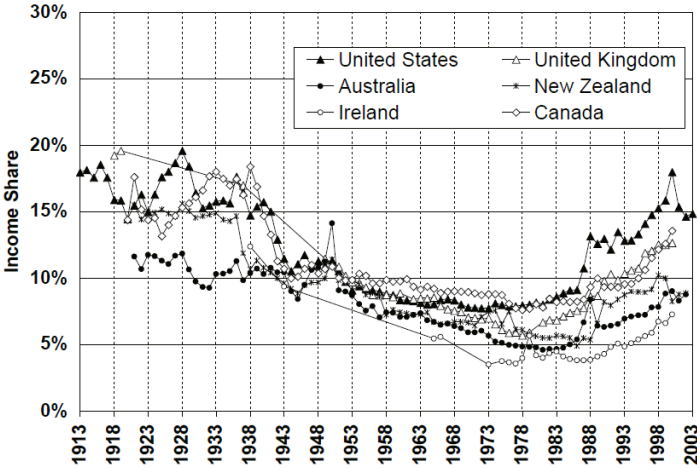
Sources: Alvaredo, 2008, Alvaredo and Pisano, 2008, Alvaredo and Saez, 2008, Dell, 2007, Dell, Piketty and Saez, 2007, Piketty, 2001, Roine and Walderström, 2008, Salverda and Atkinson, 2007.

We turn now to the top 1%, shown for the English-speaking countries in Figure 8 and for Continental European countries and Japan in Figure 9. The difference between the periods before and after WWII is again marked. After 1945 the picture is one of stability in Europe, with only the Netherlands showing a pronounced reduction from 1960 to 1975. In contrast, the five English-speaking countries exhibit a remarkable convergence up to the 1970s; there was subsequently some divergence, with the top 1% share starting to rise in the US but continuing to fall in the other countries. But there is considerable commonality to the rise from the 1980s. The shares of the top 0.1% are shown in Figures 10 and 11.

Although most of the countries follow the general pattern described above – abrupt decline of top capital incomes between 1914 and 1945, sudden rise of top wages in Anglo-Saxon countries since the 1970s – a careful analysis reveals interesting details. In Switzerland, top shares have been basically flat in the long run. Countries like Ireland, Australia and New Zealand, which were less affected by the wars, also witnessed a limited decline in inequality during the 1914-1945 period, although less limited than in Switzerland, for

reasons that probably have to do with differences in the trade structure. The case of Germany reveals another interesting pattern: top German capital incomes were strongly hit by WWII but they seemed to have recovered quickly and to be structurally higher than in other Western countries, probably due to the limited tax progressivity of the German fiscal system in the immediate postwar years. Sweden experienced an important reduction in concentration during the 1970s and 1980s.

**Figure 8**  
**Top 1% Income Shares in Anglo-Saxon Advanced Countries**

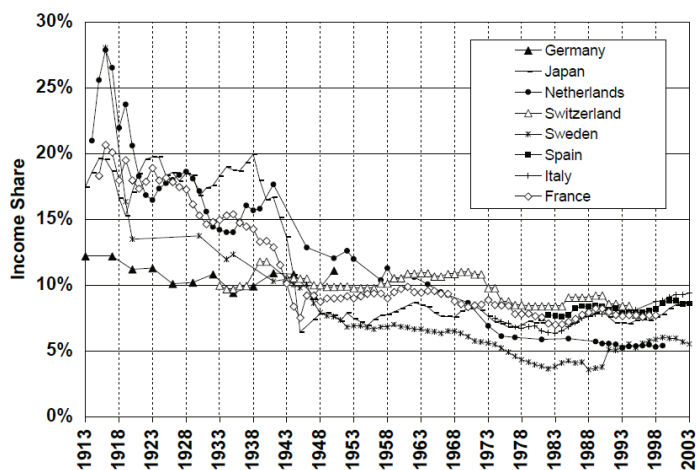


Sources: Atkinson, 2007, Atkinson and Leigh 2007a, 2007b, Kopczuk and Saez, 2004, Nolan, 2007, Piketty and Saez, 2003.

