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# **The Evolution of Top Incomes in an Egalitarian Society; Sweden, 1903–2004**

Jesper Roine and Daniel Waldenström

# The Evolution of Top Incomes in an Egalitarian Society: Sweden, 1903–2004\*

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June 21, 2006

## Abstract:

This study presents new homogenous series of top income shares in Sweden over the period 1903–2004. We find that, starting from levels of inequality approximately equal to those in other Western countries at the time, the income share of the Swedish top decile drops sharply over the first eighty years of the twentieth century. Most of the decrease takes place before the expansion of the welfare state and by 1950 Swedish top income shares were already lower than in other countries. The fall is almost entirely due to a dramatic drop in the top percentile explained mostly by decreases in capital income, while the lower half of the top decile – consisting mainly of wage earners – experiences virtually no change over this period. In the past decades top income shares evolve very differently depending on whether capital gains are included or not. When included, Sweden's experience resembles that in the U.S. and the U.K. with sharp increases in top incomes. Excluding capital gains, Sweden looks more like the continental European countries where top income shares have remained relatively constant. A possible interpretation of our results is that Sweden over the past 20 years has been a country where it is more important to make the right financial investments than to earn a lot to become rich.

**Keywords:** Income inequality, Income distribution, Wealth distribution, Top incomes, Welfare State, Sweden, Taxation, Capital gains.

**JEL:** D31, H2, J3, N3

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## 1 Introduction

The evolution of income inequality across different economic systems has received enormous attention. A key issue in the literature has been the possible trade-offs between egalitarian ambitions and incentive effects. It is not surprising, therefore, that Sweden, allegedly the most extensive welfare state, has been the object of a very large number of studies concerning income distribution. However, two important aspects have largely been overlooked. First, while the achievements of the Swedish welfare state are well known, the lack of available micro data have led to most studies not going further back than to 1968.<sup>1</sup> The lack of homogenous, long-run series means that we can not really put the developments over the past decades in historical perspective. We do not know, for example, to what extent the equal distribution of income in Sweden is mainly the outcome of the growth of the welfare state, or if Sweden perhaps has a history of being an egalitarian society. Second, the focus on welfare issues has resulted in most studies concentrating on general measures of the distribution, such as the Gini coefficient, or on the lower parts of it but no attention has been paid to details of top incomes. This is potentially problematic as detailed knowledge about the top of the distribution may be crucial for distinguishing between different explanations of what drives inequality. For example, to differentiate between theories which, on the one hand, focus on changes in the relative wages of skilled and unskilled workers and, on the other hand, theories that stress the importance of savings and capital formation we must have details about top incomes.

This paper addresses these two shortcomings by providing new homogenous series on top income shares in Sweden, starting at the time of the introduction of the modern tax system in 1902 and until today. We also propose ways of explaining these developments. In 1902 Sweden was still in a phase of industrialization, had not yet extended the franchise to all male citizens, and was still half a century away from the expansion of the Welfare State. Our series, hence, allow us to study changes in income concentration over a period during which Swedish society has undergone major structural change and also allow us to add the historical perspec-

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<sup>1</sup> See Lindbeck (1997) for an overview of the Swedish welfare state; Atkinson et al. (1995), and Gottschalk and Smeeding (1997) for Swedish income distribution in international perspective; and, e.g. Björklund and Freeman (2006) for a recent overview of income equalization in Sweden. Examples of studies of income distribution before 1968 include Björklund and Palme (2000) who study the Swedish income distribution on decile level for four years between 1951 and 1973; Spånt's (1979) study of Census data for the period 1920–1976, Lydall's (1968) for the period 1920–1960; Gustafsson and Johansson (2003) who study tax returns for five separate years during the period 1925–1958 (restricted to people living in the City of Gothenburg); Söderberg (1991) who studies salaries in various sectors between 1870 and 1950; Lindstrand (1949) study the period 1935–1947 and Quensel (1944) the period 1930–1941, both using tax return data, etc. Bentzel's (1953) study of the period 1930–1948 is closest to ours in methodology. See Roine and Waldenström (2006) for a more complete listing.

tive on income inequality in Sweden which previously has not been available. The fact that we can decompose income shares with respect to the source of income, as well as study smaller fractiles within the top of the distribution (from the top 10 percent to the top 0.01 percent), enables us to discriminate between the possible economic mechanisms that could explain our findings. As changes in wealth concentration and in particular wealth distribution by income class are important for understanding changes in top income shares we provide new series for these developments over the twentieth century.

This paper also contributes to the recent work on long run income inequality, following the studies by Piketty (2001a, 2003), Piketty and Saez (2003), and Atkinson (2004), in which long run series of income concentration have been constructed using a common methodology.<sup>2</sup> These studies have given numerous new insights to changes in income concentration and in particular noted common developments for Anglo-Saxon countries, on the one hand, and continental European countries, on the other. As our study is the first to study one of the extremes of what Esping-Andersen (1990) denotes “the different worlds of welfare capitalism” namely the *social democratic welfare state*, it is particularly interesting to compare our findings to the previous work.<sup>3</sup> It turns out that Sweden is indeed different from both the Anglo-Saxon as well as the Continental European group of countries, although not entirely in ways which may have been expected.

A number of broad facts stand out from our series. Over the first eighty years of the twentieth century top income shares in Sweden decreased. Most of this decrease happened during the first half of the century, that is, before the expansion of the Welfare State, and most of it was due to large falls in the income share of the top percentile (P99–100). By contrast, the income share going to the lower half of the top decile (P90–P95), which consists mainly of wages, has been remarkably stable over the entire period. Between 1903 and 2004 this share has fluctuated between 9 and 11 percent, while the top percentile has changed by a factor of four. This suggests that decomposing the top decile into smaller fractions is crucial for understanding the

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<sup>2</sup> Other recent studies include Australia (Atkinson and Leigh, 2006), Canada (Saez and Veall, 2005), Germany (Dell, 2005), Ireland (Nolan, 2005), Japan (Moriguchi and Saez, 2005), the Netherlands (Atkinson and Salverda, 2005), New Zealand (Atkinson and Leigh, 2005), Spain (Alvaredo and Saez 2005) and Switzerland (Dell, Piketty and Saez, 2006). Lindert (2000) and Morrison (2000) provide surveys of previous work.

<sup>3</sup> In his distinction between “The Three Worlds of Welfare Capitalism”, Esping-Andersen (1990) identifies three different types of welfare states; “liberal welfare states” (e.g., the U.S. and the U.K.), the “corporatist-conservative welfare states” (e.g., France, Germany, Italy) and the “social democratic welfare states”. A similar distinction is often made between an Anglo-Saxon, a Continental European, and a Scandinavian group of countries; see, e.g., Lindbeck (2006).

development. In terms of composition, most of the early decrease seems to have been driven by falls in capital income, but after around the mid-1930s wage compression also becomes important in explaining the decreasing top shares. The drops in capital shares fit well with sharp decreases in top wealth shares during the first half of the century, in particular in the early 1930s, but notably not during World War II, as was the case in many other countries. Between 1950 and 1980 the continued decrease in inequality was quite steady but smaller relative to the first half of the century. Over the past two decades the general picture turns out to depend crucially on how capital gains income is treated. If we include capital gains, Swedish income inequality has increased quite substantially; when excluding them, top income shares have increased much less. This indicates that while labor incomes have not diverged dramatically over the past decades, the gains from exceptionally large increases in asset prices (mainly increases in share prices) have been very unevenly distributed.<sup>4</sup> This, in turn, suggests that the Swedish case over the past decades is different from both the Anglo-Saxon case as well as from the continental European case previously identified in the literature.<sup>5</sup>

The remainder of the paper is organized as follows: In Section 2 we discuss the data and methodology used, in Section 3 we present our main findings under four sub-headings; first we account for the evolution of top income shares in terms of gross income from all sources (separating series including and excluding capital gains), second we study the composition of these shares by source, third we analyze the effect of potential tax avoidance and evasion on our series, and fourth we study separate top income series when excluding taxable transfers giving us an income concept closer to market income.<sup>6</sup> Thereafter we attempt to account for our results in Section 4 by studying changes in factor shares, the wealth distribution, tax progressivity, and changes in asset prices. We also address the question of what our series suggest regarding the Kuznets hypothesis. In Section 5 we highlight differences and similarities in our results for Sweden with the findings in a number of other countries for which comparable data exist. Section 6 concludes.

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<sup>4</sup> Our data suggests that these capital gains have accrued to those who also have the highest wages, hence magnifying inequalities in the income distribution.

<sup>5</sup> See, e.g., Saez (2004) and Piketty and Saez (2006) for overviews of cross-country comparisons.

<sup>6</sup> For most other countries this distinction is not very important when studying top incomes, but in the Swedish context (taxable) social transfers are sufficiently large to have an effect on the top income shares, even if they do not make up any large part of top incomes, as including them affects the reference total for income (see, for example, Björklund and Freeman (2006) on the importance of transfers for income distribution in Sweden). All details of the series as well as various robustness checks have been placed in a separate working paper, Roine and Waldenström (2006).

## 2 Methodology and Data

In recent years, a methodology for studying income concentration using long time series of tax return data has been established following Piketty (2001a), who in turn builds on the seminal work by Kuznets (1953). The basic idea is to construct shares of total personal income received by different fractiles of the entire (tax) population, had everyone been required to file a tax return. Since historically only top income earners were taxed they are the only ones directly observed over the entire period. This in turn means that the reference totals for population and income, which are aimed at also including individuals who did not file a tax return and their incomes, must be constructed using aggregate sources from the population statistics and national accounts. Top income shares are then computed by dividing the number of tax units in the top, and their incomes, with the reference tax population and reference total income.<sup>7</sup> Assuming that top incomes are approximately Pareto distributed, standard inter- and extrapolation techniques can be used to calculate the income shares for various top fractiles, such as the top 10 percent (P90–100) or the top 0.01 percent (P99.99–100).

Our data on income distribution come mainly from the income statistics published yearly by Statistics Sweden starting in 1943 and for the period before that from scattered public investigations.<sup>8</sup> These sources generally provide tabulations of the number of taxpayers and their total assessed income for a large number of income brackets. Typically, these tables also include information on the different sources of income (e.g., wages and capital income), tax liabilities, and even data on net personal wealth in different income classes for some years.<sup>9</sup> To make these data homogenous and comparable over time, a number of adjustments have been made as described in more detail in Table 1. Our preferred concept of income is *total (gross) income*, defined as income from all sources before taxes and transfers, but deducting

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<sup>7</sup> There are, of course, a number of potential problems with using tax statistics data; it is collected as part of an administrative routine in which individuals have incentives to underreport income, it tells us nothing *per se* about the welfare of individuals, etc. Nevertheless, as long as we think that tax statistics, at least for the top income earners, approximate actual incomes, and as long as the problems with the statistics have not changed systematically over time, they are a useful source. Importantly, it is also the only available source for much of the twentieth century. Our general view in the case of Sweden is that the administrative process has, compared to most countries, been very thorough and Swedish tax data is quite reliable, at least for high income groups. The estimates of tax avoidance and evasion that we have found suggest that the levels have not changed in any systematic way over the century (see further section 3.3 below).

<sup>8</sup> Data come from the Ministry of Finance in 1903 (only the very top), 1907, 1911, 1912, 1916, 1919, 1920, 1934 and 1941 and Statistics Sweden in the Censuses (*Folkräkningen*) of 1920, 1930, 1935, 1945 and 1950, and its annual publication of tax-based income statistics (*Skattetaxeringarna* and later titles) published from 1943 onwards (see Roine and Waldenström, 2006 for a full description of these sources).

