Lifting All Boats?

The Evolution of Income and Wealth Inequality over the Path of Development

Daniel Waldenström

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Abstract

Does a rising tide lift all boats? This question – that is, to what extent does improvements of the general economy benefit all – is central to the study of economics and history. From fundamental issues about whether market forces have an innate tendency to increase or decrease differences in economic outcomes, to much debated questions about the effects of government policies, distributional concerns are always present.

In this dissertation, a novel dataset of international long-term income wealth inequality data is presented and used to shed new light on long-standing issues in economic history. What were the distributional impacts of the industrial revolution? Who gains and who loses the most from the outbreak of a financial crisis? Has progressive taxation been a successful way to redistribute resources from the rich to the rest of the population?

Several important findings come out of the analyses presented. A general result is that whereas nineteenth century industrialization had a mixed impact on inequality across the Western world the twentieth century experience, including a rapid growth of government, educational reforms and the introduction of progressive taxation, uniformly equalized societies.

Key words: Income distribution, Top incomes, Wealth inequality, Intergenerational mobility, Income taxation, Economic history

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Writing this book would not have been possible without the support of a number of people. From the economic history department at Lund University, Christer Gunnarsson and Jonas Ljungberg provided excellent guidance in the finalization stages of the thesis.

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Daniel Waldenström, Täby, September, 2009

Chapter 1

Introduction

1.1 Inequality in historical perspective

In a famous quote attributed to John F. Kennedy, the question of the extent to which improvements in the general economy benefit everyone, is captured by the analogy of development being "a rising tide" that "lifts all boats".[1] The study of this question, i.e., the study of the relationship between inequality and development, is central to economics and history. From fundamental issues about whether market forces have an innate tendency to increase or decrease differences in economic outcomes, to much debated questions about the effects of government policies, distributional concerns are always present. Inequality is a natural part of a functioning market economy, with economic outcomes reflecting the different efforts and talents of individuals. Yet, too high levels of dispersion of incomes and wealth could be detrimental to society through hampered growth rates and eroding social structures across different groups.

In order to understand the forces driving economic inequality as well as its long-run impact on society, we need to study trends in inequality over time. Most institutions that shape—and are shaped by—inequality evolve only slowly and hence a long-run perspective is crucial to detect the relationships of interest. For example, the spread of owner-occupied housing among the larger population in Sweden in the middle of the twentieth century, partly due to government-subsidized loans, had a first order impact on distribution of personal wealth.[2] Educational reforms aimed at raising human capital levels among low-educated groups have been found to equalize the distribution of incomes over the long run (see, e.g., Goldin and Katz, 2008).

Despite the strong case for studying long-term trends in economic inequality, a paucity of hard statistical evidence has since long constrained researchers from such pursuit. When commenting on the views on inequality expressed by nineteenth century hall-of-fame economists

[1] I am not the first to use this quote in the context of academic studies dealing with economic inequality (see, e.g., Hines, Hoynes and Krueger, 1997, and Andrews, Jencks and Leigh, 2008). In passing, it can also be noted that Kennedy never used this sentence to explicitly address issues concerning taxation of the rich, as some people have subsequently argued (see further the discussion in Lazere, 2009).

[2] See further the analysis in Chapter 3 in this dissertation on this issue.

Robert Giffen and Alfred Marshall, the more recent economic historian Peter Lindert bluntly states the following: "They were bluffing, of course. None of them cited any serious size distributions of income or wealth, nor any believable average incomes or wealth holdings for major economic classes." (Lindert, 1986).

In the early postwar era, improvements were made when a few economic historians and economists started putting together the strains of historical inequality estimates that were available from past works (see, e.g., Williamson and Lindert, 1980). The majority of inequality researchers during this period, however, turned their back on the historical sources and focused instead on the creation of new individual-level micro datasets, often based on large-scale surveys among the current population. Micro-based evidence offers detailed distributional information of the population as whole. Its opportunity for examining long-term inequality trends is, however, limited. Moreover, few micro-datasets have been collected and implemented in coordinated manners across time and countries, therefore offering a scattered picture of historical trends in income inequality. As Anthony Atkinson expressed it: "Figures collected at different dates are often not comparable and hence do not allow conclusions to be drawn about changes over time" (Atkinson, 1999).

The dissatisfaction with these scattered datasets as source for inequality trends recently inspired the French economist Thomas Piketty to construct new homogenous series of income and wealth concentration over most of the twentieth century (Piketty, 2001). Piketty adopted the basic approach of Simon Kuznets (1953, 1955), using compilations of personal tax returns as tabulated distributions that are available in most countries for long periods. Early on only people with high incomes were obliged to pay taxes and hence included in the tax statistics. Relating these top incomes to calculated reference totals for the whole population and its incomes, however, researchers have been able to construct top income shares over the entire twentieth century. While limited in their coverage of the population, the final series are sufficiently detailed and rich, not least in terms of income composition, to offer unique long trends in inequality as well as an opportunity to study the interactions between inequality and economic growth.

In passing, it should be noted that at the same time as Simon Kuznets made his contributions the Swedish economist Ragnar Bentzel (1953) independently published a study of the Swedish income distribution in the 1930s and 1940s, using almost the same approach as Kuznets did, i.e., relying on historical tax returns data and reference totals computed from national accounts. The studies of Swedish top incomes presented in this dissertation have benefitted greatly from Bentzel's work.

The remainder of this introductory chapter is organized into five sections. The next section provides a motivation for why a specific focus on the top of the economic distribution is warranted. Then, the methodological approach and its problems are discussed. After that two thematic extensions are presented, one investigating the possible presence of a Swedish Kuznets Curve and the other examining how a financial crisis affects inequality. In the last section, I outline the subsequent contents and review the main findings of this thesis.

1.2 Why study the rich?

The historical evidence on economic inequality studied in this dissertation refers mainly to the top of the distribution. Focusing on the rich is not common in inequality research. Typically, researchers have preferred studying the lower ends and the particular welfare issues concerned with them. But as the English economic historian R. H. Tawney remarked, "What thoughtful rich people call the problem of poverty, thinking poor people call, with equal justice, the problem of riches" (Tawney, 1913, p. 10). There are, in fact, a number of reasons for why an enhanced knowledge about the relative status of the rich is motivated from a scientific viewpoint.

To begin with, the rich are doubtlessly an important group in society. They constitute a significant tax base, they hold considerable shares of ownership of the corporate sector and through these channels typically enjoy a disproportionate influence on the economic and political agenda. In other words, if we wish to fully understand what forces drive economic and political change we need to keep track of the status of those with the highest incomes and fortunes.

From a purely fiscal perspective, the rich are important since that is where the money is. In the year 2006, the highest paid tenth of all Swedes earned one third of all before-tax incomes and paid almost four tenths of all taxes. The top wealth decile in Sweden owned the same year over half of all personal wealth in the country. Such concentration of resources is not unique for Sweden. Quite the contrary in fact. For example, the richest decile in the United States earned about half of all incomes (Piketty and Saez, 2003) and owned two thirds of all wealth (Wolff, 2002). Given the fiscal needs of government, studying the rich as tax objects is therefore highly relevant.

Another, more pragmatic, reason for studying the rich relates to the unique availability of historical data on the income and wealth top. Inequality estimates based on top income or top wealth shares can hence span considerably longer time periods than any other of the common ine-

quality measures used.[3] Given the right adjustments they are also homogenous and comparable over time as well as across countries. Furthermore, the long-run trends presented here are not confined to only depicting the status of the rich. In fact, top income shares are highly correlated with other broader measures of income inequality, e.g., the Gini coefficient (see Leigh, 2007, 2009 and section 1.3 below).

Furthermore, recent findings in the top income literature suggest that the rich are not all alike but rather a quite heterogeneous group in society.[4] Both in terms of the size and structure of their income and wealth, the differences between the lower and upper parts of the top decile are huge. Such detailed knowledge about the top is 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.

1.3 Measuring inequality: Methodological issues

1.3.1 Estimating top income shares

As has already been noted, much of the traditional research on trends in inequality has been based on observations drawn from scattered and disparate data sources. Peter Lindert emphasizes how this literature has been confined to studying under the light of lamp-posts, "illuminating some aspects but leaving others in the dark" (Lindert, 2000). For example, researchers have blended wage and income series, which is conceptually wrong since (labor) incomes are the product of the wage and the amount of labor exerted. When surveying the landed classes, estimates of land rents or bank interest rates have been spliced with distributional measures based on estate or wealth tax data. These erroneous measures results in a lack of homogeneity in the final inequality series, and renders huge problems in drawing robust conclusions about the actual historical trends.

The project launched by Piketty (2001a) was aimed at solving specifically this kind of data-related problems. Piketty's approach, as already

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[3] In fact, it was the dissatisfaction with the scattered data points in most inequality datasets that spurred Thomas Piketty to write his book on French inequality (Piketty, 2001) which started this new wave of research.

[4] As an example of just how different the rich are from each other, *Wall Street Journal* reporter Robert Frank describes in his book *Richistan* (Frank, 2007b) how the millionaires in today's U.S. can be divided into four different social classes based on where in "Richistan" they live: "lower", "middle", and "upper Richistanis", and, finally, the richest living in Billionaireville.

mentioned, built on the seminal contributions of Simon Kuznets (1953, 1955) using historical time series of tax return data available in a large number of countries for most of the twentieth century. The calculation of top income shares starts by collecting data from income statements in personal tax returns reported for different income classes.[5] Incomes in these sources are typically reported as gross total income, which includes income from labor, business and capital (and sometimes realized capital gains) before taxes and transfers. While being comprehensive in the coverage of income sources and reasonably well in reflecting market outcomes, the total income concept may not be the best to represent dimensions of personal welfare. For such considerations, disposable income, which is income after *after* taxes and transfers preferably at the household level (with adjustment for the number of adults and children) is arguably more appropriate.

Top income shares are computed by dividing the observed sums of incomes in different top fractiles by the sum of all incomes earned by the entire (tax) population, had everyone filed a personal tax return. 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), the top 1 percent (P99–100) or the top 0.01 percent (P99.99–100). In most countries only a minority of the people filed taxes before World War II and the computation of reference totals for income regularly include both tax statistics and various estimates from the national accounts.

1.3.2 Estimating top wealth shares

It is fair to say that the majority of past scholarship in economic inequality and mobility has been centered on incomes. Much less attention has been given to the role of wealth. Neglecting wealth issues is problematic for several reasons. While there are indeed numerous situations where incomes represent the natural unit of observation, in many cases the significance of wealth is overlooked.

Personal wealth is an important component of the well-being of families and closely linked to central aspects of economic inequality and mobility. For example, wealth is important as it, together with income, determines the possibilities for individual consumption. According to the classical Haig-Simons definition, income should ideally be measured as the value of consumption plus the change in real wealth. In other words, income is that which we can consume while keeping our real wealth intact and the distribution of wealth is hence an important part in determin-

[5] For a more detailed treatment of the construction of top income shares, see Chapters 2 and 5 in this thesis.

ing our welfare. Furthermore, wealth acts as self-insurance against negative income shocks and is also a means of smoothing consumption over the life-cycle. Additionally wealth is arguably important for social status and possibly also for (political) influence in society. This means that the wealth distribution is central to the study of individual well-being.

To studies of historical inequality paying attention to the wealth distribution has a specific meaning because of its role in economic development. Wealth holdings are central for the possibilities individuals have to pursue different occupations, especially in the presence of credit constraints. Assets can serve both as collateral and as a means of financing entrepreneurial undertakings, and the distribution of wealth is, therefore, an important determinant for the path of development. Consequently, the interplay between the distribution of wealth and development is central to many theories attempting to explain the cross-country differences in long term development.

When measuring the concentration of wealth, approximately the same methodology is used as when measuring top income shares. That is, observed top wealth holdings for fractiles in the top are divided by the reference total for all personal wealth. There are, however, some important differences between estimates of income and wealth inequality. First, the sources for personal wealth data are not as straightforward as the income distribution data are and they also pose a different set of methodological challenges. In particular, older wealth sources are mostly based on either wealth tax returns or estate tax returns, but for more recent periods researchers also use survey data. None of these sources are typically available on a regular basis and for many countries they are not available at all. For this reason, they are less reliable in terms of determining the true trends and variability of wealth inequality than is the case for incomes.

Furthermore, the different sources display the wealth distribution for different entities. While wealth tax data or surveys reflect the distribution of the living population, estate tax data and probate records reflect the distribution of the diseased. Since those who people who die during a year is not a representative sample of the living population (e.g., since the old are heavily overrepresented), these two distributions are not immediately comparable. The usual procedure used by researchers to make the comparable is by applying so-called *mortality multipliers*, which are inverse mortality rates for different age, sex or social status groups. In this

way, the distribution of estates can be transformed so as to reflect the wealth distribution among the living population.[6]

Another problem with estimating wealth distributions concerns the difficulties associated with valuating assets. Tax statistics mostly refer to tax assessed values of real and financial assets, despite the fact that it is the market values that are the most economically relevant. Fortunately, the computation of top wealth shares turn out to be fairly insensitive to the use of either tax assessed or market values, as long as the same kind is used in both the numerator and denominator. This is shown by the sensitivity analyses in Chapter 3 of this dissertation.

1.3.3 Measurement problems and comparability

As has already been indicated, the data-related and methodological challenges arising along with the estimation of long-run trends in economic inequality are manifold. Some are due to the fact that tax data were originally not assembled for the purpose of future research on distribution, but rather as part of an administrative process spelled out by tax laws and bureaucratic needs. Because of this, much of the efforts embedded in the current top income literature have focused on ways to deal with these challenges.

One important source of problems with tax-based income and wealth data come from tax avoidance and tax evasion behavior among taxpayers. Arguably, taxes provide people with incentives to minimize their taxable income or wealth, and this can potentially influence the amounts reported on tax returns. More importantly, if avoidance varies over time, countries and the distribution, serious measurement errors may arise. The role of tax avoidance has been given special treatment because of its potentially large impact on the final series. In some instances the extent of avoidance appears to have been notable such as the case of the largely tax-driven capital flight from Sweden in the 1980s and 1990s (see in Chapter 3). In many cases, however, researchers have found the impact of avoidance and evasion on both level and long-run trends in inequality to be modest. One intuitive explanation for this robustness is that the top income data series are based on reported incomes *before taxes*, i.e., incomes to a large extent unaffected by tax minimizing behavior.

Other data problems relate to the structure of the underlying data, meaning the way data were originally collected and reported by various statistical and tax agencies. In the countries covered in this literature so far, there are several shifts in the definition of income or wealth or the tax

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6 The most common technique is based on mortality multipliers, where the sex, age and often social status of the diseased is used (see further Atkinson and Harrison, 1978, ch. 3).

units required to report these. Mostly, these changes are products of changes in policies for data collection routines and tax legislation. For the early periods, moreover, there are often missing years during which data were not collected or reported at all. This causes breaks in the time series and renders difficulties in determining correct trends and degree of variability in incomes and wealth.

Many, but far from all, of the measurement problems have been alleviated through adjustments and consistency checks presented in the past top income literature. For example, many changes concern one-time shifts, which can fairly easily be controlled for through applying multiplicators to either pre- or post-break series. Overall there is little evidence suggesting large systematic errors in the reported series.[7]

The validity of top income shares can also be checked by comparing them with other measures of income inequality. In particular, how well do top income shares correlate with the widely used Gini coefficient? This is in fact not only a consistency check, since it also relates to the usefulness of top shares as proxy for overall income inequality. Many of the theoretical models relating inequality and economic development do not specifically apply to the status of the rich, but if their relative standings correlate with the overall income or wealth dispersion this may still be a relevant analytical tool for evaluating these theories.

Figure 1.1 displays the cross-country relation between Gini coefficients and top income decile shares for eleven industrialized countries.[8] In the left panel, levels in 2000 (or years close to it) are related, indicating a strongly positive correlation of 0.78. In the right panel, changes in inequality between years around 1980 and 2000 are shown, again indicating a strong positive relationship with a correlation of 0.89. In a similar comparative analysis of top income shares and other measures of inequality, Leigh (2007, 2009) finds clear correlations, suggesting good external validity of top income shares.

7 For an extensive account of the different kinds of adjustments and robustness checks made by researchers in the top income literature to make their series homogenous and comparable, see Leigh (2008).

8 Data on Gini come from the Luxembourg Income Study (2009), and use net of tax incomes. Data on top income shares come from chapter 5 and are gross of tax.

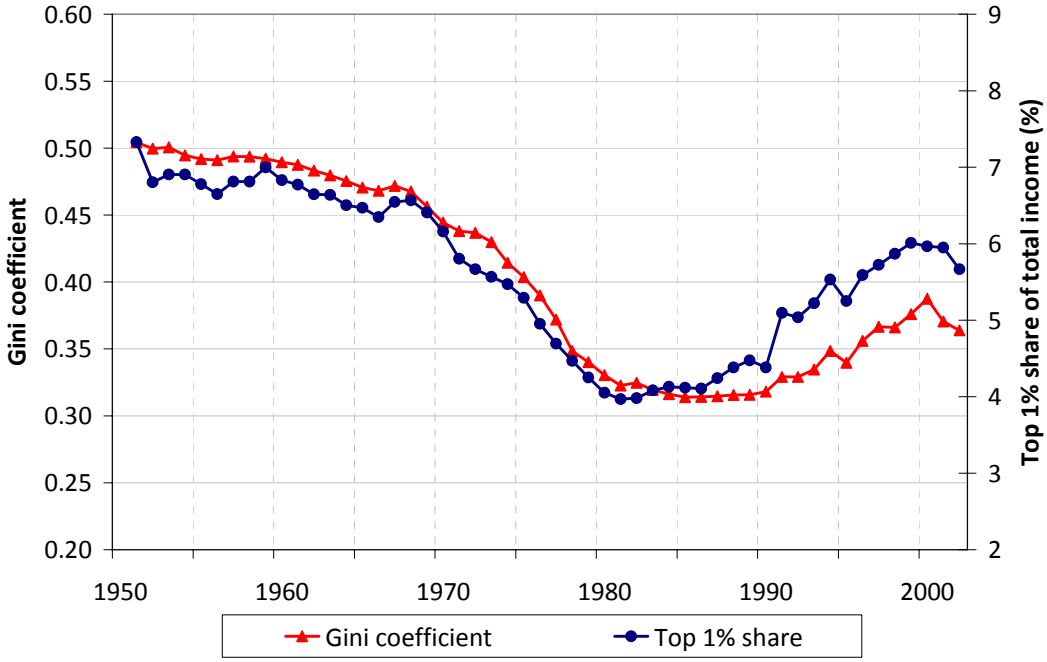
Figure 1.1: Gini and top income deciles in 11 countries.