Due to historical and cultural links with Latin America, it is pertinent to make an explicit reference to the experiences of Spain and Italy. In Spain, isolated from the world wars but hit by a cruel civil war, income concentration was much higher during the 1930s than it is today; it dropped during the 1940s and remained fairly stable throughout the Spanish economic miracle from the 1950s to the 1970s. During the last two decades, income concentration has increased significantly and this phenomenon is concentrated in the top 1%, and especially in the top fractiles within the top 1%. A large fraction of the increase is due to a surge in realized capital gains following the stock market boom of the late 1990s and since 2002 (Alvaredo and Saez, 2008). Estimates for Italy for the last three decades show a persistent increase in the shares of top incomes since the mid-1980s, mainly driven by top wages and self-employment income (Alvaredo and Pisano, 2008). Notwithstanding this trend, the increase in income concentration in both countries is very small relative to

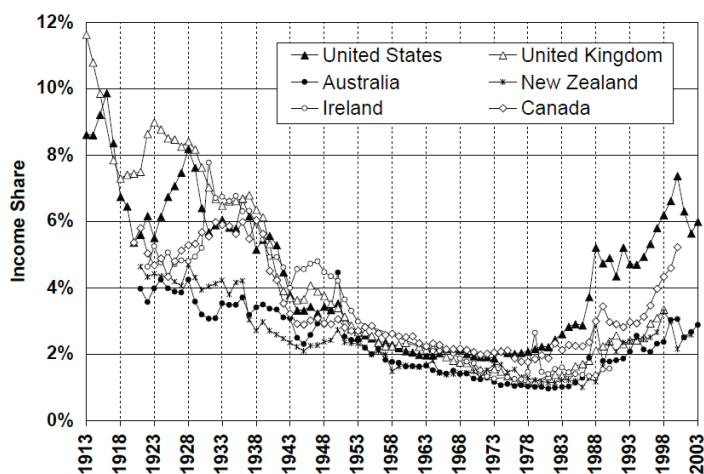
the surge experienced by top incomes in the United States and other Anglo-Saxon countries.

**Figure 9**  
**Top 1% Income Shares in Continental Europe and Japan**



Sources: Alvaredo, 2008, Alvaredo and Pisano, 2008, Alvaredo and Saez, 2008, Dell, 2007, Dell, Piketty and Saez, 2007, Moriguchi and Saez, 2007, Piketty, 2001, Roine and Walderström, 2008, Salverda and Atkinson, 2007.

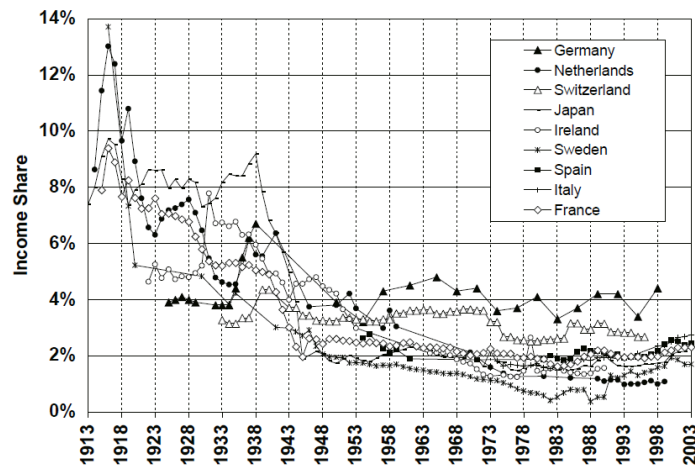
**Figure 10**  
**Top 0.1% Income Shares in Anglo-Saxon Advanced Countries**



Sources: Atkinson, 2007, Atkinson and Leigh 2007a, 2007b, Kopczuk and Saez, 2004, Nolan, 2007, Piketty and Saez, 2003.



**Figure 11**  
**Top 0.1% Income Shares in Continental Europe and Japan**



Sources: Alvaredo, 2008, Alvaredo and Pisano, 2008, Alvaredo and Saez, 2008, Dell, 2007, Dell, Piketty and Saez, 2007, Moriguchi and Saez, 2007, Piketty, 2001, Roine and Walderström, 2008, Salverda and Atkinson, 2007.