<sup>9</sup> Between 1910 and 1948 Sweden had a peculiar kind of wealth tax, which operated through an addition of a fraction (1/60 until 1938, thereafter 1/100) of taxable wealth to total income to get “taxable income”. This creates problems in terms of having to adjust tax data to get actual incomes (without the wealth shares) but it also means that information on wealth distribution by income class is available.

deficits at source (mainly interest payments). Capital gains are included in this concept, but the structure of the data allows us to subtract them and construct series both with and without capital gains.<sup>10</sup> One specific aspect of the Swedish income statistics is that after 1974, new laws made several transfer-like, non-market incomes such as unemployment compensation, family allowances and sick pay, fully taxable. In our main series we have added these components before 1974 so as to get a total income concept that corresponds to today's definition of total income, but we have also done the opposite, i.e., deducted these non-market incomes after 1973 to get series which are closer to *market income*.<sup>11</sup>

Table 1 about here

To calculate the reference totals for income there are basically two ways in which to proceed: either starting from the total income reported on tax returns and then adding items not included in the tax base as well as income estimates of individuals not filing taxes (not including children), or starting from the National Accounts item "Total Personal Sector Income" from which (estimates of) all that is not included in the preferred definition of income can be deducted. Thanks to the relative richness of Swedish historical tax data and national accounts, we have been able to calculate our reference total for income in a number of ways and our final preferred series combine both ways of constructing the reference total for income.<sup>12</sup> When creating a series for the reference tax population, we must incorporate the fact that the Swedish tax law, and income statistics, changed from being household-based to individual-based between 1951 and 1971.<sup>13</sup> Our reference population total, hence, shifts from being the adult population (16 and above) minus married women, to the entire adult population (16 and above).<sup>14</sup> What effect this has on the top income shares is an open question. As shown by At-

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<sup>10</sup> Data on taxable capital gains are available in 1945, 1951, and annually from 1967. In 1945 and 1951, the capital gains shares are very low in all fractiles. We use the 1945 shares as estimates for all prior years (see Roine and Waldenström, 2006, for more details).

<sup>11</sup> For some years we have direct observations on the size of transfers by income class and this data supports the assumption that these transfers constitute very small shares of total income in the top of the distribution.

<sup>12</sup> Our main sources for calculating the reference income total are the new National Accounts data for Sweden compiled by Edvinsson (2005) and Swedish tax statistics (*Skattetaxeringen till inkomst och förmögenhet*, various years). For details see Roine and Waldenström (2006), where we also show that our findings are robust to alternative specifications of this reference total.

<sup>13</sup> In 1951, the income statistics started being made based on a 10 percent individual sample of the entire population, despite the fact that in the tax laws the shift to independent taxation did not come until 1966, when married couples could decide whether they wanted to file jointly or not, and finally in 1971 when individual assessment were made compulsory.

<sup>14</sup> The main source for our reference population series are Statistics Sweden, Population Statistics (*SCB, Programmet för befolkningsstatistik*). The shift from household-based to independent taxation happened gradually between 1952 and 1970. We constructed a number of alternative reference totals to capture the possible varia-



kinson and Leigh (2005) it basically depends on how incomes were distributed among the married men and women.<sup>15</sup>

To get a sense of the size of the fractiles and what it takes in terms of income to be part of a particular income share today, Table 2 presents some descriptive statistics for 2004. As the incomes are highly dependent on whether capital gains are included or not we have included both in the table. The amounts have been converted into US-dollars using the average exchange rate in 2004.

Table 2 about here

### 3 The Basic Facts

#### 3.1 Top income shares 1903-2004

Figure 1 shows the evolution of the top decile income share in Sweden over the period 1903–2004. The broad trend is that this share has been divided by a factor of two over the first eighty years, from around 46 percent of total income in the first years of the century, to 23 percent in 1980. Approximately two thirds of this decline took place before 1950, with large falls in the volatile years just after the two world wars. This means that most of the drop in pre-tax income inequality actually took place before the expansion of the welfare state. The decline thereafter is more stable with a new relatively sharp drop in the late 1960s and over the 1970s to a lowest point around 23 percent in the early 1980s.<sup>16</sup> After the mid-1980s the trend depends crucially on the treatment of capital gains incomes. When these are included, the income share for the top ten percent increases substantially, but when capital gains are excluded the top share remains quite stable, though it does increase slightly (we will analyze this in more detail in section 3.2). The peaks in 1991 and 1994 in the series including capital

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tions across the different legal regimes, but found no significant effects on our basic findings. Moreover, we also changed the age cutoff of the adult population from 16 years to 20 years, which lowered top income shares by roughly five percent for the post-1951 period for which there are detailed age data.

<sup>15</sup> Using data on income distributions on both household (from public tax investigations) and individual (from Censuses) for the years 1920, 1930, 1935, 1945 and 1950, we can get a rough idea of how the change in tax units affects our estimated top income shares. The individual income distribution seems to generate about 10 percent higher top income shares in 1920 and 1930 but the difference is almost insignificant (and even reversed) in the latter years. Overall, the two distributions are equal around the time of the actual shift (1951), but if one would account for the earlier effects the long-run decline in top income shares would be somewhat more pronounced.

<sup>16</sup> The period between 1951 and 1971 is potentially problematic because of the change in the definition of tax units from households to individuals. We have tried a number of different specifications for dealing with this gradual change, and while the levels may change over this period by as much a ten percent, the trend and our qualitatively results are not altered; see Roine and Waldenström (2006) for details.

gains are well known effects due to tax reforms which made it profitable to sell assets in these years.

Figure 1 about here

Even though this development in itself reveals a number of interesting facts, it turns out that decomposing the top decile is crucial for understanding the development. Figure 2 shows the evolution of the income shares for P90–95, P95–99, and P99–100 respectively. Looking first at the decline over the first eighty years of the century, we see that virtually all of the fall in the top decile income share is due to a decrease in the very top of the distribution. The income share for the lower half of the top decile (P90–95) has been remarkably stable, hovering around 10 percent over the entire period, while the P95–99 share declines gradually from about 15 percent of total income in the beginning of the twentieth century to around 10 percent in the early 1980s, with the sharpest drop over the 1970s. In contrast, the top percentile income share is divided by at least a factor of four, dropping from above 20 percent in the early 1900s, to around 7 percent in early 1950s, to a low of 4.7 percent in the beginning of the 1980s. Over the past decades the pattern is similar; P90-95 is stable (whether including capital gains or not), P95-99 increases slightly as does P99-100 when excluding capital gains, but the major difference appears only when including capital gains for the top percentile. Over several years in the late 1990s the income share of the top percentile is about twice as large when including capital gains compared to excluding them.

Figure 2 about here

The above patterns get even starker when considering higher fractiles within the top percent. Figure 3 shows the income share top 0.01 percent of the income distribution. This share was divided by a factor of about eight over the first half of the century, from above 3 percent of income to around 0.4 percent in the early 1950s. Given that most of the income in the very top consists of capital income it is interesting to note that the major falls take place during the financial crises after World War I, in the early 1930s, and after World War II, but notably, not during World War II. This period (1939–1945), which in many other countries was one of major cuts in top income shares, seems to have been a period of relative stability for the very top groups in Sweden. From the 1950s the P99.99–100 income share continues to decline steadily to their lowest points in the late 1970s after which it recovers, reaching new peaks at

the time the stock market boom around 2000 given that we include capital gains. If we compare the incomes share for this top group when including and excluding capital gains respectively, the difference is a factor ten in order of magnitude, which again highlights the impact of capital gains in Swedish top incomes. Expressing the incomes of the top 0.01 percent group in multiples of average income, our data suggests that over the twentieth century their income has gone from being around 300 times the average income in the early 1900s, falling down to around 25 times average income in the 70s, and then rising to more than 100 times average income in the late 1990s (again when including capital gains).

Figure 3 about here

### **3.2 Composition of top incomes**

Examining the composition of top incomes offers important hints to the understanding of the development of top income shares. For example, shocks to capital income during World Wars I and II explain much of the decline in French top incomes (Piketty, 2003) while large increases in wage and salaries has been the primary factor behind the increased income inequality in the U.S. during the 1980s and 1990s (Piketty and Saez, 2004). The composition of Swedish top incomes also changes significantly during the twentieth century, and these changes hold important clues for explaining the general patterns.

Swedish tax laws distinguish four sources of income: labor (wages and salaries), capital (mainly interest earnings and dividends), business and capital gains.<sup>17</sup> In Table 3, we decompose the decline in Swedish total top income shares (excluding capital gains) for various fractiles between 1912 and 1980. In the period 1912–1935, almost the entire decrease in total income shares is due to falls in capital income which explain about two thirds of the drop of the top percentile. An interesting exception is the drop in 1916–1920, which is mainly due to large earnings increases of the rest of the population (P0–90). During the period 1935–1951, total income shares fall roughly as much as in 1912–1935 (–9.4% compared to –12.9% for P95–99, –39.3% compared to –41.1% for P99–100), but this time about half of the decrease is attributed to a decreased wage share for top income earners. During 1950–1980, total income

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<sup>17</sup> As discussed in Appendix A in Roine and Waldenström (2006) the Swedish income statistics reported six different sources of incomes until 1990 and only three thereafter. Using available data we are however able to construct consistent and continuous series of the four above-mentioned sources for the entire post-war period. For the earlier periods we rely on data from the censuses (1920, 1930, 1935 and 1945) and estimates of returns to wealth to calculate approximate shares.

shares continue to fall, but not because of falling capital or wage shares but falling top business income shares. Over this period business income goes from constituting approximately 20 percent of total incomes in the top decile to being only a couple of percent in 1980.<sup>18</sup>

Table 3 about here

To further illustrate the large differences both within the top decile as well as over time Figure 4 shows the income composition for different fractiles in the years 1945, 1978 and 2004. The general pattern that capital income is more important higher up in the distribution is true for all of these years. However, between 1945 and 1978 the wage share at all levels of top incomes became more important, while the share of business income decreased at all levels. But in 2004 the pattern is back to that of 1945 in terms of the importance of capital if we include capital gains. In fact, at the very top of the income distribution, the share of capital gains in income today is larger than the return to capital was in 1945.

Figure 4 about here

The distribution of capital incomes and its development is depicted in Figure 5 for fractiles within the top decile for the period 1912-2004.<sup>19</sup> It shows that capital incomes become less important for most top groups over the century, as suggested by the lower shares after World War II (solid lines) than before (broken lines). However, in the very top of the distribution (the top 0.01 percent), the share of capital income is instead U-shaped over time. It represents about half of their total income before World War I (1912, 1916), then decreases down to being about a fifth in the postwar era (1951, 1970) but thereafter increases to being almost two thirds of total income again in the post-1980s (1990, 2004). Adding capital gains to these interest earnings and dividends would almost surely magnify this U-shape. These results strikingly suggest that the classic “coupon-clipping” rentiers have not disappeared in Sweden as they have in, e.g., the U.S. as argued by Piketty and Saez (2003).

Figure 5 about here

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<sup>18</sup> The drop in self-employment income should not be taken as evidence of decreased small-business activity, per se, as self-employed individuals may choose to start a firm from which they pay themselves regular wages, etc.

<sup>19</sup> The pre-WWII shares (broken lines) are based on an assumed 4 percent rate of return of the net wealth of each top income fractile (which is available in the tax statistics) while the post-WWII shares (solid lines) are directly observed in the income statistics.

The particular role of capital gains in the Swedish top income context, especially after 1980, is interesting. Traditionally, capital gains are excluded from studies of income inequality due to their potentially problematic character (even though they constitute an undisputable part of income according to the classical Haig-Simons definition). Unlike other incomes capital gains are not typically thought of as a flow of income, but rather realizations of gains earned over a longer period of time. This is most likely true if the capital gains arise from the sale of a house, for example, but it need not be the case if the capital gains instead come from frequent stock market trading. In studies based on tax returns capital gains are sometimes excluded simply because they are not included in the country's income statistics (as in France where they were not subject to taxation before the 1980s) but in most studies series including as well as excluding capital gains have been constructed. As has already been mentioned above, the difference between the series including and excluding capital gains constitute one of the quantitatively most interesting features of recent developments in Swedish top income shares. Even though there is no doubt that some fluctuations (especially the peaks in top income shares in 1991 and 1994 when sales due to tax reasons were relatively attractive) are due to the timing of sales of accumulated wealth, the majority of capital gains earners in the top of the distribution are not likely to be "new" individuals each year, who sell off assets accumulated over a longer period, but are instead those with the highest earnings who year after year make most of their income from capital gains (see Section 4.3 below).