Note: The top income shares are based on gross-incomes and the Gini coefficients (from the Luxembourg Income Study project) on net incomes.

Turning to the intertemporal (time series) correlation between the Gini coefficient and top income shares, one cannot do a similar cross-country analysis due a lack of data. Instead, I confine myself to examining one single country during the postwar period: Sweden. Figure 1.2 depicts the gross of tax Gini coefficient and top income percentile in between 1951 and 2002. Well in line with the cross-country analysis, the time series correlation also appears to be strongly positive between the Gini and the top income shares. Having said this, one should not rule out the possibility that top shares and Gini coefficients could well diverge specific time periods.[9]

[9] For example, Prados de la Escosura (2008) provides examples of period when the Gini coefficient and the top 0.01 percentile income share diverged strongly, e.g., during the 1950s. It should be noted, however, the this Gini series is computed from broad aggregates of wages and land rents and not, as the top income share, from actual distributional sources.

Figure 1.2: Gini and top income percentile in Sweden, 1951–2002.



Note and sources: Both series use gross total income including realized capital gains. Gini data are from Johansson (2006) and top income data from Chapter 2, this thesis.

Overall, there are a number of measurement problems that plague the historical series on top income and wealth shares. Although some of these are difficult to fully account for, a multitude of consistency checks suggest that the final series are quite robust in terms of both levels of and trends in inequality. This impression is underlined by the remarkable similarities in inequality patterns between top income shares and Gini coefficients. In other words, the data on income and wealth concentration analyzed in this dissertation indeed appear to be valid indicators of inequality, useful for further analyses.

1.3.4 Inequality of outcome or opportunity?

Up until this point the type of inequality dealt with has been one of annual cross-sections in the income or wealth distributions. Such representation of inequality corresponds to the inequality of outcomes.[10] When thinking more deeply about the notion of inequality, however, it becomes obvious that a purely static and outcome-oriented measure cannot address all relevant aspects of inequality. *The Economist* wrote on June 15, 2006: "Who cares if the boss earns 300 times more than the average working stiff, if the stiff knows he can become the boss?". The message of this

[10] Note that the type of "outcome" considered here predominantly expressed as total income before taxes and transfers, hence without any of society's measures to redistribute resources to dampen the effect of pure market outcomes.

sentence is that our views of economic inequality does not solely rely on how much more income the top person earns relative to some average person, but also how this top person came to earn such a high salary in the first place. In other words, our views and interpretations of inequality do not only include the static notion but also a dynamic perspective on inequality. Such a dynamic perspective means putting more weight on the *mobility* in the income and wealth distributions. What are the possibilities that people have to move up or down the economic ladder? Such a view refers to inequality of opportunities in society. Questions about fairness and efficiency—two words with outmost policy relevance—are directly linked to such a view. As hunched by the Economist quote above, the distribution of outcomes is interpreted differently depending on how have actually people reached their position in society, e.g., if they have become successful because of their own efforts or thanks to a certain family background. Close links between parents and offspring in terms of economic status usually indicate high inequality of opportunity.

Questions about inequality of opportunity are hence closely related to aspects of economic mobility. Yet, it is not the case that more mobility automatically implies more equality of opportunity. There are, in fact, a number of parental influences that can still be in play without influencing what people normally think of as equality of opportunity. The political philosophers John Roemer argues that there is a hierarchy of sources of parental influence, which can be ranked according to their degree of social acceptance (Roemer, 2004). These four are, from the least to the most socially accepted: social connections leading to better outcomes in education and wealth; family culture and investments influencing beliefs and skills; genetic transmission of ability; the influence of preferences and motivation to hard work. While parents' social connections is regarded as a force reducing equality of opportunity, parents' role in shaping work ethics or saving motives is not. Hence, equality of opportunity does not imply zero correlation between outcomes across generations.

When assessing socio-economic mobility empirically researchers typically address two different kinds of mobility. One is the study of mobility of individuals or households within a career or lifetime, hence tracking peoples' relative status between time periods (see, e.g., Kopczuk, Saez and Song, 2009 on U.S. postwar earnings mobility). The other approach is to associate the economic status of a generation with the equivalent status of its parent generation. Such intergenerational linkage allows researchers to identify the role of initial conditions for subsequent success. For example, when explaining the persistence in income or earnings status from parents to their offspring, researchers have not only studied the role of income and earnings as such, but also the contributions of edu-

cational choice, social traits and even intelligence (see Bowles and Gintis, 2003).

In the past research dealing with intergenerational economic mobility, most of the attention has been paid the broad picture for the population as a whole. Questions have then mainly concerned the size of the average level of mobility for a specific country at a specific point in time. Less attention has been paid to specific issues concerning mobility in the top of the distribution. In particular, no one has answered questions such as who becomes rich and why? What institutional factors matter in this process and are there any policies that assist people to realize their innate abilities? Is it easier to succeed in economies with relatively small income dispersion or is rather it the other way around? In chapter 6 of this dissertation, some of these specific questions are addressed by studying the relationship between economic successes among Swedish men born in the 1960s and their fathers.

1.4 Further perspectives on the rich

1.4.1 Is there a Swedish Kuznets Curve?

In his presidential address at the American Economic Association in 1954, Simon Kuznets presented a theory—or a "collection of hunches" as he referred to it—for why inequality changes during economic development. Kuznets suggested that increases in inequality during early stages of industrialization reflected increasing productivity gaps between the industrial and agrarian sectors. As labor started flowing from low-wage agriculture to high-wage industry, the gaps gradually shrunk and finally vanished. Income inequality hence follows an inverse-U pattern over the path of industrialization, a pattern later been named *the Kuznets Curve*. As pointed out by Atkinson (2005), however, Kuznets (1955) also emphasized a second mechanism causing widening inequality over the path of development namely the increased concentration of capital.

There are few theories in economics that can match the Kuznets hypothesis of structural change in terms of the number of times it has been empirically evaluated. Overall, it is fair to say that consensus is not reached regarding its validity. The case of Sweden is possibly an exception. Several previous scholars have in fact suggested Sweden to display support of the Kuznets hypothesis. In his survey of cross-country evidence on inequality, Christian Morrison stated that "Sweden offers a clear example of Kuznets' curve between 1750 and 1970" (Morrison, 2000, p. 227). In his study of salaries across sectors, Söderberg (1991) found that wage differences between skilled and unskilled workers 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 wage inequality between 1870 and 1914 and the declining thereafter, has been interpreted as an example of Kuznets' curve.[11]

Can the recent series with top income shares add any value to this discussion about the explanatory power of the Kuznets curve? Perhaps. On the one hand, the structure of the tax-based income data underlying these top shares is not optimal for investigating the validity of Kuznets' theory. Specifically, there is no sectoral separation and neither are there good information on wages or wage gaps as functions of, e.g., education or vocational training. On the other hand, Kuznets himself used precisely these data to create his theory in the first place. As I have already tried to argue, moreover, when it comes to represent long-run trends in income inequality there are few alternatives that can match the historical consistency of top income shares.

According to Piketty (2001a), a general conclusion from the top income literature is that the forces driving twentieth century inequality are not those described by Kuznets. The case of Sweden may, however, be different. A main finding in chapter 2 is that drops in top capital income and the rise of progressive taxation were 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 that wages constitute 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. By relating their incomes to the rest of the (mainly) wage earning population, i.e., P0–90, Figure 1.3 displays a relationship that could be interpreted as support for a Kuznets curve. Specifically, it 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).[12]

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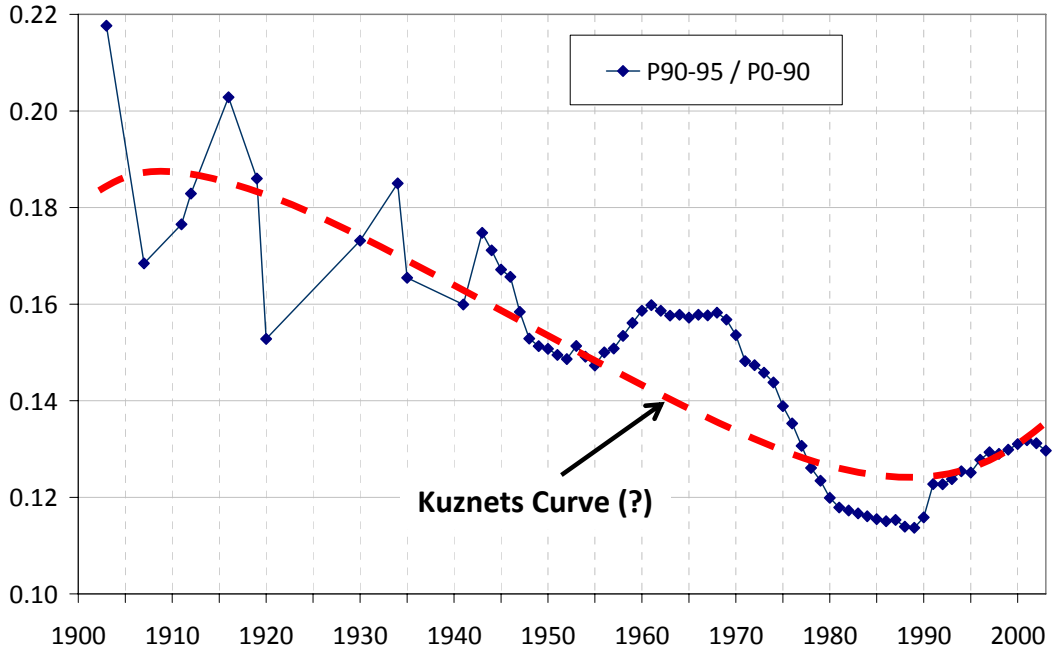
11 Jungenfelt (1966) is another example of a study offering support of Kuznets' hypothesis in the Swedish context.

12 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 1.3: Is there a Swedish Kuznets Curve?



Note: The figure shows the ratio of P90–95 to P0–90.

The Swedish wealth distribution suggests the opposite as wealth concentration decreases at least over the first 80 years of the twentieth century. But this cannot be taken as direct 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.

With respect to the Kuznets' structural change hypothesis for Sweden, hence, the tax-based income and wealth data suggest two things. First, if capital owners at the top of the distribution are excluded, and focus is put on the ratio between two groups whose income mainly consists of wages—those with the highest wages and the rest—a pattern emerges that is consistent with previous findings in 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.

1.4.2 Financial crises and the rich

The world is currently undergoing a severe financial and economic crisis. Its impact on the welfare of citizens will be profound, but we still do not know exactly how this impact will affect different groups in society. Will the poor lose relative to the better endowed? Or will capital owners take the biggest hits?

Theory provides limited guidance to the distributional effects of a financial crisis. One likely effect of a crisis is that it causes a "credit crunch" in the economy, meaning that the amounts of credits are reduced. If this happens, the crisis will be especially punitive on the financially constrained in society who needs loans for their current activities, e.g., penniless entrepreneurs. Such credit crunch-effects will therefore increase income inequality. On the other hand, the poor are typically workers earning their income from relatively fixed wage contracts. Crisis-related income shocks would hence hurt them primarily through the risk of unemployment rather than through wage cuts, and if they go into unemployment they are typically sheltered by the social security system (in Western countries).[13] The rich are deeply involved with the financial sector, holding most of their assets in corporate stock and often being heavily indebted. Many of the top earners also get a disproportionate share of their incomes in the form of capital-based reimbursements (e.g., stocks or stock options).[14] A short-run effect of a financial turmoil would therefore be a substantial reduction of the value of both the wealth and the size of capital-based incomes accruing to the rich. As noted by Hoffman, Postel-Vinay and Rosenthal (2007), however, it is much less evident what the long-run effects on the rich will be. If the rich will lose half their wealth but the middle-class entrepreneurs will lose all, it may well be the case that the rich will stand to gain from the crisis over time thanks to a strengthened market position.

Financial development over the long run seems to disproportionately benefit the rich. The analysis in Chapter 5, using the compiled set of cross-country panel data on top income shares to study the determinants of inequality over the twentieth century, finds that finance increase top income shares. Banking crises appears to play a significant role in this process. Specifically, the analysis shows that the outbreak of banking cri-

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13 I only discuss the effects from financial crises on inequality within the developed world. For treatments of the effects in developing countries, which are likely to be quite different in a number of ways, see, e.g., Ferreira and Ravallion (2008).

14 On the predominance of stocks and options in today's financial elite, see Jensen, Murphy and Wruck (2004).

ses is related to large negative effects on the income share of the rich but has no clear impact on the rest of the population.

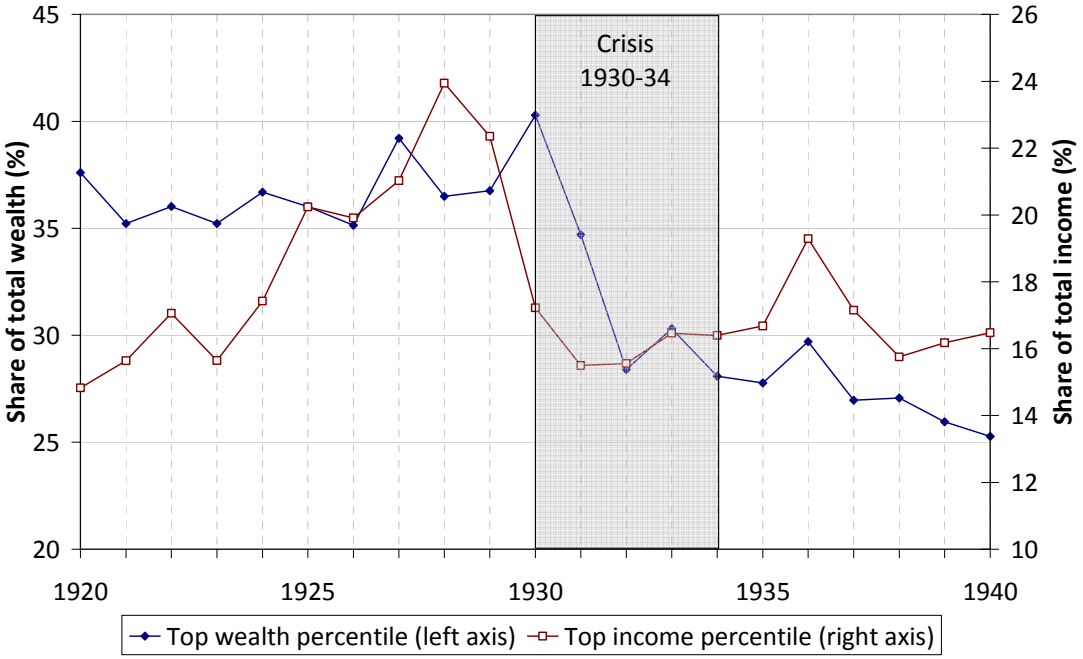
We have less systematic evidence for the top of the wealth distribution in order to be able to say something similar regarding the impact of financial crises. Instead we must resort to anecdotal evidence. One such observation is the reductions in the largest fortunes documented for several countries during 2008 and 2009, which indicate that equalizing motions are in play during the current financial crisis.[15] Historically, there are two especially interesting country case studies for which this can be done: United States during the Great Depression and Sweden during the banking crisis of the early 1990s.[16]

Figure 1.4 shows the top percentile in the U.S. wealth and income distributions between 1920 and 1940, i.e., a decade before and after the outbreak of the financial (and economic) crisis. It is clear from the figure that both income and wealth rich took substantial blows during the crisis, losing about a quarter of their shares to the rest of the population. This close connection between income and wealth is in line with what previous scholars have found, namely that the rich in pre-war U.S. were dominated by "coupon-clipping" rentiers (Piketty and Saez, 2003). To the extent that some of the top income earners were high paid executives, Frydman and Saks (2008) document that corporate executives had a large share of their compensation in the form stocks and options, but that these plummeted in the early 1930s.

15 For example, Sunday Times (2009) report that the thousand wealthiest people in Britain lost a third of their wealth during the 2008 stock market crash.

16 While these crises have been extensively studied by other researchers, their effects on top wealth and income shares have, to my knowledge, not been analyzed before.