## 5. The Drop in Income Concentration until 1945: Market Forces and Historical Factors

The fact that, before 1945, the drop in income inequality is solely due to the fall in top capital incomes and that it took place mostly during wartime, the stock market crash and the Great Depression suggests an obvious explanation: for the most part, income inequality dropped because capital owners were hurt by major shocks to their capital holdings (destruction, inflation, bankruptcies, the way of financing war debts). This is confirmed by the very peculiar timing of the fall: top capital incomes and inequality at large did not start falling until WWI. The labor market and the rural-urban migration process played no role: low-wage rural workers slowly disappeared, but they were replaced by low-wage urban workers at the bottom of the distribution, so that overall wage inequality hardly changed. The idea that capital owners incurred large shocks and that this had a big impact on income distribution is not new; Kuznets, 1955 already mentioned this factor. What is new is that there is not much else going on. The decline in income inequality that took place during the first half of the century was mostly accidental.

Kuznets did stress in his 1955 article the key role played by wars, inflation, recessions, and the rise of progressive taxation, though this is not the part of the explanation that most economists chose to remember. It was only at the end of his presidential address to the 1954 American Economic Association Annual Congress that he suggested that an additional process (based on the two-sector model) might also have played a role. Kuznets was fully aware that he had no empirical support in favor of this interpretation: “This is perhaps 5% empirical information and 95% speculation, some of it tainted by wishful thinking.”<sup>11</sup> As he himself put it quite bluntly, what was at the stake in the 1950s was nothing but “the future prospect of the underdeveloped countries within the orbit of the free world.”<sup>12</sup> To a large extent, the optimistic theory of the inverse-U curve is the product of the cold war.

It is interesting to note that the structural decline of capital concentration that took place between 1914 and 1945 in developed countries does not seem to have had a negative impact on their growth performance. On the contrary, per capita growth rates have been substantially higher in the postwar period than during the nineteenth century and all the more so in countries such as France and Germany. This is consistent with the theory of capital markets imperfections: in the presence of credit constraints, excessive wealth inequality entails negative consequences for social mobility and growth. There are good reasons to believe that the 1914-1945 shocks allowed new generations of entrepreneurs to replace old-style capitalist dynasties at a faster pace than would have otherwise been the case. High capital concentration was not a prerequisite for growth.

## **6. State Action: The Role of Progressive Taxation in the post WWII period**

The more challenging part that needs to be explained is the non-recovery of top capital incomes during the post 1945 period. Here the proposed explanation is that the 1914-1945 shocks had a permanent impact because the introduction of high income and estate tax progressivity (there was virtually no tax progressivity prior to 1914 and top rates increased enormously between 1914 and 1945) made it impossible for top capital holders to fully

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<sup>11</sup> Kuznets, 1955, p. 26.

<sup>12</sup> Kuznets, 1955, p. 24.

recover. Simple simulations (Piketty, 2003) suggest that the long-run impact of tax progressivity on wealth concentration is indeed large enough to explain the observed changes.<sup>13</sup>

In all countries for which we have data, the secular decline in income inequality took place for the most part during the 1914-1945 period, and most of the decline seems to be due to the fall of top capital incomes. The 1914-1945 drop was larger in countries that were strongly hit by the war (France, Germany) than in the US, and there was no drop at all in neutral countries (such as Switzerland), which is consistent with the proposed explanation based on capital shocks. Moreover, wealth concentration seems to have better recovered during the post-war period in countries with less tax progressivity (especially estate tax progressivity) such as Germany, which again seems broadly consistent with the tax explanation.