### **3.3 Tax avoidance and evasion**

Problems with tax avoidance and evasion are inherent in all studies of income inequality based on data from personal tax returns.<sup>20</sup> In particular, if such activities change in systematic ways over time without being accounted for, changes in top income shares may just as well reflect changes in reported income as changes in actual income. Unfortunately there is only scattered evidence on the importance of tax avoidance and evasion in Sweden. The earliest estimate that we have found is by Bentzel (1952) for the period 1930–1948 suggesting that between 2–7 percent of personal income may be missing due to underreporting. Later studies such as Apel (1994), Löfqvist (2001), and Malmer and Persson (1994), variously using consumption equivalence scales and discrepancies in National Accounts arrive at similar esti-

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<sup>20</sup> We will not emphasize the distinction between legal tax avoidance and illegal tax evasion as we are interested in all missing income. Based on the saying that the main difference between the two is a good tax lawyer we will call the activities in the top of the distribution tax avoidance without necessarily implying that all activities we discuss would be judged as being in accordance with the law.

mates – between 4 and 6 percent of all incomes – for years in the 1980s and 1990s.<sup>21</sup> These estimates suggest that there is no reason to believe that underreporting has changed dramatically over time. A speculative reason for this may be that while the incentives to underreport have increased as tax rates have gone up over time the administrative control over tax compliance has also been improved. However, none of these studies focus on avoidance in the top of the distribution. As it is well known that the possibilities for high income earners to avoid taxation on any wage income are small, the best source for attempting to study this is arguably the estimates of “capital flight” in the period 1980–1999 made by the Swedish tax authority (National Tax Agency, 2002). Using information on unexplained residual capital flows (“net errors and omissions”) published in official balance of payments statistics, they estimate that somewhere between 250 and 400 billion SEK has left the country without being accounted for.<sup>22</sup>

To get a sense of the order of magnitude by which this “missing wealth” would change our top income shares, we add all of the returns from this capital (the lower and upper bound estimates, respectively) first to the incomes of the top decile and then to the top percentile. The main results of this exercise are the following.<sup>23</sup> For the years before 1990, there is no effect on top income shares by adding income from offshore capital holdings since they are simply too small. After 1990, and especially after 1995, however, these incomes become notable. When adding all of them to the top decile, its income shares during 1995–2004 increase moderately (3 percent when using bank deposited wealth and 6 percent when using securitized wealth). When instead adding everything to the incomes of the top percentile, the income shares increase by between 20 and 30 percent depending on the assumption about the rate of return.

Overall, potential changes in underreporting over the twentieth century probably play a marginal role in explaining the evolution of Swedish top income share series with the exception of the past decade. However, for the income shares to change much we must make the rather extreme assumption of attributing all of the missing capital income in recent years to the top

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<sup>21</sup> Apel (1994) can mainly be interpreted as capturing underreporting among the self-employed, the study by Löfqvist (2001) as estimating avoidance in the economy as a whole, while Malmer and Persson (1994) study the effects of the tax reform in 1991 on tax compliance.

<sup>22</sup> The higher number coming from assuming that the capital was invested at a 5 percent interest rate. The Swedish Taxpayer Association (2002) shows that if one instead assumes that the capital was invested in global stock and bond markets, the amount is closer to 570–640 billion SEK depending on portfolio choice. The latter numbers certainly represent the upper bounds since some of these holdings were in cash and normal bank deposits.

<sup>23</sup> Details on the calculations are available from the authors upon request.

percentile, and when doing so this only amplifies what we find without this adjustment. The quantitative importance suggested by our tentative treatment indicates that the role of offshore wealth may be something that is worthwhile examining more closely in future inequality research.

### **3.4 Total income shares vs. market income shares – excluding taxable transfers**

In 1974 a number of work-related transfer programs, such as unemployment insurance, sickness payments, and parental leave payments, became taxable. As such programs have grown in importance over time it could be argued that our series of total gross (pre-tax) income shares have gone from being shares of market income (or even factor income) in the earlier parts of the century to being shares of a pre-tax income concept which includes substantial de-facto transfers. To address the impact of these transfers on our income shares we have calculated series in which we exclude the most important transfer payments.<sup>24</sup> In our basic series above we added the total government outlays for the transfers that were made taxable in 1974 to the reference total for income for the period before 1974. Under the assumption that these transfers made up a negligible share of top incomes before 1974, this adjustment suffices to make the series conform to the current definition of gross pre-tax income. To exclude the transfers we basically do the opposite. Before 1974 we do not make any additions to the reference total for income, while we thereafter deduct total transfers from the reference total. However, we must now also take care of the fact that transfer incomes, while being small shares of top incomes, are not zero for everyone in the top decile. To correct our shares we rely on exact data on the size of these transfers by income class for the years 1974–1977 and from 1991 and onwards, and estimations for the period in between.

Figure 6 displays the changes in the series the top percentile when including these transfers in the income concept (*total income*, which is the same as our main series) and when excluding them (*market income*). The basic trend is that market income shares go from being relatively equal to total income shares in the 1950s, starts to grow in the 1970s and are about 20 percent higher in the beginning of the twenty first century. The marked recent increase is likely to be an effect of large increases in sickness payments. Overall the difference between total income and market income shares is insignificant and has no effect on the trend.

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<sup>24</sup> The most important transfers are unemployment insurance, sickness payments, and parental leave payments. Transfers which are not taxed (such as child benefits, housing benefits, study grants, etc.) never enter our series. See Roine and Waldenström (2006) for details.

Figure 6 about here

#### **4 Explanations to the evolution of Swedish top income shares**

What accounts for the large declines of top income shares in the first half of the twentieth century, the steady decline during the expansion of the welfare state, the relatively sharp drops over the 1970s, and the increase in the recent decades (which is augmented when including capital gains)? This section discusses factors that can contribute to our understanding of the evolution of the top income shares presented above. First, we examine the roles of factor shares and wealth distribution, and their respective changes over time. In particular, the Swedish tax system before 1948 provides us with data on wealth by income class. Second, we study the evolution of the Swedish progressive income tax system and its effects on top income shares, and third, we account for the recent dramatic changes in asset prices, arguing that these are fundamental for understanding the particular Swedish experience with very large differences in top shares depending on whether capital gains are included or not. Finally, we relate our findings to previous discussions on the Swedish “Kuznets curve”.<sup>25</sup>

##### **4.1 The roles of factor shares and the wealth distribution**

According to David Ricardo, “the principal problem of Political Economy [...] is to determine how [...] the produce of the earth ... is divided between ... the proprietor of the land, the owner of the stock of capital needed for its cultivation, and the labourers by whose industry it is cultivated”.<sup>26</sup> If we were to assume that the very top of the income distribution consists of mainly of wealth holders, while the rest of the population consists mainly of wage earning workers, fluctuations in factor shares should also explain fluctuations in income shares. (We shall return to the question of how good an approximation this is below). Figure 7 shows the changes in the capital share of value added (defined as GDP by activity, minus wages and salaries, minus imputed labor income of self-employed) as a share of GDP, and the evolution of the top one percent income share.

Figure 7 about here

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<sup>25</sup> According to Morrison (2000), Sweden is as an example of a country which exhibits an inequality pattern in line with the Kuznets hypothesis between 1870 and 1950.

<sup>26</sup> Quoted in Atkinson (1975, p 161).



The correlation between the two series over the whole period is 0.86, but with a clear difference between the first and second half of the century. Between 1907 and 1950 the correlation is 0.94, while it drops to 0.55 between 1951 and 2000. This indicates that, at least during the first fifty years, even short term fluctuations of top incomes follow the fluctuations of the capital share of value added as a share of GDP. The figure also shows a downward trend in the capital share of value added over the first 80 years and a conservative reading would suggest a drop in this share from around 0.35 in the first decade, to approximately 0.25 in the 1970s and 1980s.<sup>27</sup> If we were to take this share as a proxy for the share of GDP derived as a return to property it would translate directly to an equally large drop in the income share of property holders who, in turn, are found mainly among the top income earners. Of course, no income class consists of only wage earners or only property holders, and furthermore a number of institutions (such as firms and the government sector) stand between the productive sector and the personal sector whose income distribution we are concerned with. Nevertheless, such approximations give a sense of the magnitude by which the respective factors could have changed the income shares.<sup>28</sup>

To estimate the impact of returns to property on the top income shares we also need data on the property holdings of the top income groups. Typically such data are not available and as a substitute many studies have used wealth distribution estimates, assuming that the distributions of wealth and income overlap sufficiently. In the case of Sweden, however, there exist unusual data on individual wealth holdings by precisely those groups for which we also have income data. The reason is that between the years 1911 and 1948 Sweden had a peculiar form of joint income- and wealth taxation in which taxes were levied on what was called the *taxable amount*, consisting of all income *plus* a share of net wealth holdings. For selected years, tabulations of incomes decomposed into actual income and wealth shares by income class are

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<sup>27</sup> The question of factor shares, to what extent they are relatively stable over time, and how “relatively stable” should be interpreted, is of course a much debated question. See Atkinson (1975, ch. 9), for a good overview and a historical perspective, where it is also noted that the labor share seems to have been increasing at least since the 1930s up to the 1970s in a number of Western economies.

<sup>28</sup> Among the interesting details found by studying the development of the capital share of value added as share of GDP is that it is likely to explain the peak in the top income share in 1916. The first years of World War I was a period during which industrial companies made huge profits while the majority of the population experienced substantial falls in real wages and trade restrictions that lead to a food shortage (see Edvinsson (2005, p. 242), and references given there). The year 1916, which is the only year for which we have data during this period, was most probably the most extreme year. The average wage rate fell by ten percent and the ratio between gross surplus and labor income jumped from about 50 percent in 1914–15, to around 70 percent in 1916–17 (after which it fell back down to 50 percent in 1918–19), indicating that 1916 was a year when the income share of capital owners was very high compared to the years immediately before and after.

available.<sup>29</sup> Similar information is also available in the 1950 Census (for the year 1951) and for the years 1991–1993. This allows us to calculate the *wealth shares held by top income groups*. Figure 8 shows the evolution of wealth shares by income class, together with our calculations of wealth shares (by wealth class) and income shares (by income class) for P99–100 and P90–99 of the respective distributions.<sup>30</sup> Not surprisingly, wealth shares by income class follow the fluctuations of income shares closer than do wealth shares, but the trends seem to be the same.<sup>31</sup> The wealth share of the top percent among the income earners, as well as among wealth holders, decrease quite dramatically over the century with slight recoveries over the past decades.<sup>32</sup> The wealth shares for the P90–99 group, both in the income and in the wealth distribution, are instead increasing until around 1950. After that they fall slightly, to recover again after the mid 1980s. Once again this highlights the importance of distinguishing between different groups in the top to understand the trends.

Figure 8 about here

What would be the joint impact of the changes in wealth concentration and the changes in factor shares on the income distribution? Following Meade (1964), we can make a simple approximation to get a sense of the magnitude of the effect. Let  $a$  and  $b$  be the share of all earnings and all returns to property, respectively, received by a certain income group. Then the total income share of this group is given by

$$a \cdot (\text{factor share of earnings}) + b \cdot (\text{factor share of property}).$$

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<sup>29</sup> The taxable amount was equal to all income plus 1/60th of taxable wealth between 1910 and 1938 and there after all income plus 1/100th of taxable wealth until 1948.