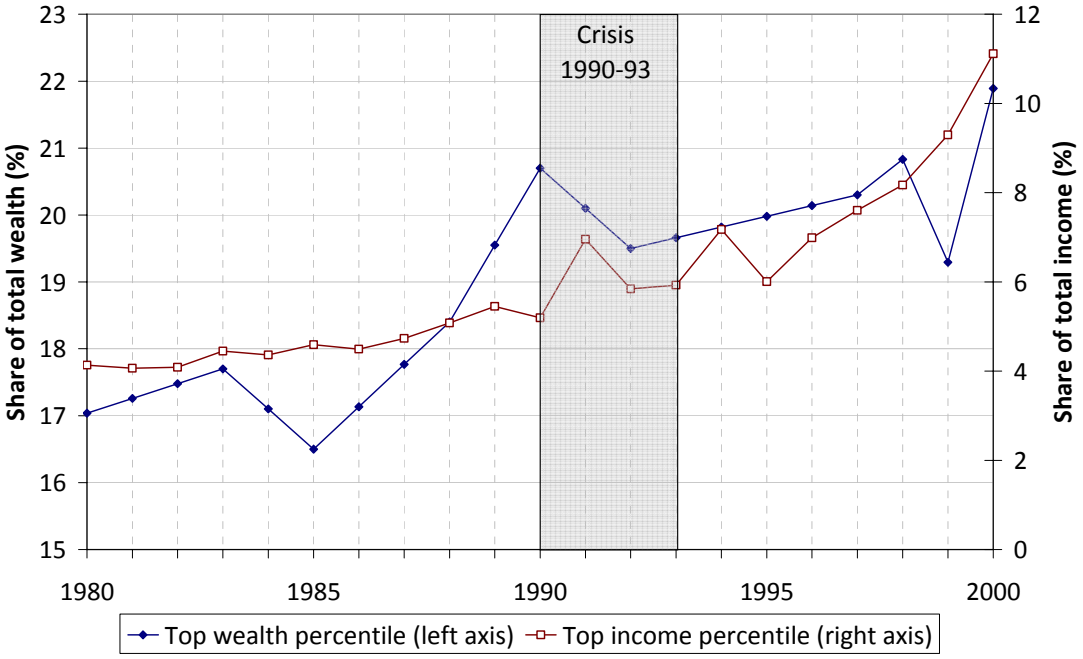
Figure 1.4: The rich during the U.S. financial crisis of 1930–1934.



Source: Incomes: Piketty and Saez (2007); Wealth: Kopczuk and Saez (2000).

Turning to the Swedish experiences in the 1990s, however, Figure 1.5 shows that the impact of financial crises is far from uniform. While top wealth holders lost ground to the rest of the population, no such pattern can be traced in the share of the top income percentile. As discussed at length in Chapters 2 and 3, there were both a number of far-reaching changes taking place during (and partly because of) the financial crisis, such as large drops in the tax progressivity, and large earnings in the corporate sector due to an export-led growth boom which resulted in a substantial value growth on the stock market (real stock returns went up 50 percent between end of 1990 and end of 1993).

Figure 1.5: The rich during the Swedish financial crisis of 1990–1993.



Source: Incomes: Chapter 2 (this thesis); Wealth: Chapter 3 (this thesis).

Altogether, there is considerable evidence on short-run equalizing effects of financial crises. Because of their large stakes in the financial sector and reliance on returns from their financial wealth, the rich is probably the single most vulnerable group during a financial turmoil. From the available historical evidence it is less clear, however, what the precise long-run effects of a financial crises are on overall economic inequality and more research is needed on this issue.

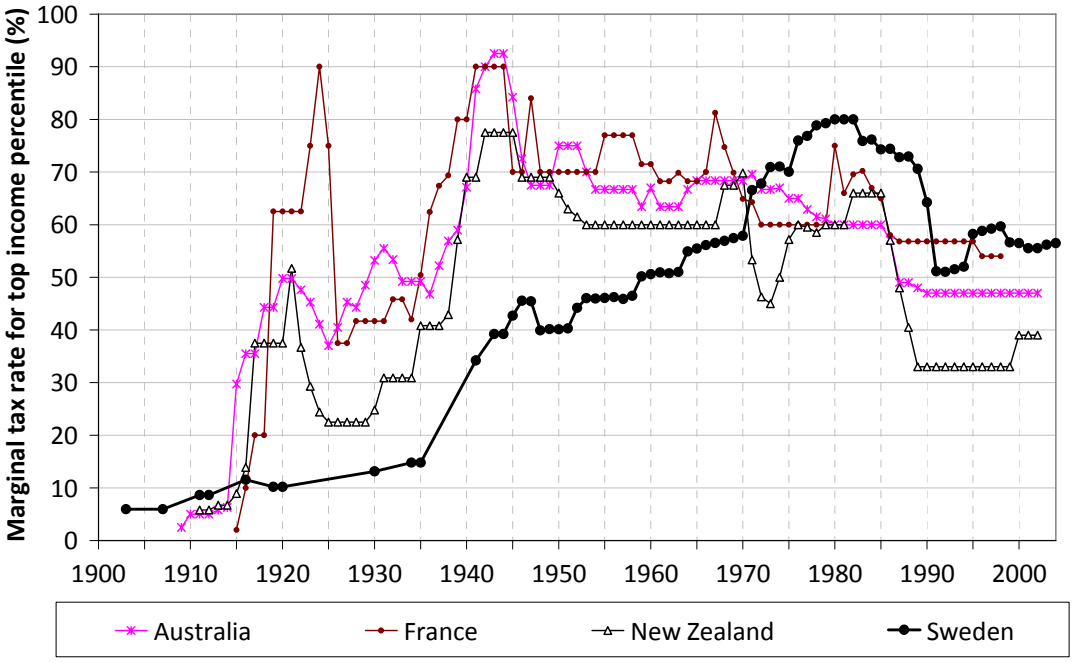
1.4.3 Taxing the rich: Some critical issues

Taxes on income and wealth have existed for a long time, but their structure and importance have varied considerably. Before the industrial era, most of these taxes were proportional, taxing the rich and the poor at one and the same marginal rate. From the middle of the nineteenth century, more "modern" tax systems started emerging in Western Europe and North America. A common feature of these systems was the use of more economically viable tax bases. Instead of almost arbitrarily taxing only some particular income stream or asset value, governments started taxing broader aggregates of income coming from labor, business and capital (Aidt and Jensen, 2009).

The progressivity of income taxation was another new feature introduced in the twentieth century. Initially the difference in tax rates between incomes was quite modest, but as countries from the 1910s onwards extended franchise and increased public expenditures due to wars (Scheve and Stasavage, 2008) and welfare state expansions (Steinmo,

1993) the progressiveness increased rapidly. This general pattern of increasing progressivity is clearly visible in Figure 1.6, which shows the marginal tax rates paid by those with incomes around the 99th income percentile in four countries since 1900.

Figure 1.6: Marginal tax rate paid by the top income percentile (%).



Source: Chapter 5, variable *Margtax1*.

Increased progressivity of income taxes is not the only way in which society started taking out higher taxes of the rich in the early twentieth century. In Sweden, a wealth tax was introduced in 1910 and during World War I yet an additional wealth tax was levied. Governments began at this time to realize the fiscal potential of financial markets, where large values started being built up and transacted at a regular manner. From a redistributive viewpoint, moreover, the early financial markets were an arena for a very exclusive and wealthy elite. Germany introduced in 1896 a tax on stock market transactions, and several other countries followed suit and launched similar taxes in the years thereafter (Waldenström, 2002). Although the transaction tax was initially motivated by externality arguments such as reducing harmful speculation, its political significance as a means to redistribute wealth soon became obvious. In Chapter 7, I study the Swedish securities transactions tax regime and ask whether its practice was really in the public interest (i.e., being an efficient tax base, reducing the negative externalities of speculation) or in the private interest (i.e., whether those receiving tax revenues were more politically influential than those taxed). The analysis clearly shows that the Swedish stock

transfer tax was predominantly in place for political, rather than fiscal or economic, reasons.

After several decades into the postwar period with sustained levels of income tax progressivity, several countries in the Western world have experienced falling tax rates in recent years. In Figure 1.6, this pattern is obvious through the decline in top marginal income tax rates. Piketty and Saez (2006) also show that the fall in progressivity is not confined to income taxation only. When also considering the distributional elements of estate and property taxes, the rich pay today much lower taxes than they did in 1970. Sweden is no different in this respect. The tax reform in 1991 reduced top marginal rates from about 70 to 50 percent and capital income taxes were taxed at even lower rates.[17] The Swedish stock transfer tax was abolished in 1991 and in recent years, the taxation of the rich has been lowered even further; the inheritance tax was repealed in 2005 and since 2007 Sweden has no longer a wealth tax or a property tax (except for a very small local "housing fee").

Is the drastic decrease in taxation of the rich economically viable? Naturally, this is a big question which cannot be fully answered here. Conventional economic analysis emphasizes that all taxes are associated with a trade-off between efficiency (higher taxes reduce incentives). In general, taxes have redistributive features and give rise to behavioral responses in order to minimize tax payments (Slemrod, 2000).

Some researchers have started questioning the assumptions underlying this trade-off, in particular concerning the taxation of very rich people. For example, Frank (2000, 2007) argue that the neoclassical premise that people only care about absolute income or consumption increases is basically flawed. If one instead assumes that monetary rewards in the top depend both on relative and absolute pay criteria or that people care about relative on top of absolute consumption, it may well be that taxes to curb income accumulation are not associated with deadweight losses. In another line of critique, Goolsbee (2000) shows empirically that the sensitivity to paying taxes among top income earners has been overstated in previous research. The reason is that researchers have ignored the fact that top earners get much of their income from capital and that such income can be shifted in time to minimize taxation. Taking time shifting (and a few other) responses into account, Goolsbee shows that the efficiency losses associated with from high marginal tax levels are limited.

The taxation of the rich has undergone profound changes over the past century. As Western societies became increasingly industrialized and

[17] Interests, dividends and capital gains on the sale of financial assets were taxed by 30 percent (with exception for the years 1991 and 1994, when the government extended substantial breaks on capital gains taxes). Capital gains on housing have generally been taxed at a lower rate, about 20–25 percent.

democratic, the rich were taxed at increasing rates. Up until some decades into the postwar era, top marginal income tax rates grew in most developed nations and supplementary taxes on the rich, such as wealth, property and inheritance taxes, were also on the rise. In recent decades, however, countervailing forces bounded the progressivity even turned the wheels around towards decreasing taxes on the rich. Perhaps the most important of these forces is technological development, which makes the rich into a mobile tax base as evidenced by the considerable inter-jurisdictional wealth mobility in recent years. Whether political forces will be able to coordinate and overcome this technological challenge and once again start raising taxes on the rich is an open, and highly intriguing, question.

1.5 Overview of the thesis: Does a rising tide lift all boats?

This dissertation consists of six self-contained studies presented in separate chapters. In the first two chapters, new evidence on the long-run evolution of income and wealth concentration in Sweden is presented. The following two chapters compile similar long-run trends in economic inequality from a number of countries, drawing on previous work by other scholars, and draw conclusions on general trends and driving forces. Several important findings come out of the analyses presented. A general result is that whereas nineteenth century industrialization had a mixed impact on inequality across the Western world the twentieth century experience, including a rapid growth of government, educational reforms and the introduction of progressive taxation, uniformly equalized societies. In Chapter 6, the degree of intergenerational income and earnings mobility in Sweden is studied, with specific attention paid to the patterns in the top of the distributions. Chapter 7, finally, examines financial market taxation and to what extent political or economic motives can explain their use in the past.

In the following a slightly more detailed overview of the chapters is provided. Chapter 2, *Top Incomes in Sweden over the Twentieth Century*, presents new homogenous series of top income shares in Sweden during 1903–2006. 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; 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 earn-

ers—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 the 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.

Chapter 3, *Wealth Concentration over the Path of Development, Sweden 1873–2006*, presents new evidence on the Swedish wealth concentration from the beginning of industrialization in the late nineteenth century to the present. The series presented come from a wide array of new evidence from estate- and wealth tax data, estimates of foreign and domestic family firm-wealth and of pension and social security wealth. The Swedish wealth concentration was at a historically high level in the agrarian state and it did not change much during early industrialization. From World War I up until about 1950, the richest percentile lost ground to the rest of the top wealth decile where relatively income rich households accumulated new wealth. In the postwar period, the entire top decile lost out relative to the rest of the population. Around 1980, wealth compression stopped and inequality increased. The chapter also introduces new ways of approximating the effects of international flows and find that the recent increase in Swedish wealth inequality is likely to be larger than what official estimates suggest.

An international comparison on long-run wealth inequality trends is offered in chapter 4, *Long-Run Changes in the Concentration of Wealth: An Overview of Recent Findings*. The aim of this chapter is to distinguish between changes which seem to be country specific and characteristics shared by all countries. While a historical account of the evolution of the wealth distribution in developed countries is interesting in itself, it can also hold implications for countries that are currently in an early stage of development or in transition. The data used originate from the taxation of wealth and estates. First, recent constructions of new historical series of top wealth distribution for the US, France, the UK, and Switzerland are reviewed. Second, new corresponding data for Denmark, Norway, and Sweden are presented. Comparing Scandinavia to other Western countries is interesting for several reasons. Scandinavia was late to industrialize, and allows for a coverage of the whole period from pre-industrial society until today. The Scandinavian "mixed economies" are extremes in the spectrum of welfare states. Furthermore, Sweden and Switzerland did not take part in any of the World Wars. The first main result is that the wealth shares of the top percentiles de-creased during the

1900s in all countries except Switzerland. Second, there are much less of common patterns during industrialization in the 1800s.

What determines long-run changes in income inequality? This question is asked in Chapter 5, *The Long-Run Determinants of Inequality: What Can We Learn from Top Income Data?*. Using a newly available panel dataset with 16 countries over the entire twentieth century, this chapter studies the role of economic, technological and political factors in explaining the evolution of income inequality. The analysis focuses on three groups of income earners: the rich (P99–100), the upper middle class (P90–99), and the rest of the population (P0–90). The results show that periods of high economic growth disproportionately increases the top percentile income share at the expense of the rest of the top decile. Financial development is also pro-rich and the outbreak of banking crises is associated with reduced income shares of the rich. Trade openness has no clear distributional impact (if anything openness reduces top shares). Government spending, however, is negative for the upper middle class and positive for the nine lowest deciles but does not seem to affect the rich. Finally, tax progressivity reduces top income shares and when accounting for real dynamic effects the impact can be important over time.

In chapter 6, *Intergenerational Top Income Mobility in Sweden – A Combination of Equal Opportunity and Capitalistic Dynasties*, the intergenerational mobility in the Swedish earnings and income distributions is analyzed. Specific attention to mobility into the very top is given. Using a large dataset of matched father-son pairs in Sweden it is possible to obtain results for fractions as small as 0.1 percent of the population. Overall, the results indicate that mobility is lower for incomes than for earnings. Second, mobility appears to decrease the higher up in the distribution one goes. In the case of total incomes, mobility decreases dramatically within the top percentile of the population. Our results suggest that Sweden, well-known for its egalitarian achievements, is a society where equality of opportunity for a large majority of wage earners coexists with capitalistic dynasties.

In the dissertation's final chapter, Chapter 7, *Why Are Securities Transactions Taxed? Evidence from Sweden, 1909–91*, questions concerning taxes on the rich are addressed. Specifically, the chapter aims to explain why a specific kind of financial market tax, the securities transaction tax, was practiced in Sweden throughout the twentieth century in spite of its obvious economic inefficiencies. The main focus is put on the political-economic determinants of this tax on the rich, By evaluating the explanatory power of the public-interest and private-interest theories in the context of the previous Swedish securities transactions tax policy, the private-interest theory of regulation is found to offer the most plausible framework overall.

Chapter 2

Top Incomes in Sweden over the Twentieth Century*

2.1 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, thanks to its tradition as an egalitarian society, has attracted disproportionate interest from inequality scholars. However, two important aspects have largely been overlooked. First, the lack of available micro data has led to most studies not going further back than to 1968.[18] 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 de-

* This chapter is co-authored with Jesper Roine. It is an extended version of "The Evolution of Top Incomes in an Egalitarian Society: Sweden, 1903–2004" published in *Journal of Public Economics*, 9(1–2), 366–387. In particular, the extensive appendix published here contains detailed information about sources, the Swedish income data, as well as alternatives for constructing reference totals in the Swedish case.

[18] 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.

tailed knowledge about the top of the distribution may be crucial for distinguishing between different explanations of what drives inequality (or the lack of it). 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 largely agrarian, 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 perspective 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 study can, of course, also be seen as a contribution to the recent work on long-run income inequality in which series of income concentration have been constructed using a common methodology.[19] 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 concerned with 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

[19] Following the first studies by Piketty (2001a, 2003) on France, Piketty and Saez (2003) on the U.S., and Atkinson on the U.K. (2004), other recent studies include Australia (Atkinson and Leigh, 2007a), Canada (Saez and Veall, 2005), Germany (Dell, 2005), Ireland (Nolan, 2005), Japan (Moriguchi and Saez, 2006), the Netherlands (Atkinson and Salverda, 2005), New Zealand (Atkinson and Leigh, 2007b), Spain (Alvaredo and Saez, 2007) and Switzerland (Dell, Piketty and Saez, 2007). Atkinson and Piketty (2007, 2009) and Leigh (2009) collect much of this work. Lindert (2000) and Morrison (2000) provide surveys of previous studies on long run inequality developments.

compare our findings to the previous work.[20] 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 2006 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 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 income from capital gains is treated.[21] 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.[22] This, in turn, suggests that the Swedish case over the past decades is different from both

[20] 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).

[21] It is important to note that throughout the paper, whenever we refer to capital gains income, this means *realized* capital gains, which is what the tax data allow us to measure. In section 3.2 below we discuss possible implications of this distinction in more detail.

[22] Our data suggest that these capital gains have accrued to those who also have the highest wages, hence magnifying inequalities in the income distribution.

the Anglo-Saxon case as well as from the continental European case previously identified in the literature.[23]

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.[24] 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. 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. A number of appendices contain detailed information about data and various adjustments as well as sensitivity analysis of our main series.