How can one account for the fact that large fortunes never recovered from the 1914-1945 shocks, while smaller fortunes did recover perfectly well? The large fortunes that generated the top capital incomes observed at the beginning of the twentieth century were accumulated during the nineteenth century, at a time when progressive taxation did not exist and capitalists could use almost the totality of their pre-tax income to consume and accumulate. Most of the analyzed countries started to adopt very progressive income and inheritance tax structures during the inter-war years, with top marginal rates often in excess of 75%. During the decades following WWII, those top rates remained extremely high. In the United States, the top marginal rate was 91% up to 1963. These high marginal rates affected only a small fraction of individuals, but the point is that they were to a large extent designed to hit the top 1% of the income distribution, and ever more so the top 0.1% and 0.01%, that is, the incomes that relied primarily on capital income and capital accumulation.<sup>14</sup>

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<sup>13</sup> The progressive taxation system as the explanation for observed changes in income and wealth concentration has been already mentioned by Lampman, 1962 and Kuznets, 1955. For the US, DeLong, 1998 also stresses the potential of the anti-trust law, more loosely enforced before 1929 and after 1980.

<sup>14</sup> In Latin America the establishment of the income tax was generally a policy response to negative outcomes in the state budget. It was enforced during the decade of 1920 in Mexico, Chile and Brazil, and in the decade of 1930 in Argentina, when public revenues (mainly based on tariffs) were severely hit by the world crisis.

In France, before the creation of a progressive income tax in 1914, personal taxation relied on individual characteristics such as housing rents, the number of doors and windows, etc. Effective tax rates were roughly proportional and never exceeded 3-4% (Piketty, 2001). There did exist an inheritance tax during the nineteenth century, but it was purely proportional and the rate was very low: 1%. The top marginal rate of the income tax was set to only 2% in 1915 in France, but it quickly reached very high levels (above 60%) during the interwar period, and it stabilized around 60-70% after 1945. Effective average tax rates have always been fairly moderate at the level of the P90-95 fractile: less than 1% during the interwar period, and between 5% and 10% since WWII. In contrast, effective average tax rates borne by fractile P99.99-100 reached 30% during the interwar period, and stabilized around 40-50% since WWII, as shown in Figure 12.<sup>15</sup> It is therefore not surprising if progressive taxation had a substantial impact on capital accumulation at the very top and a negligible impact for smaller fortunes.

In the US, top tax rates were very high from the end of WWI to the early 1920s, and then continuously from 1932 to the mid 1980s. Moreover, the United States imposed a sharply progressive estate tax since 1916, and a substantial corporate income tax ever since WWII. These very high marginal tax rates applied only to a very small fraction of taxpayers, but created a substantial burden on the very top income groups composed primarily by capital income. In contrast to progressive labor income taxation, which simply produces a level effect on earnings through labor supply responses, progressive taxation of capital income

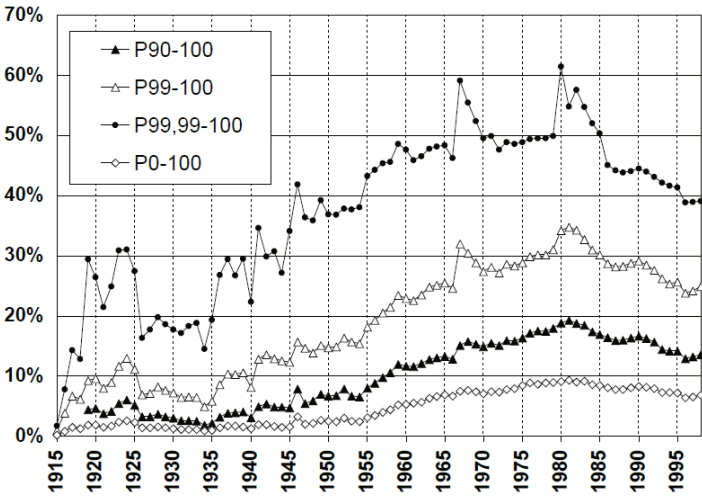
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Nevertheless, the number of individuals filing for the income tax has historically been rather low. Latin American countries show a clear preference for non-personal taxation. As an example, in 1932, in Argentina, international trade-based taxes accounted for 41% of total tax collection while the income tax represented 6%; in 2000 the income tax represented 4% and the sales tax, 52%. In Spain, in 2000, the income tax and the VAT, each accounted for 35% of total tax collection. It is worth recalling the negative effect that high inflation (pervasive in Latin America during several decades) has had on income tax collections through the Olivera-Tanzi effect.