<sup>30</sup> Our series for wealth distribution are based tax return data and are for the years 1920–1975 similar to Spånt (1975) and for the years 1978–2002 to series calculated by Statistics Sweden (2002), rather than more recent estimates based on household panel data (such as Klevmarken, 2004). In the present context these figures are most relevant as we are trying to estimate the impact of wealth concentration on income concentration rather than some measure of living standards.

<sup>31</sup> The exception is the first observations in the series. There could, however, be a problem in the data as the sources for 1911 and 1912 for wealth by income class are tax return data for the first two years when the wealth tax was implemented, which could underestimate the wealth in the top shares. The 1908 wealth data, on the other hand, is based on estates. By 1920 the system of joint income and wealth taxation was well established and wealth data was also collected for the Census which leads us to think that these series are relatively reliable at least from that point on.

<sup>32</sup> The top percent wealth share in the wealth distribution has increased over the past decades and assuming that the wealth of the top income earners has followed this is true for them as well. However, we only have data on the years between 1991 and 1993.

Setting the factor share of property to 0.3 or alternatively letting the factor share fluctuate and take on the yearly value displayed in Figure 7 above we can get a sense of the magnitude of the impact that changes in wealth concentration at the top of the income distribution has had between 1911 and 1991. Table 4 gives an example of such calculations for P99–100.

Table 4 about here

Table 4 suggests that the direction of change is correct for all intervals except for the period 1920–1930 when the income share increases slightly for the top percent of income earners but their wealth share drops. Between 1911 and 1920, however, the magnitudes are not right. The income share increases slightly more 1911–1916 and, in particular, drops much more 1916–1920 than what can be explained by changes in wealth shares. However, this is exactly what we would expect given that most of the change in 1916–1919/20 is due to increases in the incomes of the lower 90 percent of the population.

Overall, the above suggests that an important reason for the substantial drop in the top one percent income share - which is driving the decreased income share of the top ten percent - especially before 1950, is the decreased wealth share of the top income earners, which in turn decreased their share of returns to property. However, the question of why the top wealth share decreased so substantially has no obvious answer. Sweden did not take part in the world wars and even though the country's economy was of course not unaffected by these wars, they did not cause the same direct destruction of capital in Sweden as they did in many other countries. If single events are to be pointed out, the effects of the Great Depression, which hit Sweden in 1931, and in particular the dramatic collapse of the industrial empire controlled by the Swedish industrialist Ivar Kreuger (the "Kreuger-crash") in 1932 is probably most important.<sup>33</sup> Between 1930 and 1935 we observe a drop from 50 percent to 43 percent in the top percent wealth share but an even larger drop in the wealth of the top one percent of income earners, from 38 percent in 1930 to 26 percent in 1934 (see Figure 7 above). World War II, however, does not seem to have been a major shock to wealth holdings in Sweden. The top one percent share does drop from 43 to 37 percent between 1935 and 1945, but the drop just after the war is just as sharp continuing down to 32 percent in 1950 (see Section 5 for more on this point in international perspective). By 1950 progressive taxation has started to play a ma-

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<sup>33</sup> In Sweden, the economic crisis in the early 1920s was in many ways more severe than the one ten years later which coincided with the "Great Depression" in America.

job part and the most likely explanation for the continued decreasing top wealth share is that a larger share of new wealth is accumulated in the corporate and government sector and among the rest of the population, rather than in the wealthiest percent.

#### 4.2 The role of taxation

Many previous studies have shown that top incomes are sensitive to changes in top marginal income tax rates, either through their direct effect on work incentives or through more subtle processes of tax arbitrage (see Saez (2004) for an overview of this literature). For example, Saez and Veall (2005) showed that Canadian top income shares were negatively correlated with Canadian marginal income tax rates, with elasticities of income with respect to the net-of-tax rates for the top percentile being about unity.

In the case of Sweden, Figure 9 depicts the statutory marginal tax rates for incomes at the 90th, 99th, 99.9th and 99.99th percentiles over the past century.<sup>34</sup> These rates more than doubled between the mid-1930s up to 1950, and then continued to rise until 1980 when they peaked. Thereafter the top marginal taxes were lowered, particularly in relation to the tax reform of 1990–1991 when capital incomes were started being taxed at a separate, and much lower, flat rate (not fully incorporated in the figure).

Figure 9 about here

To get a better picture of the role of taxation for Swedish top income shares, we estimate tax elasticities in several top income levels for the postwar period (1943–1990).<sup>35</sup> In particular, we relate the incomes at the 90th, 99th, 99.9th and 99.99th income percentiles (listed in Appendix Table A2) to the marginal tax rates in Figure 9. Although we employ a fairly standard approach towards estimating these tax responses (following Saez, 2004), it should be noted that we only observe the product of the amount of hours worked and the per hour wage, at each income level, and any differential variation in these two as a response to changes in the marginal tax level is thereby missed.<sup>36</sup> However, since we confine the study to top and ex-

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<sup>34</sup> The presented marginal tax rates are the sum of the respective rates at the local (*kommunalskatt*) and state (*statlig skatt*) levels, calculated using tables in Söderberg (1996).

<sup>35</sup> Before 1943, there is no annual data and after the tax reform of 1990–1991, wages and capital income were taxed at separate tax rates.

<sup>36</sup> For example, if workers' bargaining strength vis-à-vis their employers increase with wages, a tax increase may imply that lower-wage workers have to accept constant pre-tax wages, and hence a real wage cut, whereas higher-wage workers may be able to threaten with reduced labor supply and thereby get a wage increase.

treme top income earners, these variations may not be of first-order importance. Then log-linear regressions are estimated for each percentile separately:

$$\ln(S_P)_t = \beta_0 + \beta_1 (\ln(1 - MTR_P)_t) + \beta_2 t + \beta_3 t^2 + u_t, \quad (1)$$

where  $S_P$  denotes income share for percentile  $P = P90, P99, P99.9, P99.99$ ,  $(1 - MTR_P)$  the corresponding net-of-tax rate (one minus the marginal tax rate),  $t$  a linear time trend and  $u_t$  a random error.<sup>37</sup> Since inflation may push incomes up in higher tax brackets (“bracket-creep”), we may have a downward bias in the estimated tax elasticity ( $\hat{\beta}_1$ ). To control for this eventuality, we fit both OLS and two-stage least squares (2SLS) regressions using the log of one minus the highest statutory marginal tax rate as instrument. The results in Table 5 shows that tax elasticities range from about 0.3 in the 90th (in the 2SLS case) and 99th percentiles, to 0.5–0.6 in the 99.9th percentile and 0.8–0.9 in the 99.99th percentile. The influence of bracket-creep seems to be of minor importance as hinted by the similarity of the OLS and 2SLS results. Altogether, these results are well in line with previous findings from the estimated tax responses of U.S. top income earners (Saez, 2004). Progressive taxation hence seems to have been a major contributing factor in explaining the evolution of Swedish top incomes in the postwar period. However, given that much of the fall in top incomes happens before taxes reach extreme levels and largely as a result of decreasing income from wealth, an important effect of taxation in terms of top income shares has been to prevent the accumulation of new fortunes. To the extent that new fortunes were created they most probably remained outside the personal sector.<sup>38</sup>

Table 5 about here

### 4.3 The role of asset prices

One aspect which stands out in our series over the past decades is the large difference in top income shares when capital gains are included or not. Whether they should be included in the

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<sup>37</sup> Equation (1) uses Newey-West standard errors and is inspired by Saez (2004), but unlike him we use threshold incomes and corresponding marginal tax rates instead of average incomes in a group of income earners, say P99–100, and the corresponding weighted average marginal income tax for all the various income levels contained in the top percentile group.

<sup>38</sup> The particular structure of ownership via various tax exempt institutions due to tax reasons are well documented in Henrekson and Jakobsson (2005).

income concept is debatable and ultimately depends on the questions at hand.<sup>39</sup> When it comes to studying Swedish income inequality, and in particular the absolute top over recent decades, we argue that capital gains incomes are too important to be ignored. The main reason for this is the development of Swedish stock prices, which in comparison with any other Western countries is remarkable.<sup>40</sup> Figure 10 shows the evolution of the composite stock price index, in real terms, at the Stockholm Stock Exchange and the amount of capital gains earned by three top income fractiles since 1967 (which is the first year with separate capital gains figures for different total income classes). Clearly, the realized capital gains and stock prices are significantly correlated over time ( $>0.9$  in all cases), which suggests that the capital gains appearing in top incomes to a large extent stem from increased values of financial portfolios.<sup>41</sup>

Figure 10 about here

One of the major concerns with including capital gains in the analyzed total income concept is the possibility that some tax payers in the top income fractiles are there only because of recent realizations of gains that have been accumulated over a longer period of time. However, using tabulated income data listing capital gains in classes of labor income (which excludes capital gains), we can after 1990 confirm that this is not the case for the most part of our analyzed capital gains incomes.<sup>42</sup> Furthermore, Magnusson (2004) has studied the income mobility including and excluding capital gains between 1991–1997 and 1996–2002 and finds that the income top is not primarily represented by low-income earners with large one-time capital gains.<sup>43</sup>

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<sup>39</sup> See for example Atkinson (1975, ch. 3), for a general discussion and, in particular Björklund, Palme and Svensson (1995) for a discussion of the effects from including income from real capital in the Swedish case.

<sup>40</sup> Over the period 1980–2000, the real stock price index at the Stockholm Stock Exchange increased 20 times compared to four to six times in New York, London and Paris.

<sup>41</sup> Compared to real estate prices, which have also increased substantially over the past decades (starting at 100 in 1981, the housing price index was 360 while the consumer price index was 250, in 2003) the gains from equities are much larger and also much more concentrated. However, it is likely that the increase in wealth holdings for the top ten percent (even when excluding the top percent) is largely due to the increases in owner occupied housing prices.

<sup>42</sup> Looking at the average realized capital gains over labor income classes, the overwhelmingly largest average capital gains in the entire period 1991–2004 accrue to those who already are positioned in the top of the income distribution. See the appendix in Roine and Waldenström (2006) for details.

<sup>43</sup> About one fifth (19.1 and 19.2 percent, respectively) of those in the top 0.1 percentile in 1997 and 2002 when counting capital gains belonged to the P0–90 group five years earlier. The same shares when excluding capital gains were about one tenth (8.4 and 12.8 percent), which suggests that about one tenth of top income earners were a relatively mobile group, and possibly low-wage earners with high one-time capital gains.

Altogether, our data suggest that the substantial increases in capital gains that drive much of the observed rise in top income shares in Sweden over the past decades is largely due to increased Swedish stock prices.

#### 4.4 Our series and the Kuznets hypothesis

The development of Swedish income inequality has previously been suggested to display support of the Kuznets hypothesis of structural change, i.e., that income inequality is inversely U-shaped over the path of development.<sup>44</sup> For example, in his study of salaries across sectors, Söderberg (1991) found that inequality increased from 1870 to 1914, dropped sharply during World War I, increased again between 1920 and 1930 before it turned down for the rest of the studied period until 1950. As industrialization in Sweden started around 1870 and peaked around the turn of the century, the increase in income inequality between 1870 and 1914 and the declining thereafter, has been interpreted as an example of Kuznets' curve.<sup>45</sup>

In this study, we have found that drops in top capital income and the rise of progressive taxation have been important for the development of inequality in Sweden. Do these findings contradict Kuznets' structural change hypothesis, which rather focuses on changing wage differentials across workers with differing skill composition? Not necessarily. Using the fact (recall section 3.2) that wages constituted almost all of the incomes going to the high-income groups just below the absolute top, e.g., P90–95. This group is likely to represent the highly skilled workers in Kuznets' model. Although Figure 2 above showed that their share of all incomes remained remarkably stable of the century, we find that relating their incomes to the rest of the (mainly) wage earning population, i.e., P0–90, displays a relationship that could be interpreted as support for a Kuznets curve. Specifically, Figure 11 shows the ratio between the income shares of P90–95 and P0–90 and the downward sloping pattern seems to be in line with what has previously been found by Söderberg (1991).<sup>46</sup>

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<sup>44</sup> The income inequality and structural change hypothesis is the one on which most studies have focused. However, as pointed out by Atkinson (2005a), Kuznets (1955) also emphasized a second mechanism causing widening inequality over the path of development namely the increased concentration of capital. In terms of the distribution of wealth our data suggests the opposite as wealth concentration decreases at least over the first 80 years of the twentieth century. But this can not directly be taken as evidence against Kuznets hypothesis. Much of the change in wealth concentration is due to a rise in popular wealth and hence has not necessarily changed what concerned Kuznets namely the distribution of "income-yielding assets" (Kuznets, 1955, p 7). However, assuming that changes in the income share from capital reflects changes in the concentration of such capital this has also decreased for all top groups except the in very top (as shown in Figure 5 above).