2.2 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, 1955). 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 in-

[23] See, e.g., Saez (2004) and Piketty and Saez (2006) for cross-country comparisons.

[24] 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).

come.[25] 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.[26] 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.[27] To make these data comparable over time, a number of adjustments have been made as described in more detail in Table 2.1. Our preferred concept of income is *total (gross) income*, defined as income from all sources before taxes and transfers, but deducting 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.[28] 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

[25] 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).

[26] 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).

[27] 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.

[28] 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 the appendix for more details).

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*.[29]

Table 2.1: Definitions and adjustments of incomes and reference totals.

Income years	Income concept appearing in data sources	Adjustments	Reference total income	Reference total population
1903–1910	Taxable income [*till statlig inkomstskatt taxerad inkomst*] ≈ 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 [*Taxerat belopp*] = 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		–		
1951–1970	Total income [*Sammanräknad nettoinkomst*] = Total (gross) income − Deficits at source	Age adjustment (excluding all <16 years old)	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. bef. 1974) plus estimated incomes of "non-filers" (1943–2003)	Adult population (>15 yrs) adj. for women being (partially) included in the statistics (1951–1970)
1971–1990	Total (gross) income [*Sammanräknad inkomst*]	Minus deficits at source + Age adjustment		Adult population (>15 yrs) (1971−)
1991–2006	Total income [*Summa förvärvs- och kapitalinkomst*]	Age adjustment		

Note: All concepts are elaborated upon in the Appendix. No age-specific data were available for different income classes until 1951.

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 defini-

[29] 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..

tion 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.[30] 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.[31] 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).[32] What effect this has on the top income shares is an open question. As shown by Atkinson and Leigh (2005) it basically depends on how incomes were distributed among the married men and women.[33]

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 2.2 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 U.S.-dollars using the average exchange rate in 2004.

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30 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 the appendix where we also show that our findings are robust to alternative specifications of this reference total.

31 In 1951, the income statistics started being made based on a 10 percent individual sample (but with full coverage of high income individuals) of the entire population, despite the fact that the 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.

32 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 variations 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.

33 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.

Table 2.2: Top income thresholds and average incomes in 2004.

Thres-hold	Inc. (inc. cap. gains), USD	Income (excl. cap. gains), USD	Fractiles	N tax units (individ.)	Ave. Inc. (inc. capital gains), USD	Ave. Inc. (ex. cap. gains), USD
			Full pop.	7,395,545	27,875	26,801
P90	48,697	46,354	P90–95	369,777	55,021	51,625
P95	61,154	58,123	P95–99	295,822	72,943	73,665
P99	115,294	79,416	P99–99.9	66,560	156,915	118,619
P99.9	298,488	240,706	P99.9–99.99	6,656	497,511	344,027
P99.99	1,218,259	685,380	P99.99–100	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 7.36 SEK/USD.

2.3 The Basic Facts

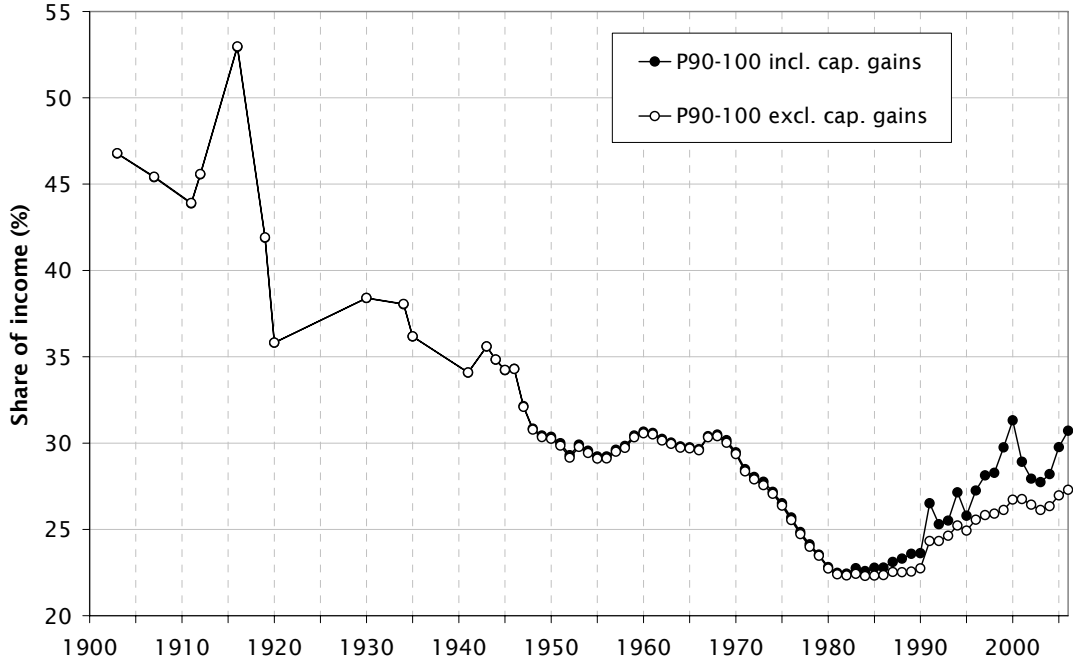
2.3.1 Top income shares 1903–2006

Figure 1 shows the evolution of the top decile income share in Sweden over the period 1903–2006. 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.[34] 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 2.3.2). The peaks in 1991 and 1994

[34] 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.

in the series including capital gains are well known effects of tax reforms which made it profitable to sell assets in these years.

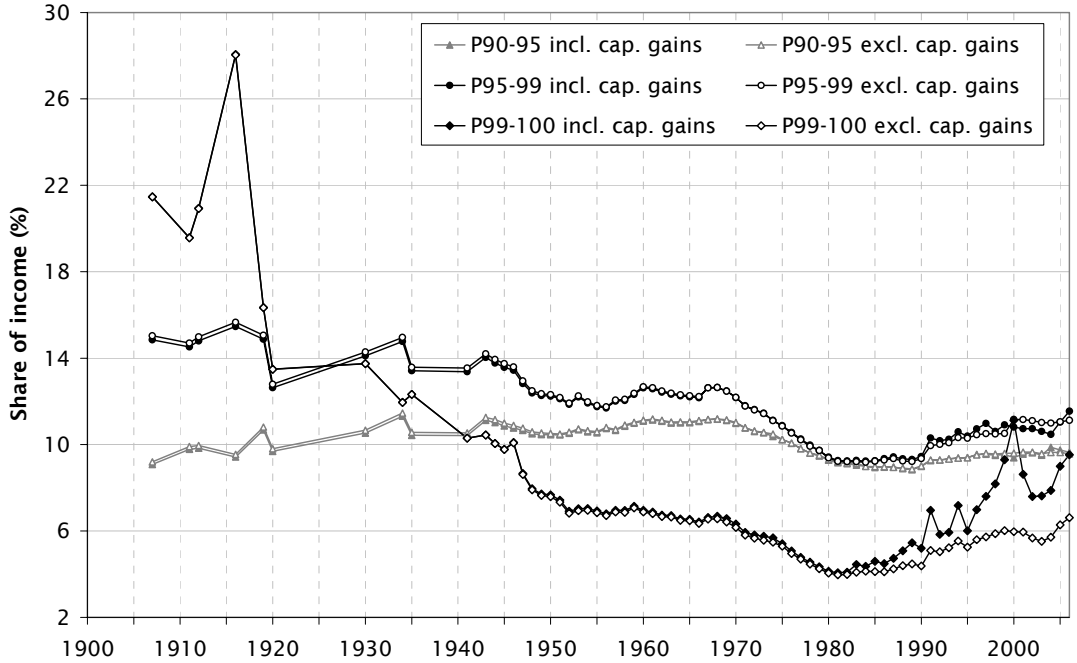
Figure 2.1: The top 10 percent income share (with and without capital gains), 1903−2006.



Source: Column 1 in appendix tables 2.A2 and 2.A3, respectively.

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 2.2 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 2.2: The P90−95, P95−99 and P99−100 (top 1 percent) income shares (with and without capital gains), 1903−2006.

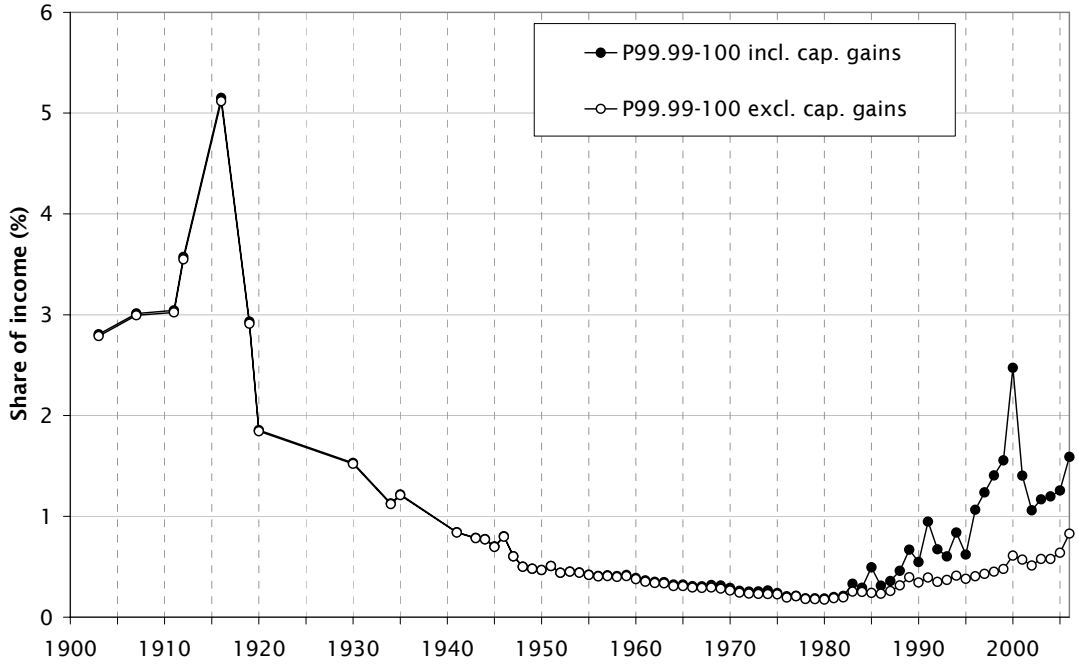


Source: Columns 3, 8 and 9 in Appendix tables A2 and A3, respectively.

The above patterns get even starker when considering higher fractiles within the top percent. Figure 2.3 shows the income share of the 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 aver-

age income in the 70s, and then rising to more than 100 times average income in the late 1990s (again when including capital gains).[35]

Figure 2.3: The top 0.01 percent income share (with and without capital gains), 1903−2006.



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

2.3.2 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 at the top 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 realized capital gains.[36] In Table 2.3, we decompose the decline in

[35] It is worth pointing out that some internationally very visible super-rich Swedes are not driving these results. Incomes of individuals such as IKEA's owner Ingvar Kamprad, and the Rausing family, founders of Tetra Pak, all high up on the Forbes-list of the world's wealthiest individuals, are not in our data as they do not reside in Sweden.

[36] As described in the appendix 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-

total top income shares (excluding capital gains) for various fractiles during three periods between 1912 and 1980.[37] 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).[38] 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 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.[39]

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.

37 These periods were chosen based on availability of data and to get one period pre-World War II (1912-1935), one period focusing on changes around World War II (1935-1951), and one period stretching from the start of the expansion of the Welfare State to the year when Swedish income equality peaked (1951-1980). One could be concerned that increases in the capital income shares would mainly reflect compensation for high inflation. However, the level of inflation has been sufficiently constant over the century to rule out that adjustments for differences in inflation would significantly change our results.

38 It is generally interesting to examine to what extent changes in top shares are driven mainly by relatively larger increases (or decreases) in the top fraction or in the denominator. It turns out that the 1910s is the only period where it is clearly one or the other that drives the change in the resulting top share, with the peak in 1916 being a consequence of much larger increases for the top fractiles, while the massive decline thereafter is due to an equally disproportionate increase for the P0-90 group.

39 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.

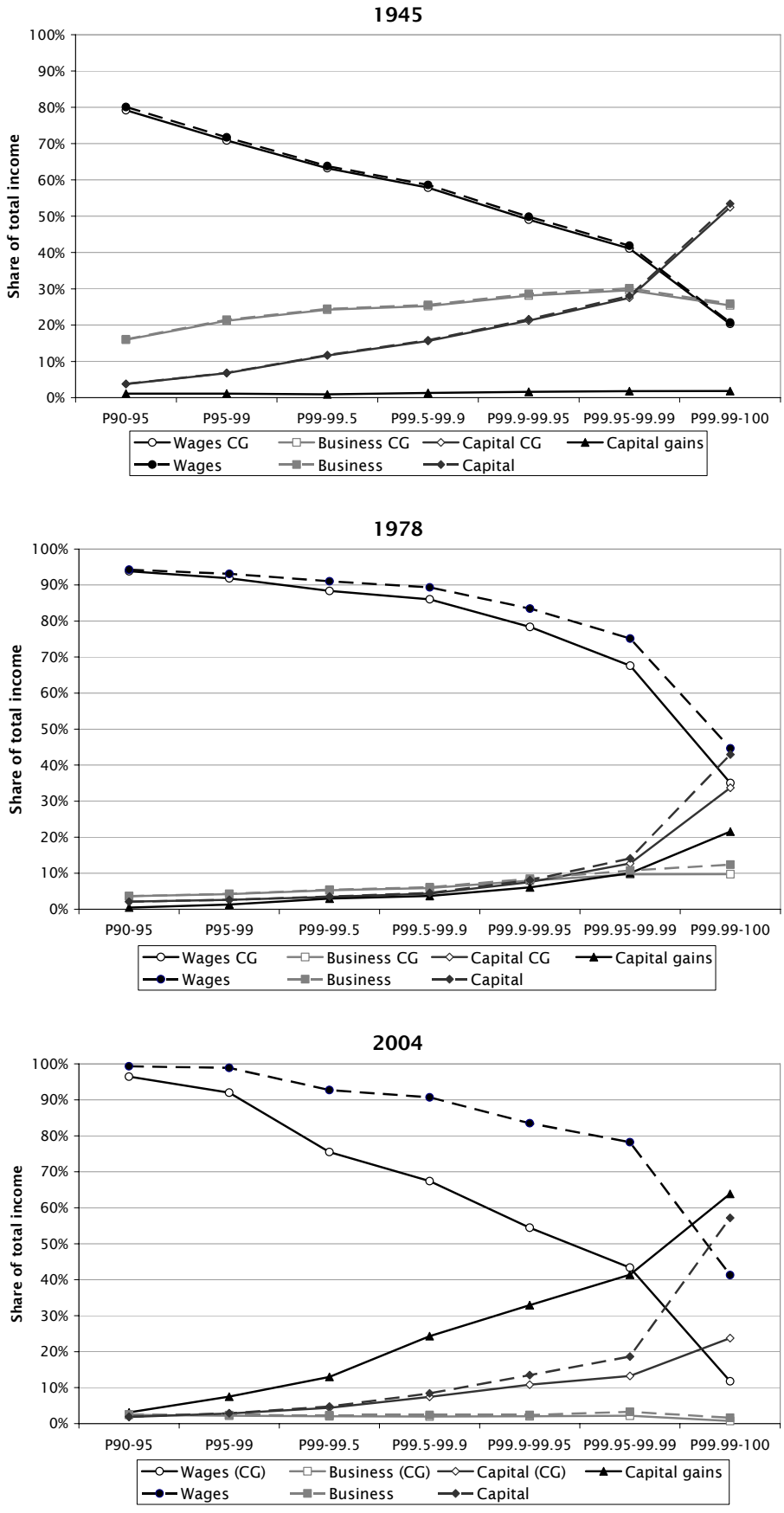
Table 2.3: Decomposition of changes in top income shares into wage-, capital- and other incomes over three sub-periods during 1912–1980.

		Percentage change in			
		Total income shares	with contribution by income from...		
			Labor	Capital	Business
1912–1935	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
1935–1951	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
1951–1980	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.

To further illustrate the large differences both within the top decile as well as over time Figure 2.4 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, in particular when we include realized capital gains. In fact, at the very top of the income distribution, the share of capital income when including capital gains is larger today than it is was in 1945.

Figure 2.4: Income composition within the top decile 1945, 1978 and 2004.