<sup>15</sup> Estimates of marginal tax rates for the countries under study can be found in Atkinson and Piketty, 2007a. The large year-to-year variations of tax rates displayed in Figure 12, especially for top incomes, show how chaotic the history of the income tax can be. For instance, the 1968 and 1981 spikes correspond to the large tax increases on the rich that were voted in the aftermath of the 1968 general strike and the 1981 socialist victory. A detailed historical account can be found in Piketty, 2001. As another example, the Second Republic established the first personal income tax in Spain in 1932 with the explicit aim of targeting high incomes. However, the marginal rates were initially rather low and were increased during Franco's years. The number of taxpayers was extremely limited. Only after the return to democracy Spain succeeded in enforcing a modern income tax since 1978.

has cumulative or dynamic effects because it reduces the net return on wealth that generates tomorrow's wealth.

**Figure 12**  
**Effective average income tax rates in France 1915-1998**



Source: Piketty, 2001.

The case of Switzerland, which did not experience the shocks of the two world wars and never established a very progressive tax structure, offers a test for this hypothesis and provides some credence to the tax progressivity explanation. In Switzerland, the majority of income taxes are levied at the local level. Probably due to fiscal competition and mobility across counties, taxes have a relatively flat rate structure with low marginal rates. The federal income and wealth tax rate has been only modestly progressive with very low top rates. Thus, over the twentieth century, the average tax rate on capital income of the wealthy has been much lower than in the other countries. Dell, Piketty and Saez, 2007 show that top wealth and income shares fell during the World Wars and the Great Depression but less than in other countries; Switzerland did increase taxes during the wars to build up defense and discourage attacks. Most importantly, top wealth and income shares fully recovered from those shocks in the post WWII period. Consequently, Switzerland is the only case among developed economies to display the same concentration of wealth and income in the early part of the twentieth century and in the decades following WWII.

Needless to say, this is not sufficient to prove in a rigorous way that the dynamic effects of progressive taxation on capital accumulation and pre-tax income inequality have the ‘right’ quantitative magnitude to account for the observed facts. One would need to know more about the savings rate of capitalists, how their accumulation strategies have changed since 1945, etc. Note, however, that it is not unreasonable to assume that the owners of large fortunes, whose pre-tax incomes and lifestyles were already severely hit by the 1914-1945 shocks, were not willing to reduce their consumption down to very low levels and to increase their savings so as to counteract the rise in tax rates.<sup>16</sup>

In fact, in the most standard economic models of capital accumulation, the behavioral response tends to amplify (and not to counteract) the rise in tax rates. That is, a rise in tax rates imposed on very top incomes leads wealthy taxpayers to increase their consumption and to reduce their savings. In the Barro-Becker dynastic model of capital accumulation, this behavioral response is so important that large fortunes completely disappear in the long run. Progressive taxation leads to truncated wealth distribution in the long run, in the sense that there is nobody above the top marginal rate threshold. In less extreme and more realistic models of capital accumulation, the impact of progressive taxation is smaller and large fortunes remain. But the impact is still substantial. For instance, simple computations show that a capitalist will deplete her wealth at a very high rate if she keeps the same consumption after progressive taxation is introduced. In the absence of taxation (say, before WWI), the capital stock of a capitalist consuming each year the full return to her capital stock (say 5%) is stationary. But if an effective tax rate of 30% is suddenly introduced (say, in the interwar period), and if this capitalist keeps consuming the full before-tax return, then she will need to consume some of her capital stock each year: 18% of the initial capital stock is destroyed after ten years, 42% after twenty years, etc, and there is no capital left after 35 years. The mechanism is trivial, but it is reasonable to think that it did contribute to amplify the shocks incurred by capital owners during the 1914-1945 period.

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<sup>16</sup> Existing evidence shows that the negative shocks incurred between 1914 and 1945 and the rise in progressive taxation induced French wealthy families to reduce drastically their savings rate between 1873-1913 and 1946-1953, according to Perrot, 1961.