<sup>45</sup> Jungenfelt (1966) is another example of a study in support of Kuznets' hypothesis in the Swedish context.

<sup>46</sup> The data in the figure is excluding capital gains (we will study series when including capital gains for the other countries below). The pattern is similar when we instead look at the ratio between average income in P90–95 and that of P0–90 as well as when calculate this ratio using earned income only.

Figure 11 about here

Our data, hence, suggest two things with respect to the Kuznets' structural change hypothesis. First, if we exclude the capital owners at the top of the distribution, and focus on the ratio between two groups whose income mainly consists of wages, those with the highest wages and the rest, we get a pattern consistent with what has previously been found as support for the Kuznets curve. Second, however, these changes are not the main explanation behind the secular decline of inequality in Sweden. Even though we do see movement in what approximately constitute the ratio of income shares of high skilled and low skilled workers, the changes at the very top of the distribution are quantitatively much more important in explaining income equalization.

## 5 International comparisons

In Figure 12 the long-run development of top percentile income shares in a number of Western countries is shown alongside that of Sweden.<sup>47</sup>

Figure 12 about here

Looking at the figure, three broad facts stand out. First, all countries experience a similar development with large decreases in top income shares between the beginning of the 1900s and the mid-1970s. The drop in Swedish top incomes over this period is the largest among all these countries, both in absolute and relative terms, but interestingly, much of the difference between Sweden and the other countries is established already by 1950. Second, the effect of World War II, which for all countries directly engaged in warfare turned out to be devastating for top incomes (see, e.g., Atkinson and Leigh, 2005; Piketty and Saez, 2006), is practically non-existent in Sweden. Table 6 shows this fact in more detail. During the war, the top income share for P99–100 decreased by between 13 and 40 percent in countries directly involved in warfare, but by less than five percent in Sweden. By contrast, right after the Swed-

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<sup>47</sup> The country specific developments would be very similar for P90–100 and for P99.9–100. As always, the developments should be compared with some caution. Even if the series have been constructed using basically the same methodology there are still some differences such as the difference in the construction of reference totals which may understate the figures for the UK and the Netherlands compared to those for the US and France. See Atkinson (2005b) for details.



ish top shares dropped by one fourth but elsewhere they decreased by much less or even increased.

Table 6 about here

The third fact that stands out in Figure 12 is the divergence after 1980 between one group of countries with significantly increasing top shares; Australia, Canada, U.K. and the U.S., and another group; France, the Netherlands and Spain, where the top shares remain virtually constant.<sup>48</sup> This division between the “Anglo-Saxon” and “Continental European” experience has received a lot of attention in the previous literature.<sup>49</sup> As can be seen in the figure, Sweden does not belong entirely to either one of these groups. More precisely, if capital gains are included Swedish top incomes shares have increased so much that the Swedish development resembles that of the Anglo-Saxon group. However, when capital gains are excluded, Sweden looks more like belonging to the Continental European group. This difference in the series is unique to Sweden among the countries for which this distinction has been possible to make.<sup>50</sup> Whether capital gains are included or not makes very little difference to the pattern of development in the U.S., Canada, as well as Spain.<sup>51</sup>

The distinction between series including and excluding capital gains holds an important key to understanding the Swedish development in international comparison. Previous work on top incomes has pointed out that the main change over the twentieth century in Anglo-Saxon countries, and in particular in the U.S. has been the replacement of the rentiers by the working rich in the top of the income distribution (see, e.g., Piketty and Saez, 2006). To what extent this in turn depends on increased returns to education and skill-biased technological change is a much debated issue, however, the fact that so much of the increase in the top happens in the very top (top one percent) has made many skeptical of a return-to-education story.<sup>52</sup> Our data for Sweden also seems to indicate that a skill-biased technological change story is not the

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<sup>48</sup> This division has previously been discussed in Saez (2004) and Atkinson and Leigh (2005), who also show that this division remains true when including New Zealand to the “Anglo-Saxon” group.

<sup>49</sup> See e.g. Piketty and Saez (2006).

<sup>50</sup> Besides for Sweden, the construction of separate series including and excluding capital gains has been possible for the US, Canada (after 1971), and Spain.

<sup>51</sup> In the case of France this distinction is not very important, according to Piketty (2001b, p. 20n), as the capital gains share is very small even for the top income earners. The same relationship seems true for Germany (Dell, 2005, p. 414, fn. 2).

<sup>52</sup> Piketty and Saez (2003) are, for example sceptical of the skill-biased technological change explanation for the U.S. See also Dew-Becker and Gordon (2005).

most likely explanation for the observed changes. First, as was discussed above the movements for the lower part of the top decile P90–95 account for very little of the top decile income share. This is true both when including and excluding capital gains and, hence, suggests that to the extent that we think that high-skilled workers make up most of this group, their income share has not increased substantially over the past decades. Second, and more important, is the large difference in the development in the top depending on how capital gains are treated. The economic interpretation of this development rests on a distinction which we can not entirely make based on our data. If we believe that much of the observed capital gains, in fact, stem from compensation for work made by, e.g., chief-executives and other high income individuals, then the Swedish development should be seen as resembling the Anglo-Saxon one, with working rich receiving an increasing share of all incomes over the past decades. What makes this interpretation plausible is the observed correlation between capital gains and wage incomes discussed in Section 4, as well as the fact that Sweden has a dual tax system where capital incomes are taxed at lower rates than wage incomes. If, however, these capital gains do not stem directly from work but just from making investments with unusually large pay-offs over the past decades, then our data suggests that the key to becoming rich in Sweden over the past decades has been to invest wisely rather than to work hard.

## **6 Summary and conclusions**

In this paper, we have studied the evolution of income concentration in Sweden over the twentieth century. We have presented new series on top income shares, their composition, as well as new data relevant for understanding these developments. We have also tried to put our results in international perspective. Our findings suggest that top income shares in Sweden, like in many other Western countries, decreased significantly over the first eighty years of the century. They did so from levels indicating that Sweden was not more equal than other western countries at the beginning of the twentieth century. Most of this decrease happened before 1950, that is, before the expansion of the Swedish welfare state. As in many other countries, most of the fall was due to decreasing shares in the very top of the distribution (the top one percent), while the income share of the lower half of the top decile (P90–P95) has been extraordinarily stable. Most of the fall is explained by decreased income from capital; however, it does not seem likely that this development in the case of Sweden is due only to shocks to capital holdings (which have been the suggested explanation in some other countries). Even though especially the financial crises in the early 1930s caused drops in both the wealth holdings and the income shares at the top of the income distribution, such shocks do not fully ex-

plain the decrease. In particular, we note that the major drop just after the First World War was mainly due to increased wages below the top decile. We also note that the Second World War had no obvious impact on Swedish top income shares. Instead a very significant drop takes place just after the war, at a time when marginal taxes for the top groups had just risen sharply. A closer look at the composition of the decrease in top income shares also suggest that wage compression was as important as decreased capital incomes between 1935 and 1951.

Even if the evolution of top income shares in Sweden in many ways resembles that in other Western countries over the first eighty years, there are some important differences. Top income shares had already by 1950 dropped more in Sweden than in any other country (for which comparable data exist), and the further increases in marginal taxes as well as “solidarity wage policies” caused them to drop even further in the 1970s. However, the most remarkably different aspect in the Swedish data appears over the past decades. During this period, when top income shares increased significantly in Anglo-Saxon countries mainly due to wage increases, while they remained virtually unchanged in Continental Europe, the Swedish development depend largely on how capital gains are treated. If we include capital gains Swedish top income shares look like the Anglo-Saxon ones, if we do not include capital gains they have increased slightly but still resemble the Continental European experience.

Notwithstanding the problems with including capital gains in a study such as this, we believe there are good reasons to think that our data does capture a real development in terms of top incomes. The main reasons for this include, the exceptional stock market development in Sweden since around 1980, the fact that capital gains are consistently concentrated among those with high earnings income, suggesting that the high capital gains do not mainly accrue to “new individuals” each year, and the fact that the capital gains component in top income shares has been important every year over at least a twenty year period. Assuming that top income shares have risen due to capital gains over the past decades, the interesting question for discriminating between different theories for explaining this increase is to what extent these gains are to be seen as part of the compensation for work efforts, or if most of capital gains are to be seen as unrelated to job performance. Depending on the answer to such questions, the Swedish experience over the recent past may be judged as being more similar to the U.S. and the U.K. than what is usually assumed, or perhaps as a development different from the Anglo-Saxon as well as the Continental European one. One possible interpretation of our

data is that top income earners in Sweden have not increased their income share over the past decades through higher earnings but instead by making the right investments.

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Income years	Income concept appearing in data sources [ <i>Swedish term</i> ]	Adjustments	Reference total income	Reference total population
1903–1910	Taxable income [ <i>till statlig inkomstskatt taxerad inkomst</i> ]. Basically “Total income”.	–	Share of “total personal sector income” (from National accounts) adding estimates of items not included in the preferred definition (1903–1942)	Adult population (>15 yrs) minus married women (–1950)
1911–1942	Taxable amount [ <i>Taxerat belopp</i> ] = Taxable income (see above) + Wealth share (share of taxable personal net wealth) – Some taxes.	Removal of wealth shares and after 1920 addition of some municipal taxes		
1943–1950	Total income [ <i>Sammanräknad nettoinkomst</i> ] = Total (gross) income – Deficits at source	–	Tax statistics income plus estimates of non-taxed items included in preferred def. (mainly corrections for changed tax treatment of unemployment and sick pay insurance etc. before 1974) plus estimated incomes of “non-filers” (1943–2003)	Adult population (>15 yrs) adj. for women being (partially) included in the income statistics (1951–1970)
1951–1970		Age adjustment (excluding all <16 years old)		
1971–1990	Total (gross) income [ <i>Sammanräknad inkomst</i> ]	Subtracting deficits at source + Age adjustment	Adult population (>15 yrs) (1971–)	
1991–2004	Total income [ <i>Sammanräknad förvärvs- och kapitalinkomst</i> ]	Age adjustment		

Note: All concepts are elaborated upon in the appendices of Roine and Waldenström (2006). No age-specific data were available for different income classes until 1951.

Table 1: Definitions and adjustments of the income data and reference totals.

Thres- hold	Income (incl. capital gains) in USD	Income (excl. capital gains) in USD	Fractiles	N tax units (individuals)	Ave. Income (incl. capital gains) in USD	Ave. Income (excl. capital gains) in USD
			<b>Full tax pop.</b>	7,395,545	27,875	26,801
<b>P90</b>	48,697	46,354	<b>P90–95</b>	369,777	55,021	51,625
<b>P95</b>	61,154	58,123	<b>P95–99</b>	295,822	72,943	73,665
<b>P99</b>	115,294	79,416	<b>P99–99.9</b>	66,560	156,915	118,619
<b>P99.9</b>	298,488	240,706	<b>P99.9–99.99</b>	6,656	497,511	344,027
<b>P99.99</b>	1,218,259	685,380	<b>P99.99–100</b>	740	3,336,038	1,554,507

Note: The calculations are based on income tax data, with income defined as total income (excluding and including capital gains, ranked in classes of total income *including* capital gains) before individual taxes expressed in 2004 USD converted from Swedish kronor (SEK) using the 2004 average exchange rate of 7.36SEK/USD. See Roine and Waldenström (2006) for more details.