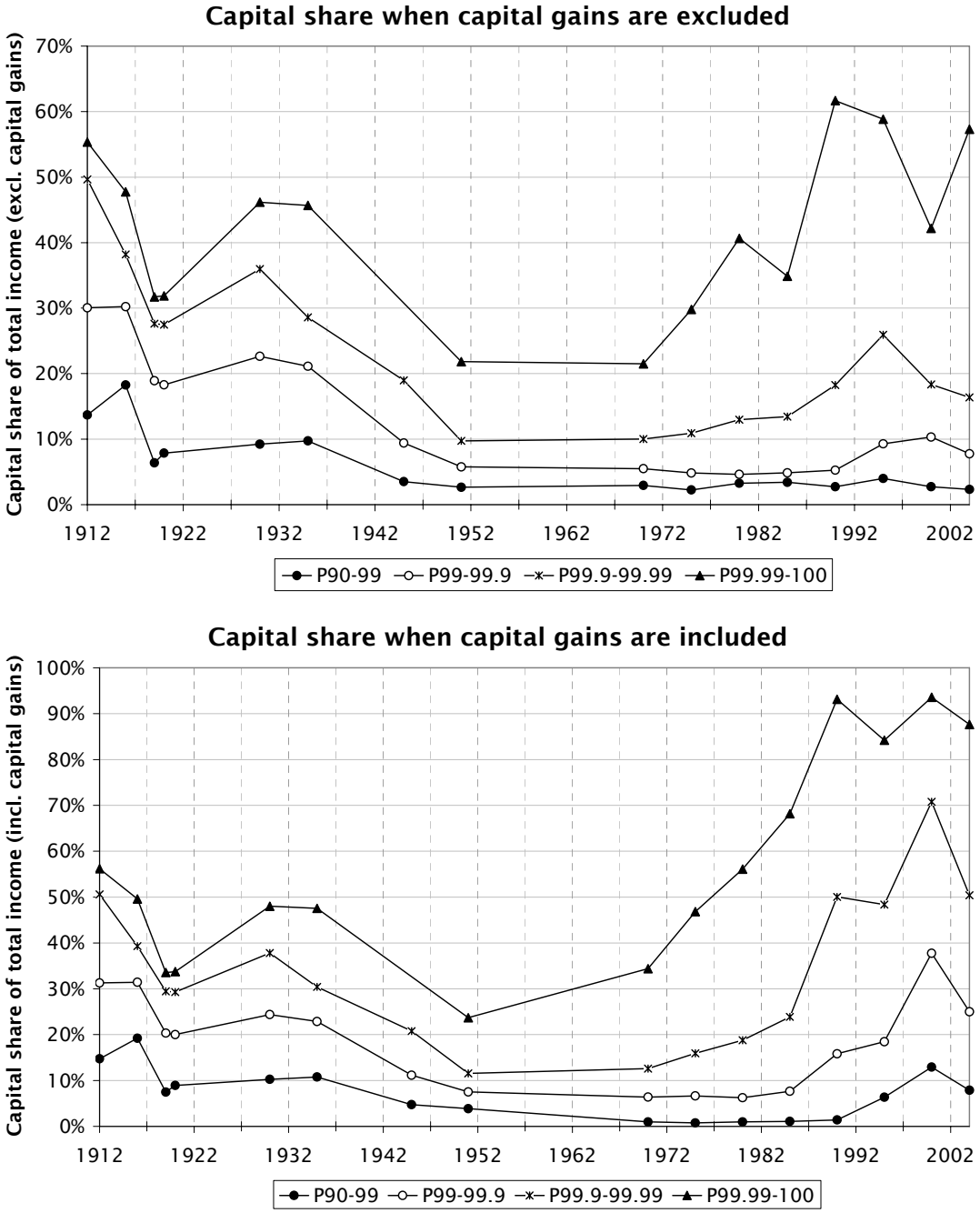


The distribution of capital incomes and its development over the period 1912-2004 is illustrated in Figure 2.5. The upper panel shows the capital share of total income for fractiles in the top decile when excluding capital gains, while the lower panel includes realized capital gains.[40] Both figures show a similar pattern. Capital incomes become less important for all top groups over the first half of the century. Starting in the 1970s, however the role of capital income for the top percentile becomes more important again and for the very top group the shares are even higher today than they were in the beginning of the period. When including realized capital income the recent increase is even more marked.[41]

[40] Observations pre-Second World War shares 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-Second World War shares are directly observed in the income statistics.

[41] One should note, however, that it is likely that our estimates of realized capital gains in the first half of the century are underestimated, and consequently the shares including realized capital gains are likely to be higher before the Second World War.

Figure 2.5: The evolution of capital income shares (excluding and including capital gains) within the top decile, 1912–2004.



The particular role of capital gains in the Swedish top income context, especially after 1980, is interesting. Capital gains are often excluded from studies of income inequality due to lack of data or due to their potentially problematic character (even though they constitute an undisputable part of income according to the classical Haig-Simons definition).[42] Ideally

[42] For example, the influential Luxemburg Income Study (LIS) does not contain capital gains at all. According to the Haig-Simons definition income should ideally be

we would, of course, like to include *all* capital gains, but according to Swedish tax law only *realized* gains constitute a taxable income and consequently this is what we can get information on. The main concern when realized capital gains are used in place of actual capital gains is the possibility that the realized gains actually represent increases over a longer period of time. This is problematic both in that such capital gains should be smoothed out over the years when they were made (but not realized) as well as in that it potentially introduces individuals in the top who are only there at the time of the sale of their asset. Furthermore it is, of course, somewhat arbitrary whether a real capital gain is realized at all. With respect to the first problem there is no doubt that we observe instances where, for example, changes in legislation made it more attractive to realize accumulated capital gains leading to likely overestimations of the top income shares for these years (the spikes in the series in 1991 and 1994 are traceable to sales being sales being relatively attractive due to tax reasons). It is not likely, however, that the series including capital gains introduce "new" individuals each year. Instead, it seems to be the case that the majority of capital gains are made by those with the highest earnings who year after year get additional income from capital gains (we come back to this in section 4.3 below).

Whether real capital gains that have not been realized would affect our shares depends on the distribution of such real gains. One may speculate that some assets are likely to be traded more frequently (such as financial assets) and therefore less likely to constitute large gains which have never appeared in tax records (not even in the form of realized gains possibly accumulated over several years) while others (such as housing) are more likely to fall into this category. If we think that real capital gains made by the top income groups are more likely to appear in the tax records (which could well be the case) we would risk overestimating their income share including capital gains when using realized capital gains. However, as Figure 2.5 above indicates, assets yielding interest and dividend are important in the top income groups (and have become increasingly so over the past decades) and given the very large increases in Swedish stock values (compared to housing, for example) we think that we would be making a more serious underestimation of the top income shares if we were to exclude capital gains altogether.

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measured as the value of consumption plus any increase in real net wealth, that is, it should include all capital gains.

2.3.3 Tax avoidance and evasion

Problems with tax avoidance and evasion are present in all studies of income inequality based on data from personal tax returns.[43] 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 (see the appendix for more details). The earliest official comment on the problem of tax evasion refers to 1919 when a special inquiry into the extent of evasion in the past five years was carried out (Statistics Sweden, 1923, p. 13*). Information about how this special inquiry was conducted is sketchy and it is therefore difficult to say what conclusions can be drawn about evasion activities. According to the available information it seems that evasion was concentrated in the top of the distribution but relatively small in relation to total income, but we do not know to what extent the top was targeted, nor the extent of the efforts to find evasion activities. Bentzel (1952) makes a more thorough calculation 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 estimates – between 4 and 6 percent of all incomes – for years in the 1980s and 1990s.[44]

Overall, 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" since the early 1980s using unexplained residual capital flows ("net errors and omissions") published in official balance of payments statistics. In a recent survey of the Swedish

[43] 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.

[44] Apel (1994) mainly captures underreporting among the self-employed, the study by Löfqvist (2001) estimate avoidance in the economy as a whole, while Malmer and Persson (1994) study the effects of the tax reform in 1991 on tax compliance.

household wealth concentration, Roine and Waldenström (2009) show that significant shares of wealth owned by the richest Swedes may be placed in off-shore locations. They estimate that somewhere between 250 and 500 billion SEK has left the country without being accounted for.

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.[45] 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. However, after 1990, and especially after 1995, these incomes become sizeable. When adding all of them to the top decile, its income shares during 1995–2004 increase moderately (by approximately 3 percent). When instead adding everything to the incomes of the top percentile, the income shares increase by about 25 percent which is equivalent to an increased share from about 5.7 to 7.0 percent. While this is a notable change, it does not raise Swedish top income shares over those in France (about 7.7 percent in 1998), the U.K. (12.5 percent in 1998) or the U.S. (15.3 percent in 1998).

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 possible exception of the past decades. 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 percentile, and when doing so this only amplifies what we find without this adjustment.[46]

2.3.4 Shares of total income vs. market income—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

45 Details on the calculations are available from the authors upon request.

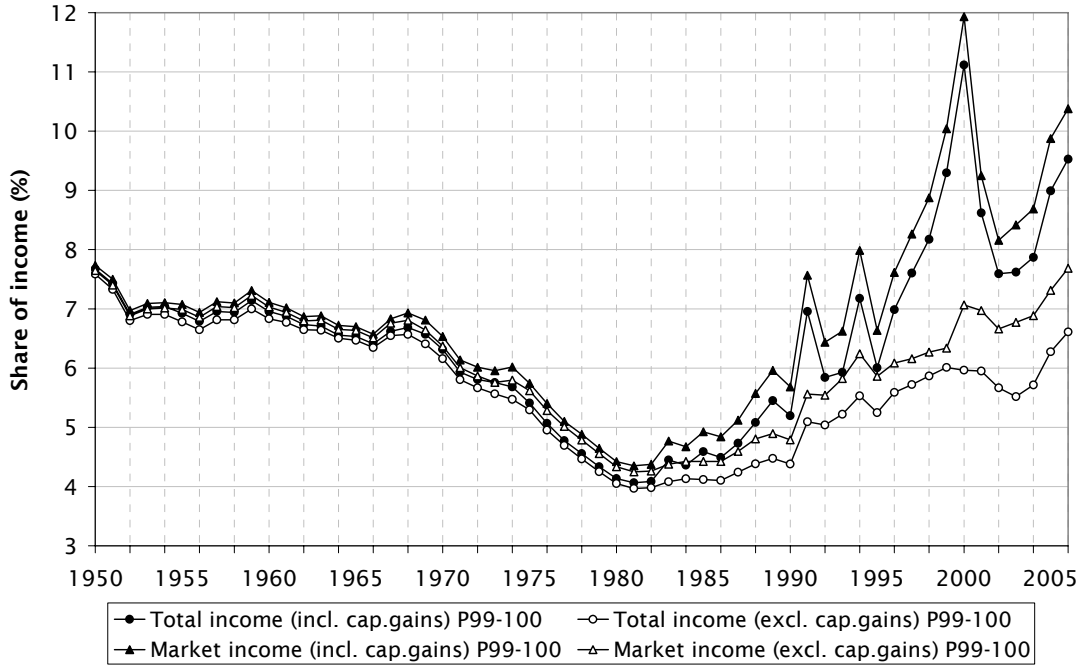
46 Roine and Waldenström (2009) contains calculations of how this possibly missing wealth would affect wealth concentration.

the most important transfer payments.[47] 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 2.6 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.

47 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 the appendix for details.

Figure 2.6: Total income shares vs. market income shares of P99–100, 1950–2006.



2.4 Explanations to the evolution of Swedish top income shares

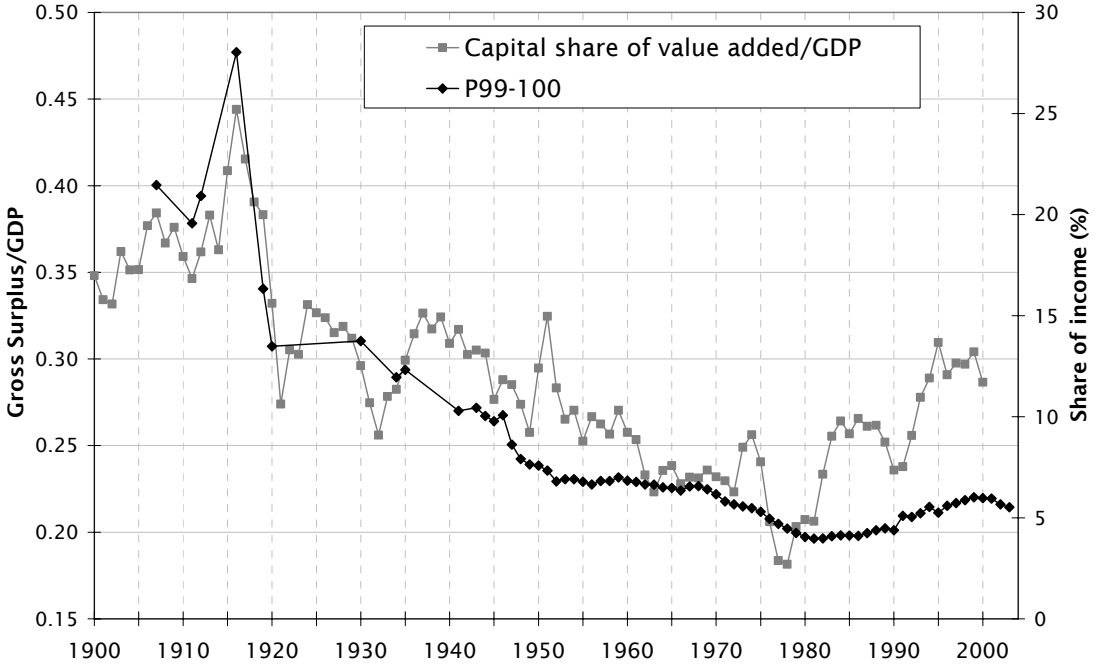
What accounts for the large declines of top income shares in the first half of the twentieth century, the steady decline during the expansion of the welfare state, the relatively sharp drops over the 1970s, and the increase in the recent decades (which is augmented when including capital gains)? This 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.

2.4.1 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 culti-

vated".[48] 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 return to the question of how good an approximation this is below). Figure 2.7 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 2.7: The capital share of value added as a share of GDP and the top 1 percent income share, 1903–2003.



Source: Data on the capital share of value added and GDP by activity come from Edvinsson (2005). Top income shares come from Appendix table 2.A2 col. 1.

The series are strongly correlated over the whole period (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.[49] If we take this share as a proxy for the share of GDP derived as a

[48] Quoted in Atkinson (1975, p 161).

[49] 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 ques-

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 who's 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.[50]

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 available.[51] 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 2.8 shows changes in 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

tion. 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.

50 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 1914–1915, to around 70 percent in 1916–1917 (after which it fell back down to 50 percent in 1918–1919), indicating that 1916 was a year when the income share of capital owners was very high compared to the years immediately before and after.

51 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.

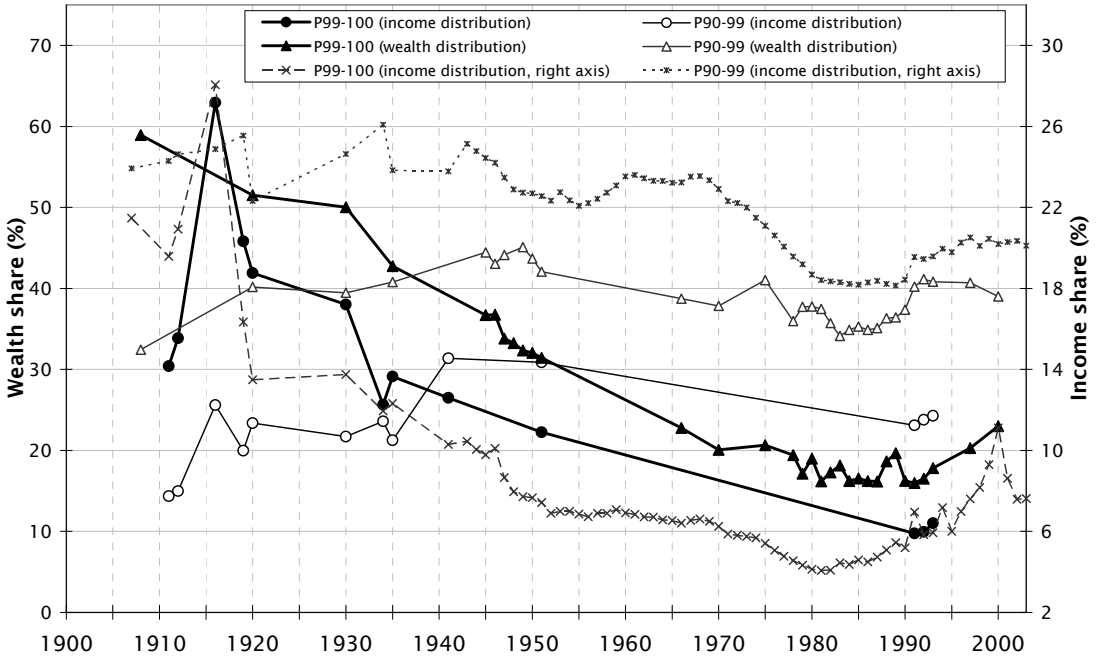
P90–99 of the respective distributions.[52] Not surprisingly, wealth shares by income class follow the fluctuations of income shares closer than do wealth shares, but the trends seem to be the same.[53] The wealth share of the top percent among the income earners, as well as among wealth holders, decrease quite dramatically over the century with slight recoveries over the past decades.[54] 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.

52 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 that 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.

53 The exception is the first observations in the series. There could, however, be 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.

54 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.

Figure 2.8: Wealth in top income and wealth fractiles, 1908–2004.



Source: Authors' own calculations.

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

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

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 2.7 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 2.4 gives an example of such calculations for P99–100.

Table 2.4: Contribution of changes in the top income earner's wealth shares on their income shares, 1911–1991.

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

Source: 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 2.4 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.[55] 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 2.7 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 major part and the most likely explanation for the continued decreasing top wealth share is that a larger share of new wealth was accumulated in the corporate and government sector and among the rest of the population, rather than in the wealthiest percent. However, over the past decades wealth concentration has increased and compared to many other countries Sweden today does have a surprisingly skewed wealth distribution.[56] A possible explanation for this is that the extensive welfare state takes away some of the typical reasons for, in particular the middle-class, to accumulate capital (such as saving for (children's) higher education, healthcare, pension, etc.) since these things are provided by the state.[57] This in turn means that income from capital is likely to be skewed and, in particular at times when returns to capital increase, the gains will be concentrated at the top of the distribution (we will discuss this in more detail in Section 2.4.3). As shown in Figure 2.5 above, the increasingly important role of capital for the very highest income earners seems consistent with such an explanation.