Consider now the more interesting case of a capitalist (or a would-be capitalist) in 1945, and assume that this capitalist is ready to devote a large fraction of her income to capital accumulation. How much can she accumulate in 50 years? The point is that progressive taxation drastically reduces the assets that one can accumulate, including capitalists with low living standards (see Table 1). For instance, with a 5% before-tax return rate and for a consumption level equal to 40% of the before-tax return to the initial capital stock, one can accumulate in 50 years a fortune that is about 5 times as large with a 0% tax rate as with a 50% tax rate. That is, the initial capital stock is multiplied by 7.3 after 50 years in the absence of taxation, while it is multiplied by 1.5 with a tax rate of 50%. This tax rate of 50% corresponds approximately to the average effective tax rates faced by fractile P99.99-100 in France since WWII, and the factor of 5 corresponds approximately to the secular decline in the income share of fractile P99.99-100.

**Table 1**  
**The Impact of Progressive Taxation on Capital Accumulation**

	r=5% t=0%	r=5% t=30%	r=5% t=50%	r=10% t=0%	r=10% t=30%	r=10% t=50%
c=100%	1.0	0.0	0.0	1.0	0.0	0.0
c=80%	3.1	0.3	0.0	24.3	0.0	0.0
c=60%	5.2	1.7	0.5	47.6	5.1	0.0
c=40%	7.3	3.0	1.5	70.8	13.2	3.1
c=20%	9.4	4.3	2.5	94.1	21.3	7.3
c=0%	11.5	5.6	3.4	117.4	29.5	11.5

Note: The table reads as follows. Assume that a capitalist's consumption level is equal to a fixed fraction  $c$  (say  $c=20\%$ ) of the full return  $r$  (say  $r=5\%$ ) to his capital stock; in the absence of taxation ( $t=0\%$ ) his capital stock will be multiplied by 9.4 after 50 years. Under a tax rate of  $t=50\%$ , his capital stock will be multiplied by 2.5 in 50 years. We assume that the capitalist keeps the same absolute consumption level over the 50 years. The formula is given by  $x(n)=c/(1-t)+[1+(1-t)r]^n \times [1-c/(1-t)]$ .

These simple simulations do not take into account the impact of the progressive inheritance tax. It should be stressed, nevertheless, that the long-run impact of the progressive inheritance tax on capital accumulation, though important, is probably less drastic than the impact of the progressive income tax. The reason is straightforward: the income tax applies every year and has cumulative effects; an effective tax rate of 50% can reduce the size of fortunes by a factor of 5 in 50 years. In contrast, assuming that the inheritance tax is paid

once every 50 years, an effective inheritance tax rate of 50% reduces the fortune by a factor of 2.

Finally, it is worth emphasizing that it is not easy to find convincing explanations other than the introduction of progressive taxation that can account for the nonrecovery of large fortunes. For instance, explanations based on hypothetical changes in before-tax returns to capital do not seem to work. All capital holders should have been hit by a reduction in before-tax assets returns. The point is that large fortunes were unable to recover from the 1914-1945 shocks, while smaller fortunes recovered perfectly well. One needs an explanation that applies only to the top of the distribution and nowhere else.

These explanations about the dynamics of capital income concentration could be tested by looking at the case of countries that either did not experience large pre- 1945 shocks and/or did not implement significant sustained progressive income tax systems. Switzerland stayed out of the wars and never implemented very progressive wealth or income taxation. In contrast to other countries, top wealth shares in Switzerland hardly declined from 1913 to the 1960s (see Dell, Piketty and Saez, 2007). The case of Ireland is also interesting. As Nolan, 2007 shows, there was no significant drop in top income shares in Ireland during WWII and to income shares were quite similar in the early 1920s and the late 1940s. Top income shares did fall significantly in the postwar decades, however, when Ireland implemented progressive taxation with very high top rates.

## **7. The History since the 1970s: Technological Change versus Institutions**

During the post-1970 period, one observes a major divergence between rich countries. While top income shares have remained fairly stable in continental Europe or Japan over the past three decades, they have increased enormously in the United States and other English-speaking countries. In recent years, the rise of top income shares is due not to the revival of top capital incomes, but rather to the very large increases in top wages, especially executive compensation. As a consequence, top executives, or the ‘working rich’ replace top capital owners, or the ‘rentiers’, at the top of the income hierarchy.