Table 2: Top income thresholds and average incomes in Sweden 2004.

		Percentage change in			
		Total income shares	with contribution by...		
			Wages	Capital income	Business income
<b>1912–1935</b>	P90–95	6.1	8.8	–1.2	–1.4
	P95–99	–9.4	–1.8	–6.3	–1.4
	P99–100	–41.1	–9.1	–23.8	–8.2
	P99.9–100	–53.0	–7.2	–35.2	–10.6
<b>1935–1951</b>	P90–95	0.3	–2.6	–4.6	7.5
	P95–99	–10.0	–9.9	–7.6	7.4
	P99–100	–38.6	–16.7	–19.4	–2.5
	P99.9–100	–56.2	–21.8	–27.0	–7.3
<b>1951–1980</b>	P90–95	–2.5	11.9	0.7	–15.1
	P95–99	–11.7	11.6	–1.5	–21.8
	P99–100	–36.1	–6.6	–4.9	–24.6
	P99.9–100	–49.5	–19.8	–5.0	–24.7

*Note:* Calculations are based on tax returns data from 1945 onwards and Census data from 1920, 1930, 1935 and 1945, including estimates of returns to wealth. Business income is calculated as a residual prior to 1951.

Table 3: Decomposition of changes in Swedish top income shares into wage-, capital- and other incomes over three sub-periods between 1912 and 1980.

Period	Change in P99 income share* (percentage points)	Change resulting from changes in wealth (assuming factor share 0.3, percentage points)	Change resulting from changes in wealth (calculated factor shares, percentage points)
<b>1911–12</b>	1.36	0.52	0.92
<b>1912–16</b>	7.12	4.36	7.76
<b>1916–19</b>	–11.70	–2.57	–5.14
<b>1919–20</b>	–2.85	–0.59	–1.79
<b>1920–30</b>	0.26	–0.58	–1.29
<b>1930–34</b>	–1.80	–1.86	–2.01
<b>1934–35</b>	0.37	0.52	0.76
<b>1935–41</b>	–2.03	–0.39	–0.17
<b>1941–51</b>	–3.21	–0.64	–0.60
<b>1951–91</b>	–1.26	–1.87	–2.44

*Sources:* Own calculations based on income and wealth shares reported above.

\* Changes based on the series including capital gains. The calculated change in the P99–100 income share between 1951 and 1991 is based on an average of the share in 1990–1992 as 1991 is an outlier in the series including capital gains (as discussed in Section 3) due to the tax reform.

Table 4: Contribution of changes in the top income earner’s wealth shares on their income shares, 1911–1991.



Fractile	Model	Coefficient estimates				R <sup>2</sup>	Pr.> $\chi^2$
		Constant ( $\hat{\beta}_0$ )	Elasticity ( $\hat{\beta}_1$ )	Trend ( $\hat{\beta}_2$ )	Trend <sup>2</sup> ( $\hat{\beta}_3$ )		
P90	OLS	3.51*** (0.06)	0.07 (0.13)	-0.01 (0.01)	-0.00 (0.00)	0.79	
	2SLS	3.53*** (0.04)	0.30*** (0.11)	-0.00 (0.00)	-0.00 (0.00)	0.77	0.00
P99	OLS	2.39*** (0.08)	0.27*** (0.10)	-0.02** (0.01)	0.00** (0.00)	0.88	
	2SLS	2.41*** (0.05)	0.32*** (0.06)	-0.02*** (0.00)	0.00*** (0.00)	0.88	0.98
P99.9	OLS	1.43*** (0.09)	0.53*** (0.08)	-0.04*** (0.01)	0.00*** (0.00)	0.92	
	2SLS	1.45*** (0.07)	0.58*** (0.07)	-0.04*** (0.00)	0.00*** (0.00)	0.92	0.87
P99.99	OLS	0.64*** (0.10)	0.81*** (0.09)	-0.07*** (0.00)	0.00*** (0.00)	0.91	
	2SLS	0.71*** (0.13)	0.89*** (0.13)	-0.06*** (0.00)	0.00*** (0.00)	0.91	0.19

Notes: OLS regressions use Newey-West standard errors (with 6 lags). The 2SLS instrument the net-of-tax rate with the  $\ln(1 - \text{Statutory top marginal tax rate})$ . Tax rates are calculated using laws listed in Söderberg (1996). Pr.> $\chi^2$  shows Hausman test of difference between OLS and 2SLS. All regressions have 48 observations. \*, \*\*, \*\*\* denote significance at the 10%-, 5%- and 1%-levels, respectively.

Table 5: Marginal tax effects on Swedish top incomes, 1943–1990.

Period:	Percentage change in the top percentile income share in...						
	Sweden	Australia	Canada	France	Netherlands	UK	USA
1939–1945	-4.6	-24.0	-40.1	-43.3	-12.7	-22.7	-25.5
1946–1951	-27.2	11.4	-0.9	19.4	-11.2	-15.2	-5.3

Note: For Sweden, we use 1941–1945 since no data exist for 1939.

Table 6: Percentage change in top percentile income shares during World War II

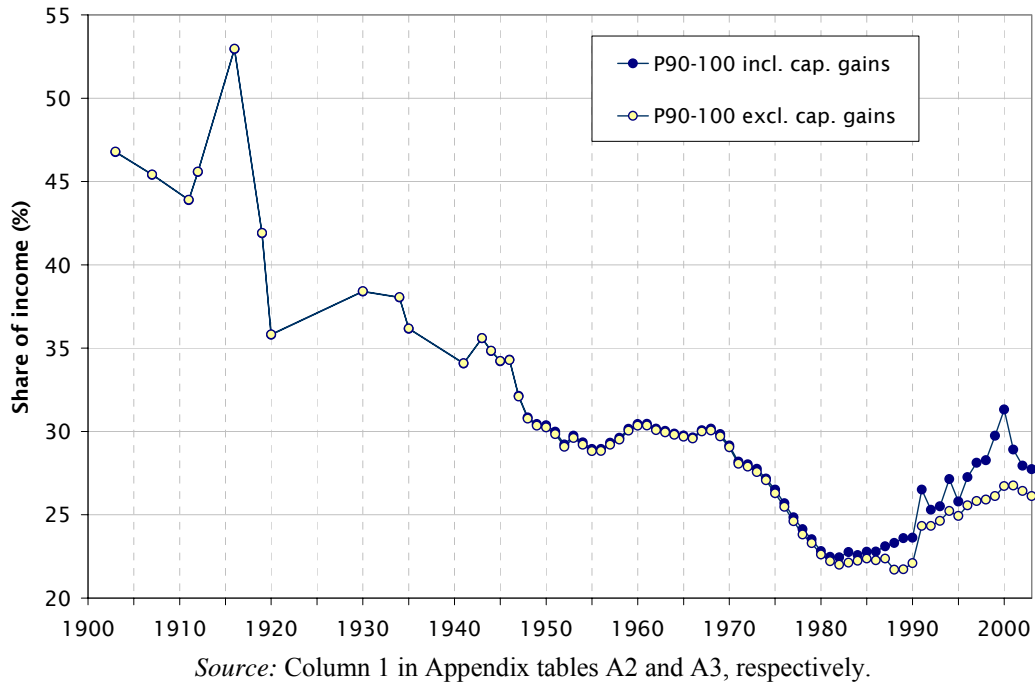


Figure 1: The top 10 percent income share (with and without capital gains), 1903–2004.

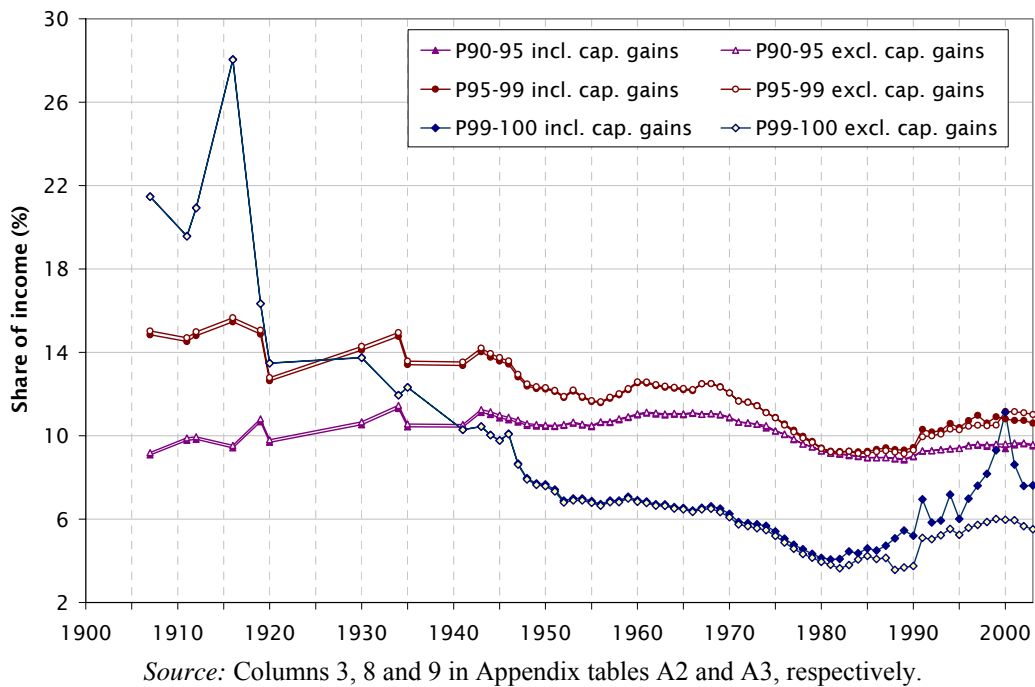
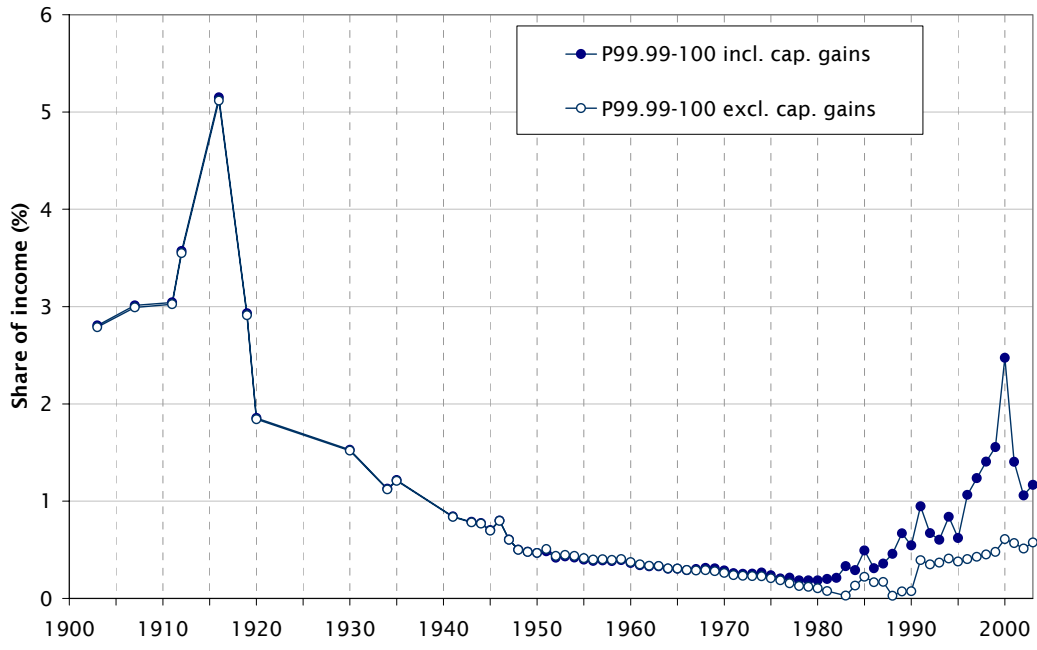


Figure 2: The P90–95, P95–99 and P99–100 (top 1 percent) income shares (with and without capital gains), 1903–2004.