2.4.2 The role of taxation

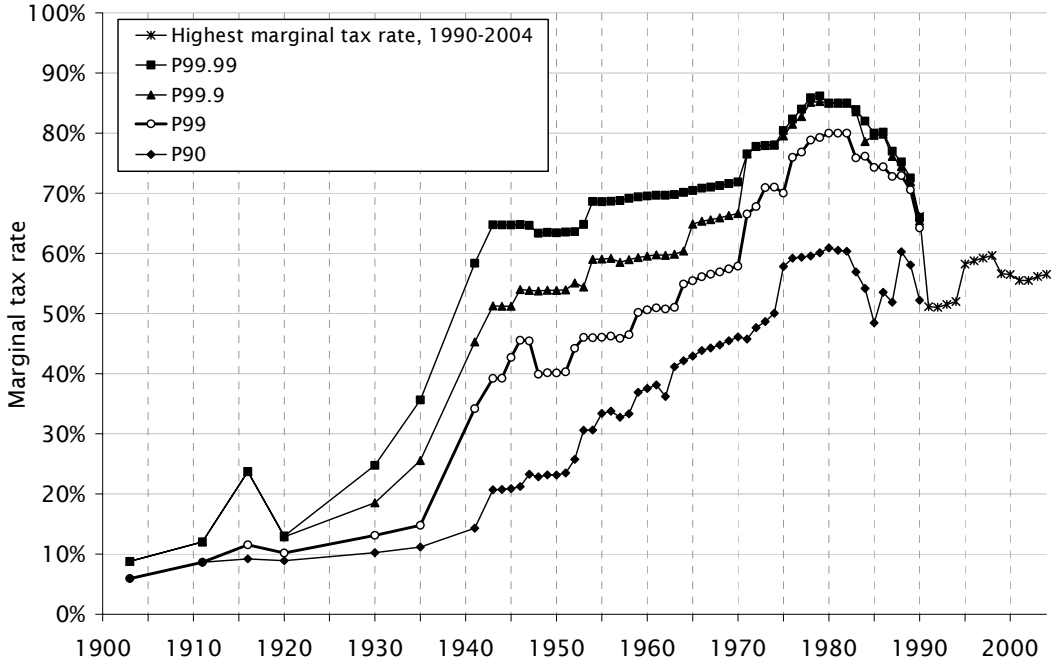
Many previous studies have shown that top incomes are sensitive to changes in top marginal income tax rates, either through their direct effect on work incentives or through more subtle processes of tax arbitrage (see Saez (2004) for an overview of this literature). For example, Saez and Veall (2005)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

[55] 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.
[56] Much of the high wealth Gini figures in Sweden is due to a large part of the population having negative net wealth (rather than high concentration at the top) but also in terms of the wealth share held by the top percent Sweden is second only to the US in high wealth concentration according to the first comparable estimates in the LWS (Luxembourg Wealth Study) project (Sierminska, Brandolini and Smeeding, 2006).
[57] Domeij and Klein (2002) study to what extent the public pension system in Sweden can account for the high wealth inequality in data.

income with respect to the net-of-tax rates for the top percentile being about unity.

In the case of Sweden, Figure 2.9 depicts the statutory marginal tax rates on incomes at the 90th, 99th, 99.9th and 99.99th percentiles over the past century.[58] 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 which introduced separate taxation of capital incomes at a lower, flat rate.

Figure 2.9: Top marginal tax rates, 1903–2004.



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).

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).[59] In particular, we relate the incomes of the tax units exactly at the 90th, 99th, 99.9th and 99.99th income percentiles to the marginal tax rates paid by precisely these tax units respectively. Although we employ a fairly standard approach towards estimating these

58 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).

59 Before 1943, there are no annual data and after the tax reform of 1990–1991, wages and capital income are taxed at separate rates.

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.[60] However, since we confine the study to top and extreme top income earners, these variations may not be of first-order importance. Then log-linear regressions are estimated for each percentile separately:

$$\ln(S_P)_t = \beta_0 + \beta_1\left(\ln(1 - MTR_P)_t\right) + \beta_2 t + \beta_3 t^2 + u_t\,, \qquad (2.1)$$

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.[61] 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 2.5 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

60 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.

61 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.

new fortunes. To the extent that new fortunes were created they most probably remained outside the personal sector.[62]

Table 2.5: Marginal tax effects on top incomes, 1943–1990.

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

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

2.4.3 The role of asset prices

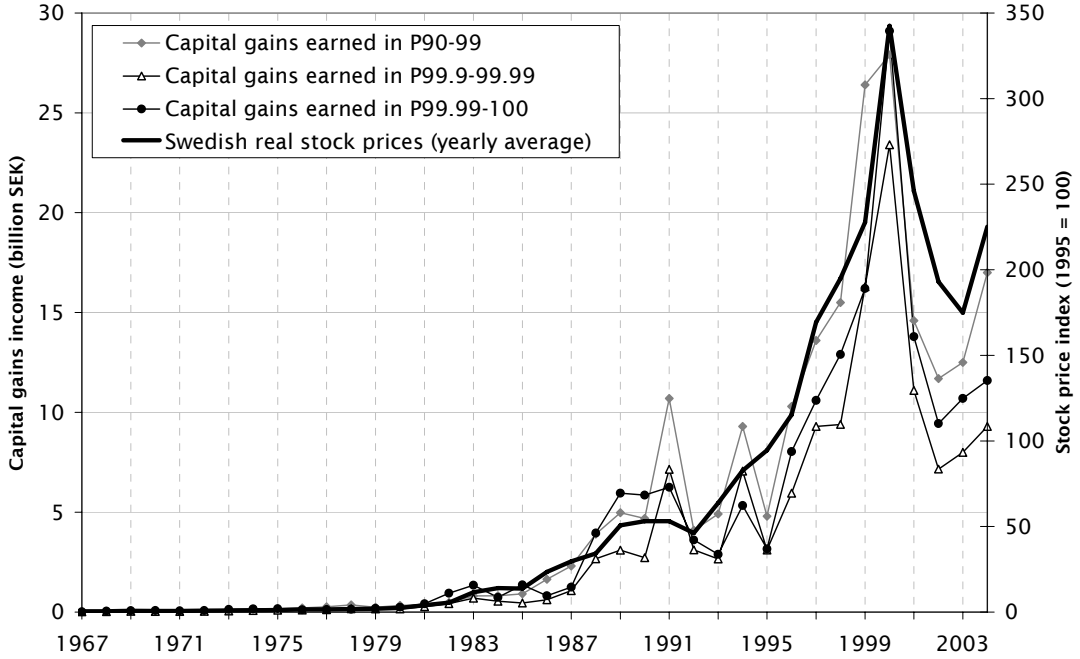
One aspect which stands out in our series over the past decades is the large difference in top income shares when realized capital gains are included or not. Whether capital gains should be included in the income concept is debatable and ultimately depends on the questions at hand.[63] When it comes 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 West-

62 The particular structure of ownership via various tax exempt institutions for tax reasons is documented in Henrekson and Jakobsson (2005).

63 In the case of Sweden the choice lies between excluding capital gains completely or using realized capital gains since data does not allow us to measure all capital gains. See for example Atkinson (1975, ch. 3), for a general discussion and, in particular Björklund, Palme and Svensson (1995) for an estimation of real capital income using assumed real rates of return on net wealth.

ern countries is remarkable.[64] Figure 2.10 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). 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.[65]

Figure 2.10: Capital gains in some top income fractiles and real stock prices, 1967–2004.



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

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

64 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.

65 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.

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.[66] Furthermore, Magnusson (2004) uses panel data for the period 1991-2002 and shows that the top of the income distribution is not primarily represented by low-income earners with large one-time capital gains.[67] 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.

2.5 International comparisons

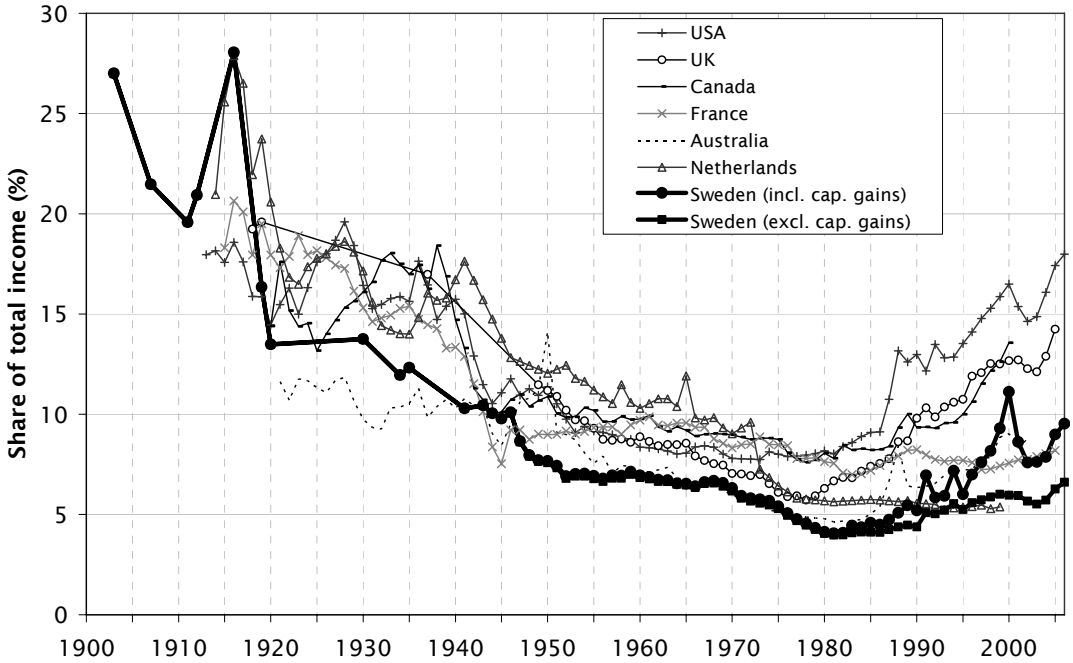
In Figure 2.11 the long-run development of top percentile income shares in a number of Western countries is shown alongside that of Sweden.[68]

66 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 for details.

67 She studies two sub-periods, 1991–1997 and 1996–2002 and shows that about one fifth (19.1 and 19.2 percent, respectively) of those in the top 0.1 percentile in 1997 and 2002 when including capital gains belonged to the P0–90 group six 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.

68 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 U.K. and the Netherlands compared to those for the U.S. and France. See Atkinson (2005b) for details.

Figure 2.11: Income shares of the top percentile in Western countries, 1903–2006.



Source: Atkinson and Piketty, (2010).

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, 2007c; Piketty and Saez, 2006), is practically non-existent in Sweden. Table 2.6 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 Swedish top shares dropped by one fourth but elsewhere they decreased by much less or even increased.

Table 2.6: Percent change in top percentile shares in World War II.

	Percentage change in the top percentile income share in...						
Period:	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.

The third fact that stands out in Figure 2.11 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.[69] This division between the "Anglo-Saxon" and "Continental European" experience has received a lot of attention in the recent literature.[70] 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.[71] 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.[72]

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-

69 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.

70 See e.g. Piketty and Saez (2006).

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

72 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).

education story.[73] Our data for Sweden also seems to indicate that a skill-biased technological change story is not the 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 2.4, 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.

2.6 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 their development. We have also tried to put our results into 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 sta-

[73] 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).

ble. 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 explain 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 suggests 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. By 1950 top income shares had already 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, but remained virtually unchanged in Continental Europe, the Swedish development depends largely on how realized capital gains are treated. If we include realized capital gains, Swedish top income shares look like the Anglo-Saxon ones, if we do not include them top shares have increased slightly but still resemble the Continental European experience. Despite the potential problems with including realized capital gains in a study such as this, we believe there are good reasons to think that our data do capture a real development in terms of top incomes.

The picture of the Swedish income distribution that emerges from this study is in some ways quite different from that which is typically found in the literature. In some respects this is due to a different focus. Most previous studies have examined how the tax and transfer systems have achieved equalization of disposable income in relatively recent times, often focusing on the lower end of the distribution. We have instead been concerned mainly with gross income and its long-run concentration in the top of the distribution. This means that many of our findings, such as the large drop in income inequality before 1950, and the extent to which this is driven by the top percentile, are new findings complementing—rather than conflicting with—the previously emphasized achievements of the welfare state during the 1960s and 1970s. But when

it comes to the development since 1980 our series do indicate that a revision of the standard view may be needed. Even though previous studies have pointed out that inequality has increased over the past decades the important role that capital incomes has played for the top of the distribution has not been fully appreciated and, in particular, most studies have not included the further increase in inequality from including capital gains. Furthermore, as the focus has previously been on broader inequality measures it has not been noted to how much of the recent developments are driven by the very top of the distribution. As such points may change not only our factual understanding about what has happened, but also our theories about the causes, further research is necessary to get a more complete view of income inequality in Sweden.

Appendix 2.A: Sources

Table 2.A1: List of income sources, 1903–2006.

Year	Main source [a), b)]	Tables	Pages	Series [c)]
1903	Flodström (1906)		1,3	
1907	Flodström (1909)		XI-XII	FU
1911	Flodström (1914)		11	FU
1912	Flodström (1915)		13*	FU
1916	Statistics Sweden (1921)	C,E	21*-27*	SOS
1919	Statistics Sweden (1923)	C	21*	SOS
1920	Statistics Sweden (1927)	21	558-559	SOS
1930	Statistics Sweden (1937)	11	268-269	SOS
1934	SOU 1936:18	10	47	SOS
1935	Statistics Sweden (1940)	21	88-89	
1941	Quensel (1944)	VIII,IX	22-23,28	
1943	Skattetaxeringarna (1) ... 1944	L	31*	SOS
1944	Skattetaxeringarna (1) ... 1945	Q	43*	SOS
1945	Skattetaxeringarna (1) ... 1946	P	42*	SOS
	Statistics Sweden (1951), *Census 1945*	4	2-3	SOS
1946	Skattetaxeringarna (1) ... 1947	R	47*	SOS
1947	Skattetaxeringarna (1) ... 1948	V	51*	SOS
1948	Skattetaxeringarna (1) ... 1949	Q	48*	SOS
1949	Skattetaxeringarna (2) ... 1950	R	48*	SOS
1950	Skattetaxeringarna (2) ... 1951	S	51*	SOS
1951	Skattetaxeringarna (2) ... 1952	Å,8	63*,26-27	SOS
	Statistics Sweden (1956), *Census 1950*	7	20-21	SOS
1952	Skattetaxeringarna (2) ... 1953	Z,8	53º,26-27	SOS
1953	Skattetaxeringarna (2) ... 1954	Z,8	49º,26-27	SOS
1954	Skattetaxeringarna (2) ... 1955	Z,8	47º,26-27	SOS
1955	Skattetaxeringarna (2) ... 1956	Z,8	46º,28-29	SOS
1956	Skattetaxeringarna (2) ... 1957	Z,8	47º,28-29	SOS
1957	Skattetaxeringarna (2) ... 1958	Y,8	47º,28-29	SOS
1958	Skattetaxeringarna (2) ... 1959	Å,8	50º,34-35	SOS
1959	Skattetaxeringarna (2) ... 1960	J,8	28º,32-33	SOS
1960	Skattetaxeringarna (2) ... 1961	I,10	28º,32-33	SOS
1961	Skattetaxeringarna (3) ... 1962	I,10	28º,34-35	SOS
1962	Skattetaxeringarna (3) ... 1963	J,10	29º,34-35	SOS
1963	Skattetaxeringarna (3) ... 1964	J,10	43º,36-37	SOS
1964	Skattetaxeringarna (3) ... 1965	K,10	44º,36-37	SOS
1965	Skattetaxeringarna (3) ... 1966	J,10	43º,116-117	SOS
1966	Skattetaxeringarna (3) ... 1967	L,9	43º,118-119	SOS
1967	Inkomst och förmögenhet 1967	2,7	44-45,58-61	SOS
1968	Inkomst och förmögenhet 1968	2,7	50-51,64-67	SOS
1969	Inkomst och förmögenhet 1969	2,7	50-51,64-67	SOS
1970	Inkomst och förmögenhet 1970	2,7	48-49,62-65	SOS
1971	Inkomst och förmögenhet 1971	3,12	68-69,90-93	SOS
1972	Inkomst och förmögenhet 1972	1,3,14	54-5,70-1,102-5	SOS
	Inkomst- och förmögenhetsförd. 1972	7	19	SM N 1973:94
1973	Inkomst och förmögenhet 1973	3,14	68-69,100-103	SOS

1974	Inkomst- och förmögenhetsförd. 1974	1,7	11,33	SM N 1976:4
1975	Inkomst- och förmögenhetsförd. 1975	1,7	13,35	SM N 1976:23
1976	Inkomst- och förmögenhetsförd. 1976	1,7	18,41,43	SM N 1977:24
1977	Inkomst- och förmögenhetsförd. 1977	1,7	22,46-47	SM N 1978:22
1978	Inkomst- och förmögenhetsförd. 1978	1,4.1,4.2	29,38,41	SM N 1980:9
1979	Inkomst- och förmögenhetsförd. 1979	1,4.1,4.2	20,27,30	SM N 1981:9.1
1980	Inkomst- och förmögenhetsförd. 1980	1,4.1,4.2	7,14,17	SM N 1976:4
1981	Inkomst- och förmögenhetsförd. 1981	1,4.1,4.2	7,14,17	SM N 1976:4
1982	Inkomst- och förmögenhetsförd. 1982	1,4.1,4.2	14,21,24	SM Be 1984:6.1
1983	Inkomst- och förmögenhetsförd. 1983	1,4.1,4.2	14,21,24	Be 20 SM 8501
1984	Inkomst- och förmögenhetsförd. 1984	1,3.1,3.2	15,19,22	Be 20 SM 8601
1985	Inkomst- och förmögenhetsförd. 1985	1,2.1,2.2	15,18,21	Be 20 SM 8701
1986	Inkomst- och förmögenhetsförd. 1986	1,2.1,2.2	17,20,23	Be 20 SM 8801
1987	Inkomst- och förmögenhetsförd. 1987	1,2.1,2.2	17,20,23	Be 20 SM 8901
1988	Inkomst- och skattestatistik 1988	1,2.1,2.2	16,19,22	Be 20 SM 9001
1989	Inkomst- och skattestatistik 1989	1,2.1,2.2	16,20,23	Be 20 SM 9101
1990	Inkomst- och skattestatistik 1990	1,2.1,2.2	15,20,23	Be 20 SM 9201
1991–2006	Tables acquired from Statistics Sweden			

a) Some publications titles are abbreviated. Skattetaxeringarna (1) = Skattetaxeringarna samt inkomstfördelningen inom yrkesgrupper; Skattetaxeringarna (2) = Skattetaxeringarna samt fördelningen av inkomst och förmögenhet inom yrkesgrupper; Skattetaxeringarna (3) = Skattetaxeringarna samt fördelningen av inkomst och förmögenhet taxeringsåret.

b) The publications since 1982 also have the subtitle *Totalräknad statistik*.

c) "FU" denotes *Finansstatistiska utredningar* (Fiscal Surveys) and "SOS" *Sveriges officiella statistik* (Swedish Official Statistics).