To get a sense of magnitude of the upsurge of high incomes in recent years, consider the real income growth displayed by the top 1% and the bottom 99%, as illustrated in Table 2 for the case of the US. From 1993 to 2006, average real incomes grew at 1.9% annual rate (or 28% over the thirteen-year period). However, if the top 1% is excluded, average real income growth is almost halved to about 1.1% per year (or 15% over the thirteen-year period). Top 1% incomes grew at the much faster rate of 5.7% per year (or 105% over the thirteen-year period). Consequently, top 1% incomes captured about half of the overall economic growth experienced between 1993 and 2006.

We can make a distinction between the 1993-2000 period (Clinton's expansion) and the 2002-2006 period (Bush's expansion). During both expansions, the income of the top 1% grew extremely quickly at an annual rate over 10.1% and 11.0% respectively. Nevertheless, while the bottom 99% of incomes grew at 2.4% per year from 1993 to 2000, they grew less than 1% per year from 2002 to 2006. Consequently, during the last expansion the top 1% captured three quarters of all income growth. Moreover, top incomes tax rates went up in 1993 during the Clinton administration while they went down in 2001 during the Bush administration. Those results help explain why the dramatic growth in top incomes during the Clinton administration did not generate much public outcry while there has been an extraordinary level of attention to top incomes in the media and in the public debate over the last two years.

**Table 2**  
**Real Annual Income Growth by Groups in the US 1993-2006**

	Average Income Real Annual Growth	Top 1% Incomes Real Annual Growth	Bottom 99% incomes Real Annual Growth
Full Period 1993-2006	1.9%	5.7%	1.1%
Clinton Expansion 1993-2000	3.7%	10.1%	2.4%
Bush Expansion 2002-2006	2.8%	11.0%	0.9%

Computations based on family income including realized capital gains before individual taxes. Incomes are deflated using CPI.  
Source: Piketty and Saez (2003) updated.

Understanding why top wages have surged in English speaking countries in recent decades but not in Europe or Japan remains a controversial question, with three broad views. First, the free market view claims that technological progress has made managerial skills more general and less firm-specific, increasing competition for the best executives from segregated within-firm markets to a single economy-wide market. While this view could account for trends in the US, it cannot explain why executive pay has not changed in other countries such as Japan or France, which have gone through similar technological changes. A second view claims impediments to free markets due to labor market regulations, unions, or social norms regarding pay inequality can keep executive pay below market levels. Such impediments have been largely removed in the United States, but still exist in Europe and Japan. Under this view, the surge in executive compensation actually represents valuable efficiency gains. Finally, a third view claims that the surge in top compensation in the United States is due to the increased ability of executives to set their own pay and extract rents at the expense of shareholders, perhaps for the same reason as under the second view. In this case, however, they might not be any associated efficiency gains.

It is very hard to explain the dramatic rise of very top wages in the Anglo-Saxon world, and especially in the US (which accounts for a disproportionate share of the rise of top incomes), on the basis of technical change alone. Between 1970 and 2000, the average real compensation of the top 100 CEOs was multiplied by a factor of more than 30, while the average wage in the US economy increased by about 10%. Much of the evidence suggests that such a phenomenal rise of executive compensation has more to do with bad governance and lack of control (perhaps due to much dispersed capital ownership) than with the rise of CEO productivity. Investors seem to have realized that CEO compensation went out of control, even before the 2008 crash.<sup>17</sup> It is still very difficult to understand why such levels of wage concentration are not observed in Europe. The idea that social norms are an important factor in setting pay is particularly plausible for very top wages, given that it is virtually impossible for board members (as well as for economists) to measure precisely the productivity of a CEO. DiNardo, Fortin and Lemieux, 1996 argue that changes in institutions such as the minimum wage and unionization account for a large part of the

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<sup>17</sup> See Bertrand and Mullainathan, 2001 and Krugman 2002.