Source: Column 7 in Appendix tables A2 and A3, respectively.

Figure 3: The top 0.01 percent income share (with and without capital gains), 1903–2004.

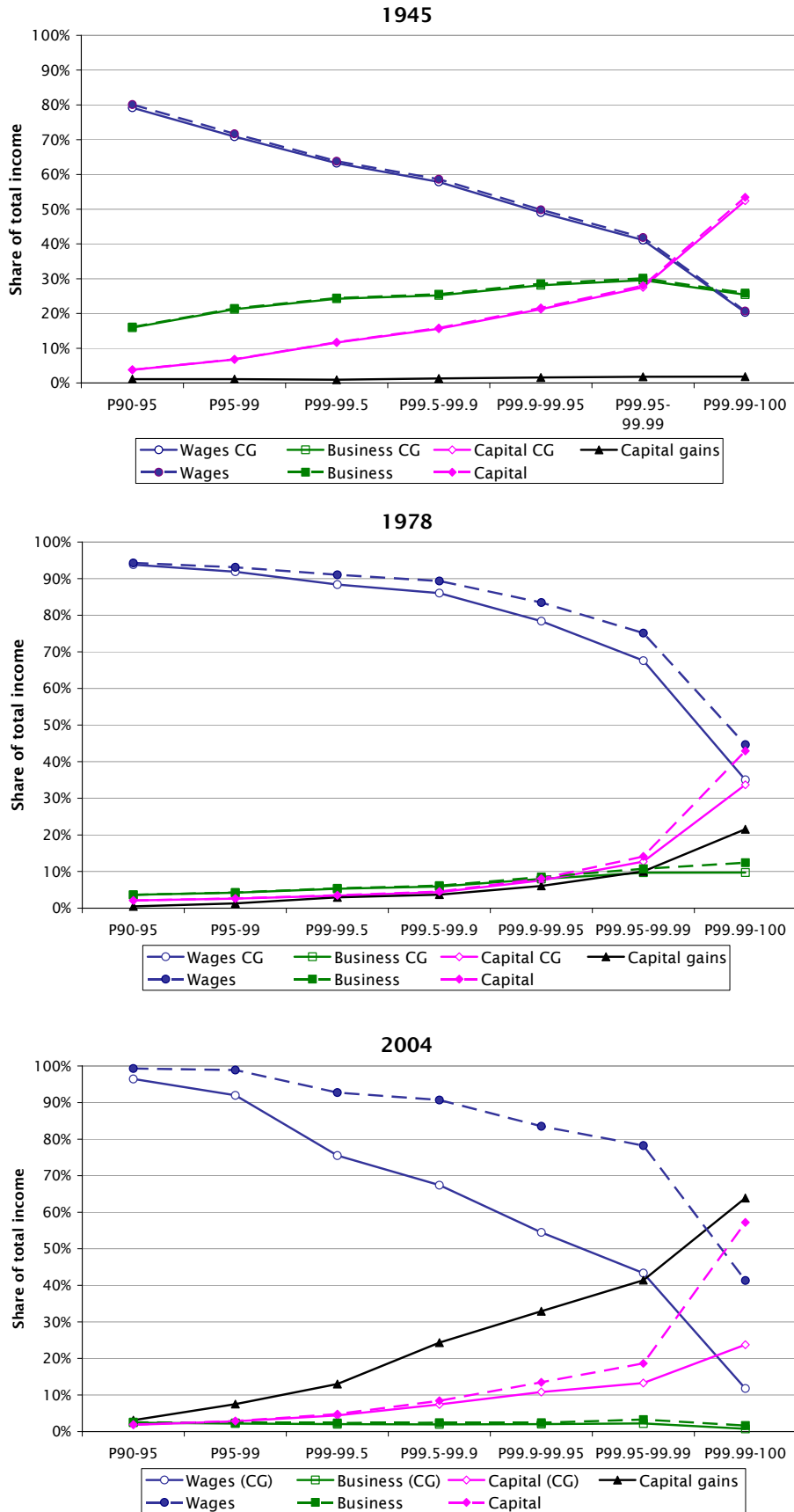


Figure 4: Income composition within the top decile 1945, 1978 and 2004

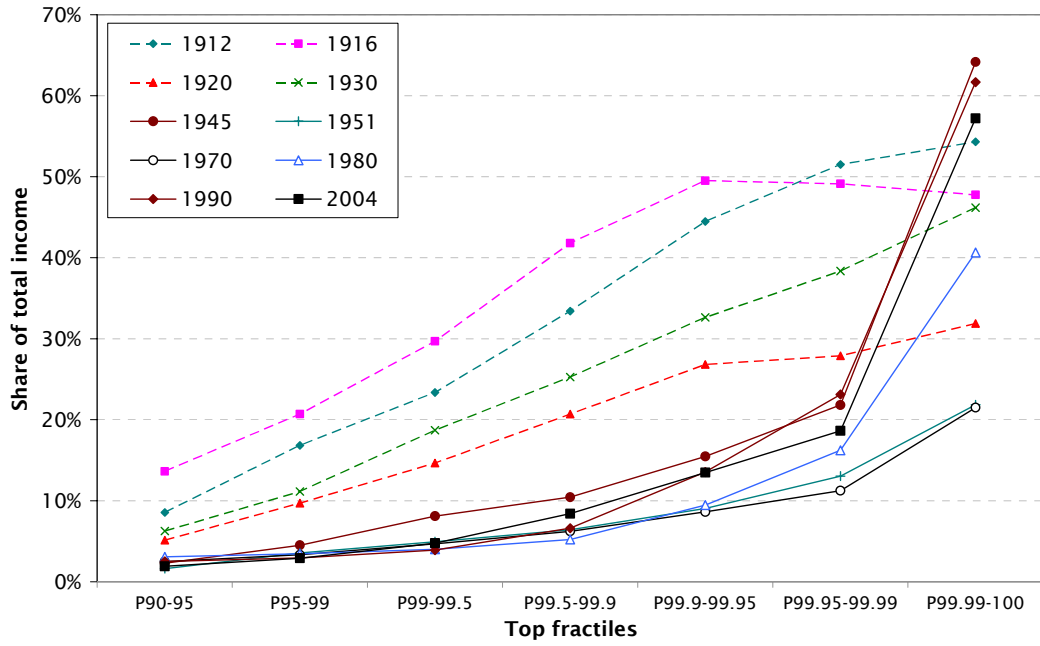


Figure 5: The evolution of capital income shares within the top decile, 1912–2004.

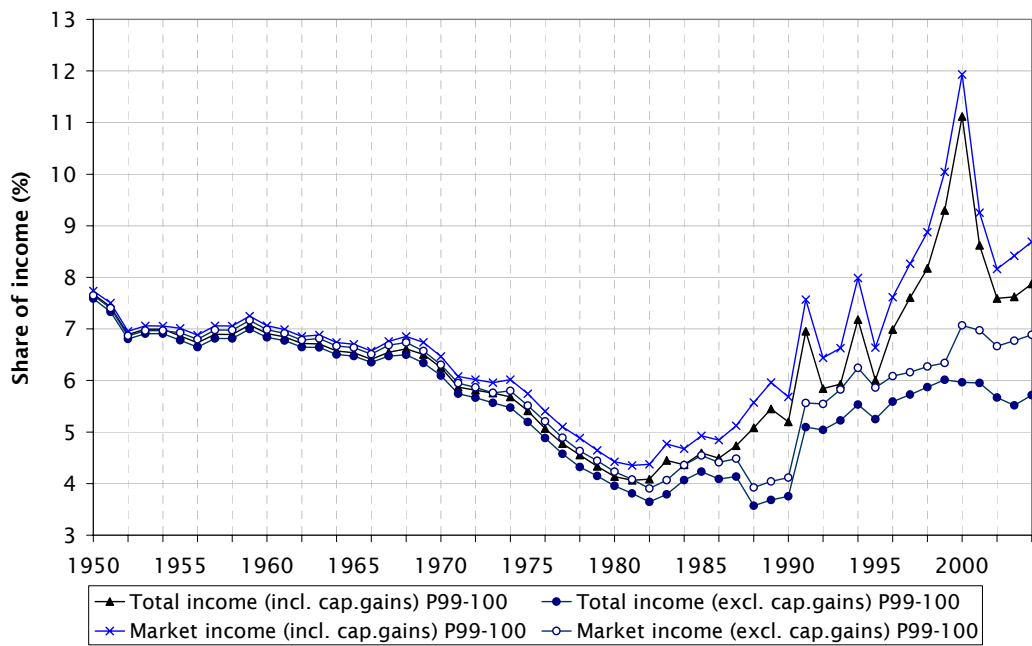
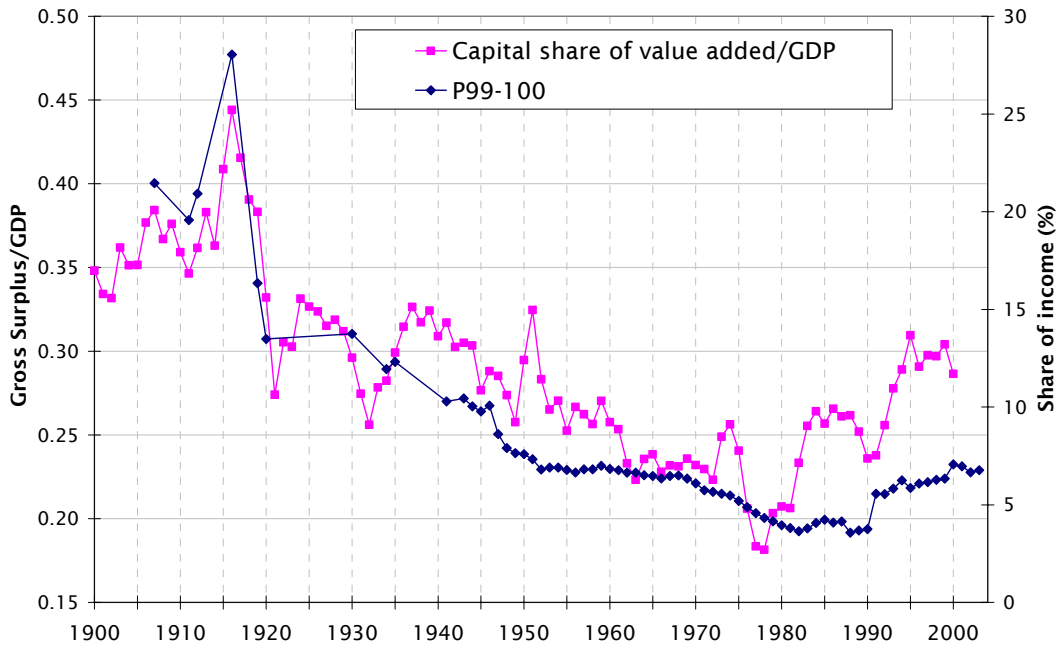
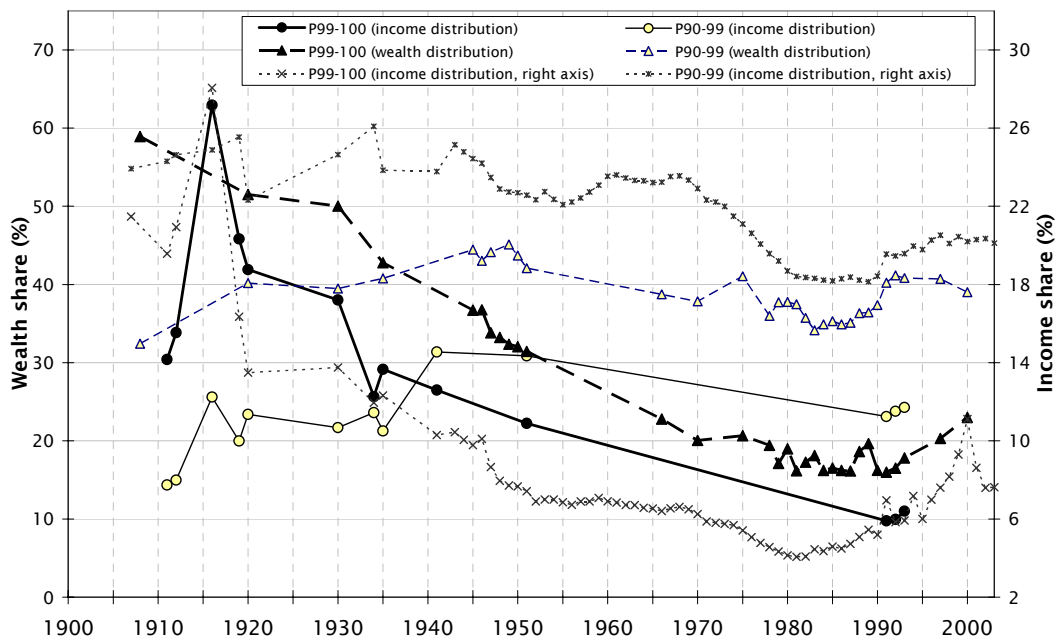