Appendix 2.B: Details of the Swedish income data

2.7 Concepts of income – overview

The Swedish income tax system contains several different concepts of income and deductions, and their basic relationships are shown in table 2.B1.

It should be noted that there are some particularities added to this scheme over the centuries, as will be described in the following. In short, the most completely reported total incomes are those in 1971–2006, followed by those in 1943–1970 when the tax authorities subtracted deficits in sources (mainly interest payments). Between 1903 and 1942, the incomes reported in the sources are incomes assessed for state taxation, meaning total net income *minus* municipal taxes paid and (from 1911) *plus* a share of taxable personal wealth. We have therefore deducted the wealth shares in all years when these are included and for the years after 1921 when municipal taxes were also progressive (flat rate taxes do not affect the top income shares and are therefore ignored), these are added to the incomes.

Table 2.B1: Income concepts, deductions and taxes.

Concept	Description and relationship with other concepts
SRI	Total income (Swedish term: *Sammanräknad inkomst*): Income from labor, capital, business, capital gains
– UF	Deficit in source of income (*Underskott i förvärvskälla*), e.g., interest rates.
= SRNI	SRNI = SRI – UF: Total net income (*Sammanräknad nettoinkomst*). Main income concept in the Swedish income of Statistics Sweden during 1943–1970. In this study used for the whole period.
– EA	Basic deductions for, e.g., state pension contributions (*folkpensionsavgift*, 1921–1935), social security fees (*sjukförsäkringsavgift*, 1955–1974), security charges (*egenavgifter*, 1993–).
= KTI	KTI = SRNI – EA: Locally assessed income (*Kommunalt taxerad inkomst*).
– KGA	Local free allowance (*Kommunala grundavdrag*). Since 1903, originally a regional adjustment for differences in cost of living (*kommunalt dyrortsavdrag*).
= KBI	KBI = KTI – KOA: Locally taxable income (*Kommunalt beskattningsbar ink.*).
LTAX	LTAX = KBI*(Local tax rate): Local taxes paid (*kommunala skatter*). These are mainly proportional, but during 1921–1937 there were two local progressive taxes, municipal progressive tax (*Kommunal progressivskatt*) and equalization tax (*Utjämningsskatt*), which are added to the other taxes.
– AA	Deduction for losses (*Allmänna avdrag*): After 1920, this was mainly local taxes (LTAX). Other losses were state pension fees (*Folkpensionsavgifter*) and sick leave insurance fees (*Sjukförsäkringsavgifter*).
– LTAX	
= STI	STI = KTI – AA – LTAX: Centrally assessed income (*Statligt taxerad inkomst*). This is what we use in our series, but between 1911 and 1942 (except for the census material of 1920, 1930 and 1935), the tax laws defined STI as STB.
or STB	STB = STI + "Share of personal taxable wealth": Centrally assessed amount (*Statligt taxerat belopp*). During 1911–1947. The wealth share added to STI was 1911–1937 1/60 of taxable wealth and 1938–1947 1/100. Note that the official income statistics used total net income as main concept from 1943, why STB did not appear in the data after 1942.
– SGA	Central free allowance (*Statligt grundavdrag*). Introduced in 1911 to mitigate effect from living in high-cost of living areas (*statligt dyrortsavdrag*, 1911–1962), but also including deductions for wife (*hustruavdrag*, 1919–1948) and children (*barnavdrag*, 1911–1948). Moreover, additional allowances were possible in case of accident or long-term illness (*avdrag för särskilda förhållanden*),
= SBI	Centrally taxable income (Statligt beskattningsbar inkomst).
STAX	STAX = SBI*(State income tax rate): State income taxes paid (*Statlig inkomstskatt*). There were different kinds of central government income taxes.

2.7.1 Concepts of income in the data, 1903–1942

In the years 1903 and 1907, the incomes reported in the tabulate tax returns data are incomes assessed to the progressive state income tax of 1902 (*till statlig inkomst- och förmögenhetsskatt taxerad inkomst*). This implies all income from labor and capital, and fixed rates of return from agricultural and other real estates in order to capture the otherwise non-reported in-kind revenues from farming (see, e.g., Flodström 1909, p. VIII). Deductions for deficits in sources of income (e.g., interest pay-

ments) were allowed, and thereby this income concept is a "total net income".[74]

In the years 1911, 1912 and 1916, the incomes reported in the statistical sources are amounts assessed for the state income and wealth tax, which means in practice "total net income" plus a share, one sixtieth in 1911–1937 and one hundredth in 1938–1947, of taxable personal wealth. This income concept, "total net income" plus a wealth share, was called "centrally assessed amount" (*taxerat belopp*). We remove the wealth shares in the years (1911, 1912 and 1916) using data on the amount of wealth shares in each income class in the year 1912 (Flodström 1915, pp. 47*–48*).

For 1919, the reported incomes are again assessed amounts, but this time we use the wealth shares in 1920 (Statistics Sweden, Statistical Yearbook 1929, pp. 286–287) to remove the shares in 1919.

For 1920, we use another source of data: Census material (reported in Statistical Yearbook 1929). It reports incomes in the form of centrally assessed incomes, i.e., total net incomes not including wealth shares. However, the incomes used when reporting the taxes paid are based on the tax statistics and then using incomes in the form of "assessed amounts", i.e., including the wealth shares. We use wealth share information from 1920 to remove the shares.

For 1930, we use the census material in Statistics Sweden (1937), in which the income concept is the centrally assessed income. Although this implies that we do not need to remove any wealth shares, local taxes paid were since 1921 made deductible from the total net income before arriving at the centrally assessed income. This means that we have to add local taxes to the assessed income in order to arrive at a comparable income concept with earlier (and later) years. Since most local taxes are proportional and hence hit all types of income earners similarly, their effect on top income shares is limited. However, between 1921 and 1937 there were two *progressive* local taxes in place, called "local progressive tax" (*kommunal progressivskatt*) and "equalization tax" (*utjämningsskatt*). These must be added to the centrally assessed income for comparability reasons. For 1930, we add the progressive local taxes as they are described in Söderberg (1996, pp. 76–77).

For 1934, the data come from a special inquiry made by the Ministry of Finance, based on a total collection of all tax filers reporting assessed amounts on SEK 8,000 income or above. For income earners with lower incomes, statistical calculations and spurious evidence were used

74 In *Nordisk Familjebok* (Uggleupplagan, 1910, p. 667) under the entry "income tax" (*Inkomstskatt*) says that deductions are allowed for all costs that arise when earning the income and for interest payments.

(SOU 1936:18, pp. 34ff). The income concept reported is hence centrally assessed amount, and we remove the wealth shares using information on wealth shares across income classes from the census of 1935/36 (Statistics Sweden 1940, pp. 88–89). Furthermore, we add the progressive local taxes that are listed for each income class.

For 1935, the material is the taken from the census of 1935/36 (Statistics Sweden 1940) and based on a 20 percent individual-based sample of the population. The incomes collected are centrally assessed incomes, i.e., without including wealth shares. We add progressive local taxes based on their amounts listed for the income year of 1934 (see above).

For 1941, we use data from yet another special inquiry made by the Ministry of Finance based on all tax returns amounting to an assessed amount of SEK 8,000 or above (Quensel 1944, p. 28). Quensel makes corrections to make the incomes equivalent to centrally assessed incomes (called *korrigerat belopp*), i.e., including local taxes and without wealth shares.

2.7.2 Concepts of income in the data, 1943–2006

In the period 1943–1970, Statistics Sweden introduced a new system for reporting the Swedish tax-based income distribution. Unlike the previous tabulations, however, a new official main concept of income was introduced: "total net income" (*sammanräknad nettoinkomst*), defined as total income less deductions of deficit in any income source.

In 1971–1990, Statistics Sweden changed main income concept to "total income" (*sammanräknad inkomst*), which is defined as above but without deducting deficits in sources. A fairly important change in terms of the reported income statistics occurred in 1974, when the government decided to make all social benefits (e.g., unemployment insurance, social security transfers, state pensions) liable to taxation. This implied that incomes filed on tax returns, and hence also the official incomes used in the income statistics, now started to include social security transfers. Since our main focus is on the incomes at the top, where these benefits are relatively small and even insignificant, this rules-based change has limited bearing on this study. Therefore, we only make an adjustment on the reference total income by adding sums of social security transfers on the national level (published in the Statistical Yearbooks of Statistics Sweden) for all years before 1974 whenever such data were found (starting in the 1940's).

In 1991–2006, Statistics Sweden once again changed its main concept of income when producing their income statistics, now to *total earned income* (*sammanräknad förvärvsinkomst*), defined as the sum of labor and business income. Hence, capital income and capital gains were

excluded. Fortunately, Statistics Sweden continued publishing a few summary tables in which they used total income (*summa förvärvs- och kapitalinkomst*) as concept of income, and these are series used by us.

2.8 Composition of income

2.8.1 Definitions of sources of income

As already mentioned above, the Swedish tax laws and income statistics define the sources of income that are to be specified on the tax returns. These definitions have been remarkably stable and the only major change came with the tax reform of 1991. Unfortunately, the published income statistics has not always reported compositional data across different income levels. In particular, before 1967, when such reports were made each year, these data are available only in two Censuses: 1945 (Statistics Sweden, 1951) and 1950 (Statistics Sweden, 1956).

The sources of income used before 1991 were the following six:[75] labor income (*inkomst av tjänst*), mainly wages and salaries; capital income (*inkomst av kapital*), mainly interest earnings and dividends; entrepreneurial income (*inkomst av rörelse*), mainly firm profits and royalties; farm income (*inkomst av jordbruksfastighet*), mainly of sales of agricultural and forestry products and leases; real estate income (*inkomst av annan fastighet*), mainly rents and in-kind payments and capital gains (*inkomst av tillfällig förvärvsverksamhet*) from sales of real estate and securities.[76]

After 1991, the number of income sources was reduced to three: labor (*inkomst av tjänst*), business (*inkomst av näringsverksamhet*) and capital (*inkomst av kapital* (*överskott*)). Compared with the earlier period, labor income was defined in basically the same way. Business income, however, included not only the previous entrepreneurial income, but also all of farm incomes and a small part of real estate income emanating from rental apartments. In the new concept of capital income, the previous capital income was included but also most of former real estate income coming from private rental and, notably, all forms of capital gains.

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75 In the late 1960's, there was also a specific entry for income from partnerships (*inkomst av delägarskap i vanligt handelsbolag etc*), but this was included in entrepreneurial income from the 1970's onwards and we do this also for these years when it was reported separately.

76 Detailed descriptions of the income sources are found in, e.g., Statistics Sweden (1945, pp. 50–67) and Statistics Sweden (1975), *Inkomst och förmögenhet 1973*, pp. 25–26.

For analyses spanning the whole period, we use four main income sources primarily following the definitions of the post-1991 period (for computational reasons): wages, capital, business and capital gains, defined in Table B2.

Table 2.B2: The four sources of income.

Income source	Description
Wages	Includes wages and salaries and is defined similarly before and after 1991.
Capital income	Includes interest earnings, dividends and real estate income. Before 1991, "capital income" (interests and dividends) and "real estate income" are included.[77] After 1991, interest earnings and dividends (*inkomst av ränta*), private rental income (*inkomst av uthyrning av privatbostad*) and special rental income (*inkomst av positiv räntefördelning*) are included.
Business income	Mainly income from privately held firms. Before 1991, "entrepreneurial income" and "farm income" are added. After 1991, "business income" is used.
Capital gains	Net gains from sales of real estate and other assets.

2.8.2 Estimating the share of capital income in top incomes, 1912–2006

Thanks to early wealth data in the tax statistics for income earners in different classes of total income, we are able to construct shares of capital income of total income as far back as 1912 and for some more years until the postwar period when we use the compositional sources described previously.

Specifically, the shares before 1945 are computed by assuming that capital income is a fixed rate of return flowing from the individuals' net wealth. Information about net wealth in different classes of income is available from the tax-based income statistics due to the fact that 1/60 of that wealth was to be added as taxable income until 1938 when the share was reduced to 1/100 and 1943 when it was removed altogether (recall Table 2.1). The approach was previously used by, e.g., Flodström (1915,

[77] Formally, one part of the real estate income was also included in business income after 1991, namely income from public rental buildings. However, this only concerned so-called "physical persons" (private individuals) and not "judicial persons" (public and private companies) which instead had to report all of their income (including that from real estate) as entrepreneurial income and which was the largest part of the two incomes. Leif Johansson at Statistics Sweden (from a discussion on June 15, 2005) also would believe that the absolute majority of the real estate income before 1991 should refer to what would after 1991 have been included in capital income. For these reasons, we place all of real estate income in the capital income in our long-run series.

pp. 46–47) and Statistics Sweden (1927). Capital income is then computed as the annual rate of return from this wealth. We assume that the yield is flat and the same for all income earners disregarding the (unlikely) possibility of systematic differences in portfolios across income levels. The yields used are 5 percent for the years 1912, 1916 and 1919, 5.5 percent in 1920, 4.5 percent in 1930 and 3 percent in 1935. These are the same rates that Flodström and Statistics Sweden use (except for 1920 when they use 5 percent).[78] Unlike them, however, we can also motivate our choice of these rates by referring to three other reference interest rates from the same particular years. Specifically, the yearly averages of the minimum lending rate (*diskontot*) set by the Swedish central bank, the average deposit rate at Swedish savings banks and the effective Swedish Government bond yield were in 1912: 4.81, 4.35 and 4.80; in 1916: 5.23, 4.76 and 5.09; in 1919: 6.38, 5.08 and 5.71; in 1920: 6.92, 5.16 and 7.00; in 1930: 3.71, 5.22 and 4.18; and in 1935: 2.50, 3.59 (in 1933) and 3.30 (*Svensk Sparbankstidskrift* 1934, p. 825). However, Östlind (1945, p. 261) shows numbers of effective yields of stock exchange-listed stocks during World War I being somewhat lower that what we use (4.0 percent for 1916). At the same time, Beije (1946, pp. 64–87) shows the market yields of new corporate bond issues during 1912–1920 more in line with the ones we use. Finally, the share of capital income of total income across the various top fractiles is computed using Pareto interpolation in the same way as in the rest of the compositional analysis.

2.8.3 Realized capital gains and the identity of top income earners, 1991–2006

One problem with using aggregate income statistics ordered in classes of total income is that we have problems assessing the true distributional effects of capital gains income. In short, we do not wish to have our top total income earners being populated by low wage income earners selling their house or some old bonds and thereby jumping from the 50th to the 99th percentile.[79]

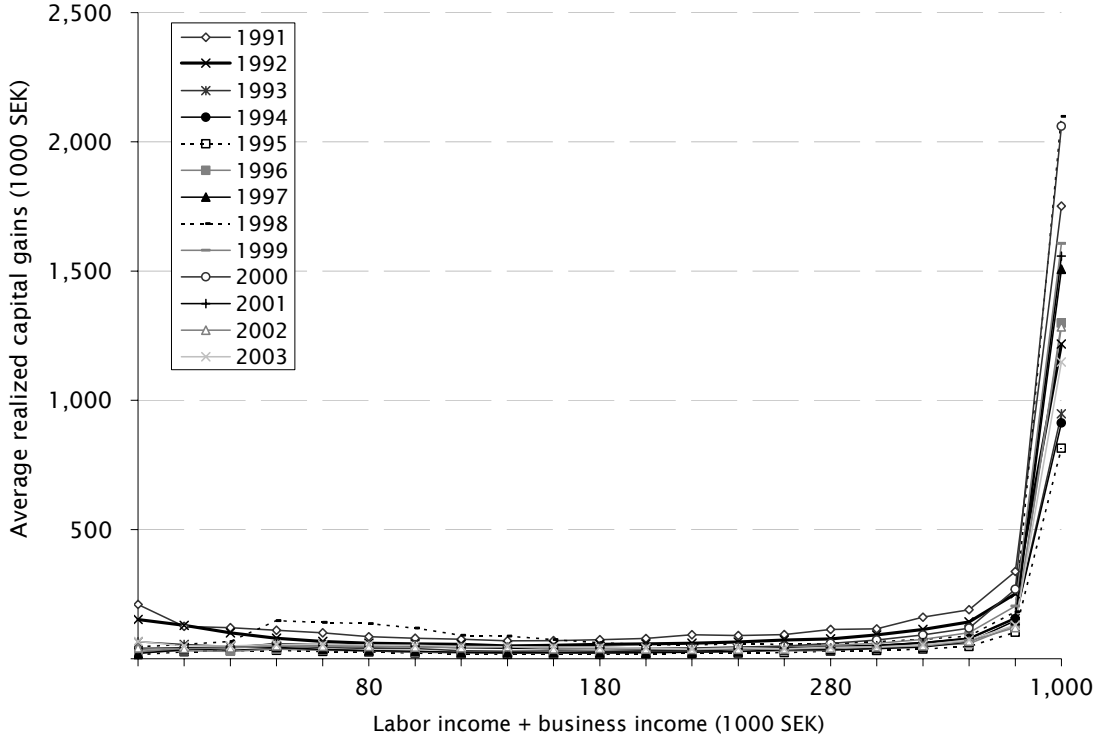
A simple way to at least rule out some of the ambiguity is to use the tabulations by Statistics Sweden of average gross capital gains income (i.e., before deductions against interest payments or capital losses) in classes of earned income, from 1991 onwards. Since the compositional analysis above showed that business income is only a minimal part of earned income during this period even for top total income earners,

78 Unfortunately, no income data were collected in the Census of 1940, why we have no information about wealth shares in different classes of income.