increase in US wage inequality from 1973 to 1992. As emphasized by Acemoglu, Aghion and Violante, 2001, it is possible that these changes in institutions have been triggered by previous technological changes making it impossible to sustain previous labor market arrangements (see also Acemoglu, 2002). It seems unlikely, however, that changes in unionization or the minimum wage can explain the surge in very top wages. Top executive pay is also probably determined by herd behavior. Changing social norms regarding inequality and the acceptability of very high wages might partly explain the rise in Anglo-Saxon top wage shares observed since the 1970s. It is quite telling to read in the recent survey by Hall and Murphy, 2004, that their best explanation for the surge in stock-option compensation was that “boards and managers falsely perceive stock options to be inexpensive because of accounting and cash-flow considerations.”<sup>18</sup>

## **8. Final Remarks**

Since the mid 1950s, the Kuznets curve hypothesis has been one of the most debated issues in development economics. This theory has strong and fairly optimistic policy implications: if developing countries are patient enough and do not worry too much about the short-run social costs of development, at some point they should reach a situation in which poverty rates drop sharply while growth and inequality reduction go hand in hand. Today, the Kuznets curve is widely held to have doubled back on itself, especially in the US and other Anglo-Saxon countries, with a period of falling inequality during the first half of the twentieth century followed by a reversal of the trend since the 1970s. It would be misleading to conclude that Kuznets’ hypothesis is no longer of interest. There are two reasons for this. Firstly, many poor and developing countries have not passed the initial industrialization stage yet. Secondly, we need to understand why advanced economies went through an initial inverse-U curve.

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<sup>18</sup> As shown in Piketty and Saez, 2007, payroll tax burden has increased substantially over the last twenty-five years in countries such as the US, France and the UK. Because very top incomes are disproportionately composed of business and capital income rather than wage income (especially in France), the overall impact of payroll taxation on tax progressivity is regressive. In France, in 2005, the regressivity of the payroll tax system undoes the progressivity of the individual income tax system, so that the resulting tax system is basically flat.

The reasons why inequality declined in industrialized countries during the first half of the twentieth century do not have much to do with the optimistic process derived from Kuznets' ideas. The compression of income distribution that took place between 1914 and 1945 was due, for the most part, to specific capital shocks. On the one hand, the very peculiar conditions of the Great Depression and the stock market crash; on the other, the world wars. Consequently, market forces and historical factors were the leading explanations to account for the observed fact before 1945. Progressive income and estate taxation likely explain to a great extent why capital concentration did not recover the high levels observed during the first part of the twentieth century. Here, public policy took the lead. Additionally, the historical experience of developed countries seems to suggest that high wealth inequality is not a necessary condition for positive growth, and that it can even be harmful: the GDP growth rates displayed by advanced economies after WWII were much higher than in previous periods.

The fact that capital shocks played the leading role between 1914 and 1945 and that progressive taxation is associated with the non-recovery of top capital incomes after the end of WWII does not imply that the technical change view of inequality dynamics has no relevance. After all, the idea that technological waves have a major impact on labor market inequality is extremely sensible. However, in practice, the impact of technology on inequality depends on a large number of institutions, which vary greatly over time and across countries.

Current debates about policy reform in developing countries often focus on improving the delivery of social services, the design of market-friendly economic institutions, the effectiveness of poverty reduction programs, or the role of trade and market liberalization. Perhaps surprisingly, they rarely deal explicitly with tax reform and the need to develop modern income tax systems in those countries. This is unfortunate for at least three reasons. Firstly, developing countries often rely excessively on highly distortionary tax instruments such as taxes on trade or indirect taxes on specific consumption goods. Secondly, income taxation can help increase the tax revenues needed to finance public goods. Finally, many developing countries witnessed a sharp rise in income inequality during the recent period;

progressive taxation is one the least distortionary policy tools available that controls the rise in inequality by redistributing the gains from growth.

Educational institutions, labor market conditions, corporate governance, social norms and other country-specific institutions play a key role in the observed relationships between inequality and development. Increasing income dispersion is not the mechanical and unavoidable consequence of technical change. However, a trend of rising inequalities will not reverse in a spontaneous fashion either. The dynamics of inequality depend primarily on the policies and institutions adopted by governments and societies as a whole.

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