Figure 6: Total income shares vs. market income shares of P99–100, 1950–2004.



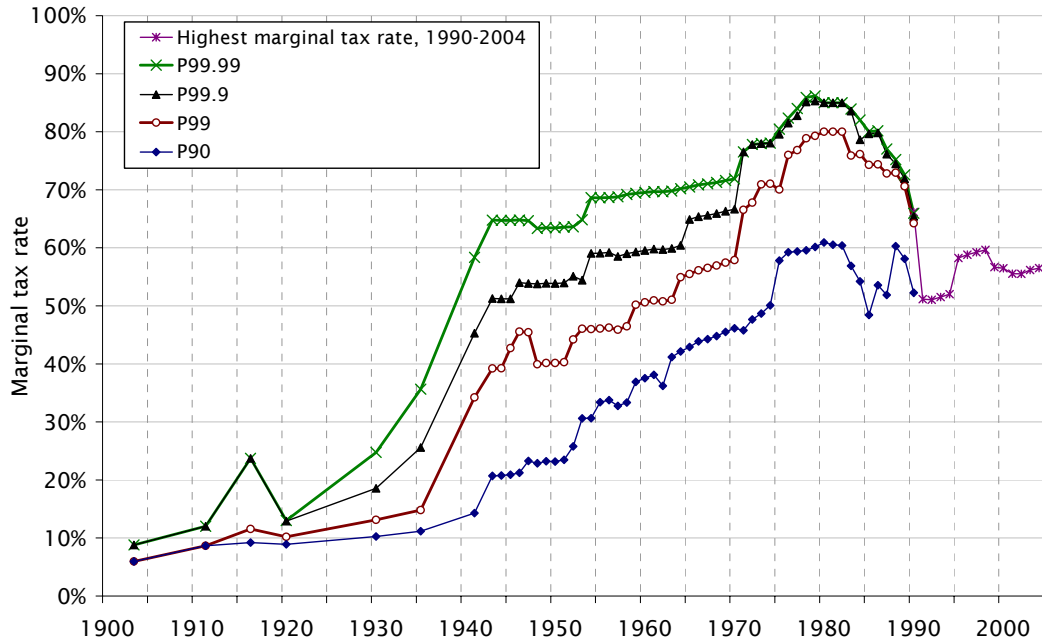
Sources: Data on the capital share of value added and GDP by activity come from Edvinsson (2005). Top income percentile shares come from Appendix table A2 column 1.

Figure 7: The capital share of value added as a share of GDP and the top 1 percent income share, 1903–2003



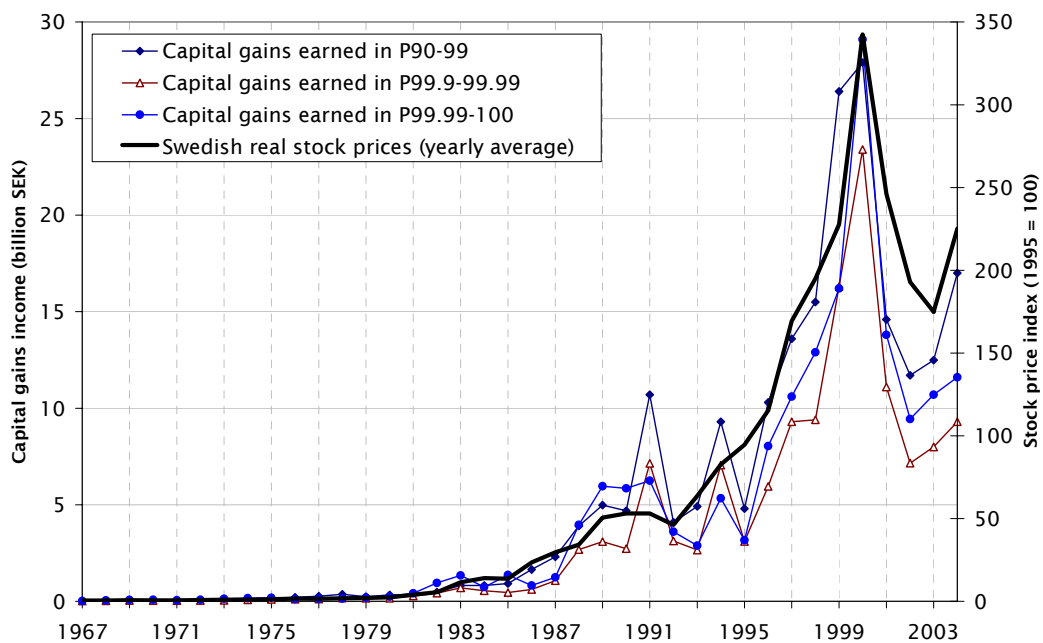
Sources: Authors' own calculations.

Figure 8: Wealth in Swedish top income and wealth fractiles, 1908–2003.



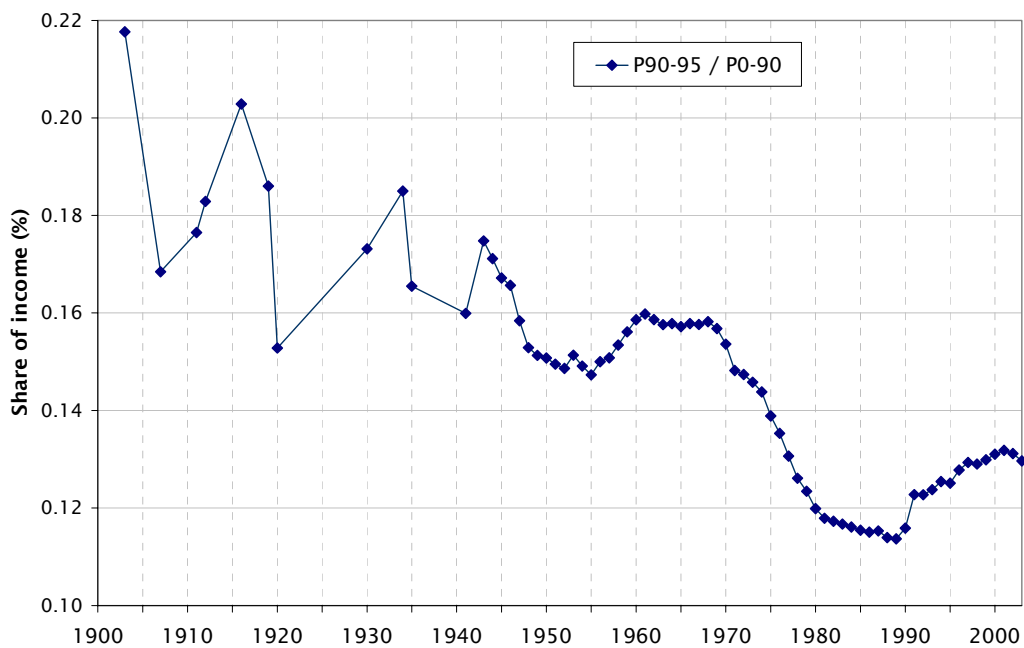
Source: Tax rates are computed for each top income level in Table A4 using tax tables in Söderberg (1996) until 1990. After 1990, we show the “highest marginal tax rate” (Swedish National Tax Board, 2004), applying only to labor income (wages + business income).

Figure 9: Top marginal tax rates in Sweden, 1903–2003



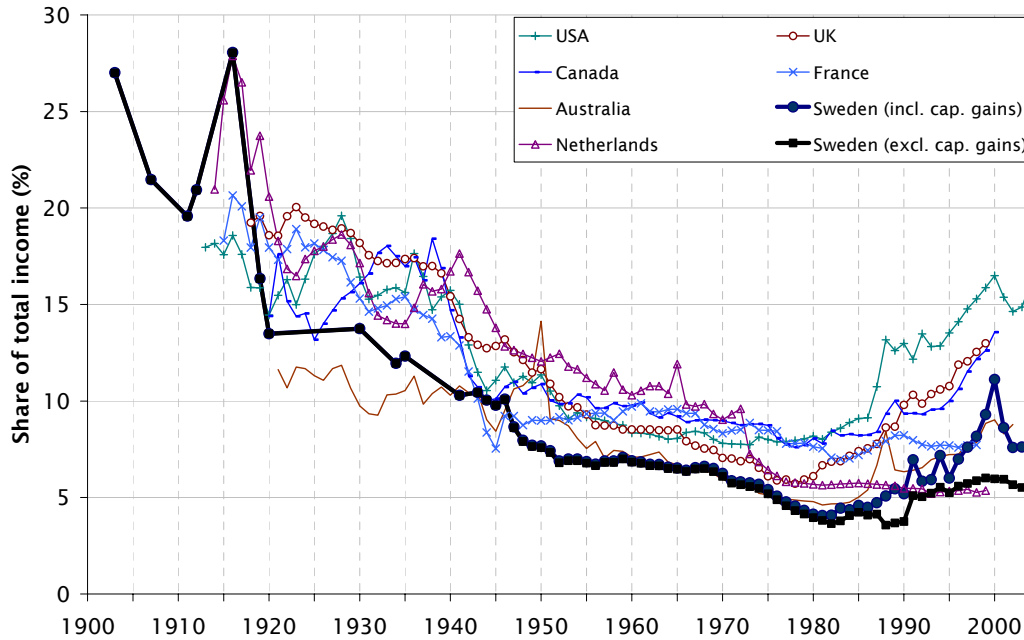
Note: Stock prices are yearly averages of end-of-month prices up to 1979 and daily closing prices thereafter of *Affärsvärldens Generalindex* (<http://www.affarsvarlden.se>), deflated with monthly CPI (monthly averages).

Figure 10: Capital gains in some top income fractiles and Swedish real stock prices, 1967–2004.



Note: The figure shows the ratio of P90–95 to P0–90 (col. 8 and one minus col. 1 in Table A2).

Figure 11: The Swedish twentieth century “Kuznets curve”.



Notes and Sources: Australia (Atkinson and Leigh, 2006), Canada (Saez and Veall, 2005), France (Piketty, 2003), Netherlands and the UK (Atkinson and Salverda, 2005) and the US (Piketty and Saez, 2003).

Figure 12: Income shares of the top percentile in Western countries, 1903–2004.