79 This has previously been shown by Saez and Veall (2005) not to be the case among top income earners in Canada.

earned income in practice means wages and salaries. The results of this exercise are shown in Figure 2.B1, where the distributions of realized capital gains are plotted across classes of labor income for each year in 1991–2003. Apparently average capital gains are highest for those who also earn the most, i.e., at least for this late subperiod of the study we find no support for the hypothesis that realizations of capital gains create a large turnover of people in our income distribution and that a constantly significant share of top income earners is low wage income earners.

Figure 2.B1: Average gross capital gains income in classes of earned income, 1991–2003.



2.9 Concepts of tax units

The Swedish income statistics have used two main definitions of tax units over the twentieth century. Before 1951, the tax unit is the *family*, meaning married couples or single households, both with any under-aged resident children. After 1951, the tax unit is the *individual*. On top of these main types, there were some minor changes mainly during the latter period which are discussed in this section.

2.9.1 Income earners (tax units), 1903–1950

Income earners in the Swedish income statistics refer to physical persons who lived in Sweden during the income year and who also filed a per-

sonal tax return.[80] The Swedish income statistics was family-based until 1950, which meant that families with at least one income earner earning more than the lowest taxable income threshold should file one tax return. Married couples filed a joint tax return.

2.9.2 Income earners (tax units), 1951–2006

For the period 1951–2006, the Swedish income statistics changed to being individual-based, meaning that individual tax returns form the basis for the income distribution data that we have used in this study. It should be noted that the definition of income earners according to published income statistics is typically, but not always, identical with the contemporaneous tax legislation. In particular, although the *income statistics* switched from using households to individuals in 1951, the Swedish *tax system* continued taxing families until 1971. But the transition was gradual between 1954 and 1971. Before 1954 the wife's income was automatically assessed as a part of her husband's income. Between 1954 and 1965 spouses filed separate tax returns after which their incomes were lumped together and taxed as one tax unit according to a specific rate of "joint taxation" (*sambeskattning*). Between 1966 and 1970, the system was further adjusted so that married couples could choose whether to have their income being taxed separately or as one couple according to a specific scale. Finally, in 1971 the Swedish tax system changed to being fully individual-based and married couples were thereafter treated as two income earners.

In the period 1943–1950 the income statistics followed the tax system by being household-based, using the total number of filed tax returns as primary material. Due to processing constraints, however, only a few variables could be collected for each tax unit and therefore it was decided to switch to a sample-based system that allowed more background information to be collected and analyzed. Because of this, Statistics Sweden decided to start using a nationally representative ten percent sample of the tax population as basis for its income statistics from the year 1951 onwards. This basically meant that the income statistics became individual-based despite still having a family-based tax system since all persons with positive income had to file an individual tax return regardless of whether they were eventually taxed jointly with their spouses or parents.[81] The ten-percent sample was drawn from the population of all adults aged 16

[80] Formally, unfinished death estates and family foundations are also counted as income earners, but they only represent about 1 percent of the total number of income earners.

[81] The switch to using a population sample followed the instructions of a governmental statute (*kungörelse den 21 december 1951*, No. 832).

years or above and born on either the 5th, 15th or 25th in each month.[82] To avoid sampling too few high income earners, these groups were fully sampled.[83] This is, of course, important in the context of studying top incomes as it means that we do not have to worry about missing top income earners due to sampling in this period. The sample-based income statistics lasted until 1967 when Statistics Sweden returned to basing the income statistics on the complete tax population with the help of new data processing techniques.

Apart from these major changes in the income earner definitions, there have been several smaller adjustments and related changes that have affected the income earner concept. For example, in income years 1972 and 1973 all retirees receiving public pension only (*folkpensionärer*) were granted extra deductions so as to avoid paying taxes.[84] Another change happened in 1978 when both employers and employees were required to report all incomes paid and received, which in itself increased the tax liable population by a couple of hundred thousand income earners who were most likely previously avoiding taxes altogether.

The main impact that these changes of tax units have in our study is on the choice of reference population and how to homogenize this over time. Details of how we do this are presented below.

2.9.3 Lowest taxable income threshold

Sweden is an outlier internationally in terms of the large share of income earners that have been obliged to file taxes over the twentieth century. Figure 2.B2 shows the lowest income level that obliging a tax return (in Swedish *deklarationspliktgräns* or *"skattestreck"*), which is negatively correlated with the number of people included in the tax population. During the first decade 1903−1910, the level was relatively high, SEK 1,000, representing between one and two times the overall average income (reference total income divided by reference total population). Over time, the level was increased nominally, shown in the right scale in the figure. Already in 1920, only if one earned a fifth of the average income one had to file a personal tax return and since the 1950's the level has been lowered even further in relative terms.

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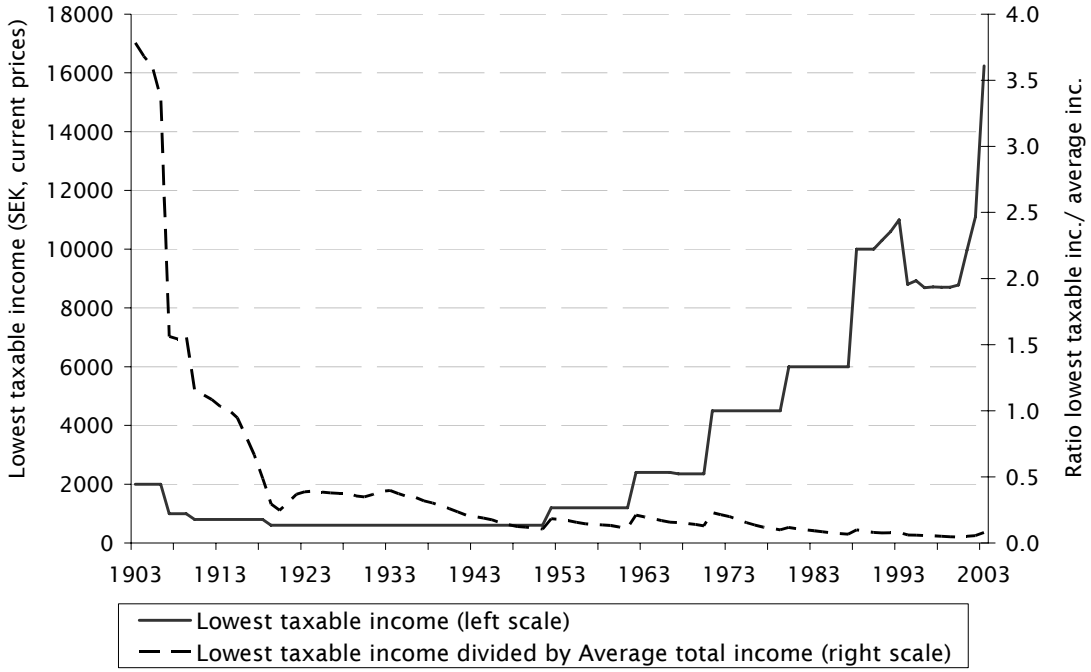
82 Having in fact 365.25 days calendar year, the chosen sample was actually smaller than 10 percent of the population and instead of multiplying each income earner with 10 (for those jointly assessed 5) it should have been 10.146 (and 5.340). As noted by Statistics Sweden in *Inkomst och förmögenhet 1968*, p. 26 (see Appendix sources), this could have some minor effects on the comparability of the data before and after 1967.

83 The definition of high income was SEK 30,000 or above during 1951–59 and with income above and SEK 50,000 or above in 1960–66.

84 See, e.g., Statistics Sweden, *Inkomst och förmögenhet 1973*, p. 15.

It should be noted that although the fairly drastic discrete changes in the threshold in, e.g., 1911, 1919, 1952, 1962 and 1971, changed the number of tax filers by several percentage points, this does not affect our analysis since we always observe the absolute top income earners as well as the reference total population.[85]

Figure 2.B2: Lowest taxable income and its share of average total income, 1903–2003.



[85] The doubling of the threshold in 1962 was estimated to decrease the number of income earners by about 125,000, representing about 3 percent (Statistics Sweden, *Skattetaxeringarna samt fördelningen av inkomst och förmögenhet taxeringsåret 1963*, p. 21).

Appendix 2.C: Details of the Swedish income data

2.10 Construction of reference totals

Here we explain in greater detail exactly how our reference totals have been constructed. The different reference totals are used below to test the robustness of our series to the choice of reference total.

2.10.1 Reference total population

As described above, there has been one major change in Swedish tax legislation in the Twentieth Century which has fundamentally changed the concept of tax unit, namely the 1970 tax reform shift from a family based tax unit to an individually based concept. In terms of *tax statistics*, however, this change occurred (at least to some extent) already in 1951. Before this tax statistics were based on the entire tax population and figures referred to "tax units" i.e. individuals as well as married couples counted as one income earner.[86] Before 1951 the obvious reference population is therefore the adult population (which we take to be everybody aged 16 or above) less married women (since a married women formed one tax unit together with her husband). After 1951, however, statistics changed to being based on a representative sample (ten percent) of the population with married couples, where both had income, now treated as two income earners in the statistics even though they were still *taxed* as one unit. The problem is that in cases where the women did not work, or had low income, she was not necessarily counted.

This means that income statistics between 1951 and 1971 when the individually based system was fully introduced (for labor income, tax on capital income remained family based) is a mix between a family based system and an individually based system including some women (those with substantial income) but not all. Starting 1971, the reference total is again relatively unambiguous, now obviously being the adult population.

Apart from the quantitatively more substantial decisions discussed above there are a number of smaller adjustments which can be considered. Over the course of a year individuals move in and out of the country, some die, some turn 16 after the population count but before taxes are filed, etc. Based on recent years when we believe that the coverage in the tax statistics is close to complete we have concluded that correcting for deaths is most important. The tax statistics before 1951 contain tax re-

[86] Note that this is the case for *tax statistics* before 1951 but not income figures in the Census (*Folkräkningen*).

turns for those who died during the previous year (the income year), in the period 1951–1973 these are not present in our data, but from 1974 and onwards they are again part of the statistics. We have therefore added deaths to our reference total for the population before 1951 and after 1973.[87] For these periods we therefore add the number of deaths during the year when calculating the reference total population.

In terms of choosing the appropriate reference population the period 1903–2004 can, hence, be divided into the following three periods: 1) 1903–1950, the total population aged 16 or above minus married women, 2) 1951–1970, the total population aged 16 or above minus women likely to be excluded in the statistics, 3) 1971–2006, the total population aged 16 or above.

For the period 1903–1950 the reference total population is:

The population aged 16-	(from Statistics Sweden, Population statistics, *SCB Programmet för befolkningsstatistik*)
– married women	(from Statistics Sweden, Statistical Yearbook of Sweden, *Statistisk Årsbok,* various years)
+ deaths during the year	(from Statistics Sweden, Statistical Yearbook of Sweden, *Statistisk Årsbok,* various years)

For the period 1951–1971 our preferred reference total population is:

The population aged 16-	(from Statistics Sweden, Population statistics, *SCB Programmet för befolkningsstatistik*)
– married women (no/low inc.)	Edvinsson (2005, p. 140) reports data on men and women in paid work and labels married women not in paid work "housewives". Part of this group

87 To be precise, deaths are not in the statistics 1951-1966 (though they are taxed) while they are separetly accounted for in the period 1967-1973 and hence we can exclude them from our tables. References for the treatment of deaths are e.g.: for the period before 1951, *Statistics Sweden, Inkomst och förmögenhet 1969, p. 11,* for the period 1951-1966, *Statistics Sweden, Skattetaxeringarna…1966*, p. 32, for the period 1967-1973 *Statistics Sweden, Inkomst och förmögenhet 1969*, p. 13-15, 20-21, and after 1974 *Statistics Sweden,*SCB SM N 1976:4 (p.2) and SCB OE 21 SM 0501.

	does have income anyway so we subtract a declining share of "housewives" in the period 1951-1967 (based on smoothing shifts in the ratio between the number of tax returns and the reference population, as well as the income shares.[88] In 1967 (when individual taxation became voluntary) the deducted share shifts more drastically (as does the number of income earners in the statistics) and in the period 1967 to 1970 the remaining share of "housewives" are subtracted.

For the period 1972–2004 the preferred reference total population is:

The population aged 16-	(from Statistics Sweden, Population statistics, *SCB Programmet för befolkningsstatistik*)
+ deaths during the year	(added after 1973 since they reappear in the statistics in 1974, from Statistics Sweden, Statistical Yearbook of Sweden, *Statistisk Årsbok,* various years)

To check the robustness of our results we have calculated a number of alternatives which differ mainly in the period 1951–1971. These are sometimes not "alternatives" in the sense that we may know that they are clear over-, or underestimations, but rather they serve the purpose of giving bounds to our estimates.[89] Figure C1 shows the population aged 16 and above, the number of tax returns and the different alternative specifications. The alternative specifications are the following:

Preferred series =	(Pop 16-) − Married W + deaths for 1903-1950, (Pop 16-) − (Decreasing

[88] We start by subtracting 60 percent of married women (which is about 75% of the housewives) and then decrease this share with about 2 percentage points per year until 1967 (as this is about the rate at which the ratio of housewives to married women changes over this period) and then allow for a larger shift between 1966 and 1967 when (judging from the upward jump in the number of tax returns) the number of women with own reported income increased more.

[89] Only Tax units 3 is really an alternative. Here we subtract all housewives in the period 1951-1967.

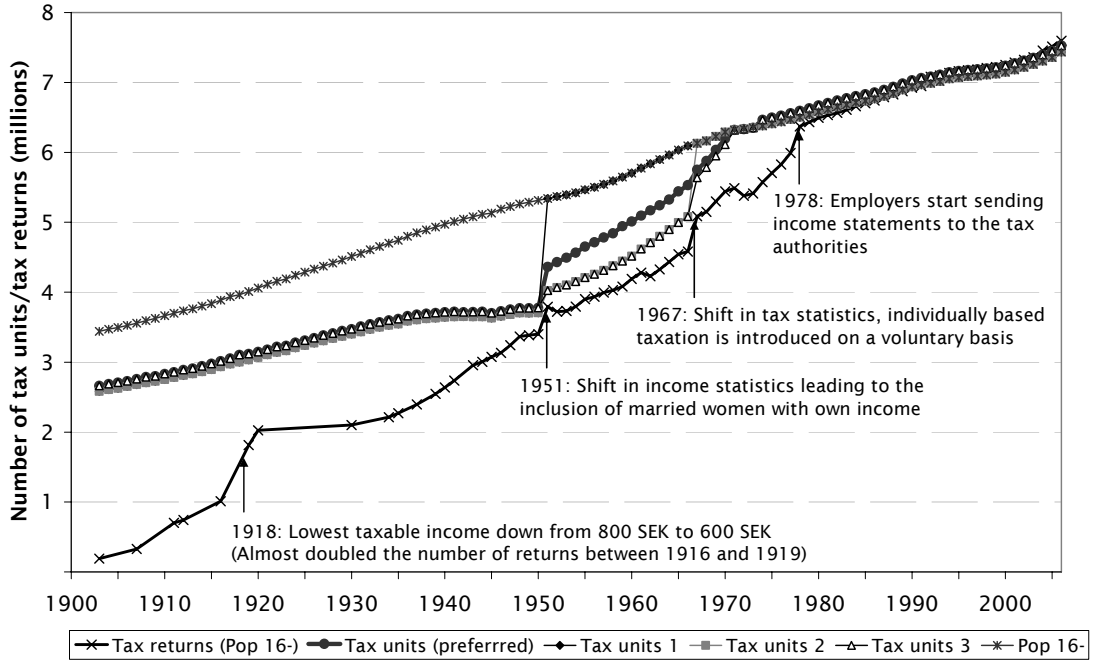
share of women 1951-1971), and from 1967 − Pop 16-, subtracting declining share of housewives 1967-1971 and adding deaths after 73 (1974-).

Tax units alt 1 = (Pop 16-) − Married W for 1903-1950, and (Pop 16-) from 1951.

Tax units alt 2 = (Pop 16-) − Married W for 1903-1950, (Pop 16-) − Housewives for 1951-1966, and (Pop 16-) from 1967.

Tax units alt 3 = (Pop 16-) − Married W + Deaths for 1903-1950, (Pop 16-) − Housewives for 1951-1966, (Pop 16-) − Declining share of housewives for 1967-73, (Pop 16-) + Deaths for 1974 onwards.

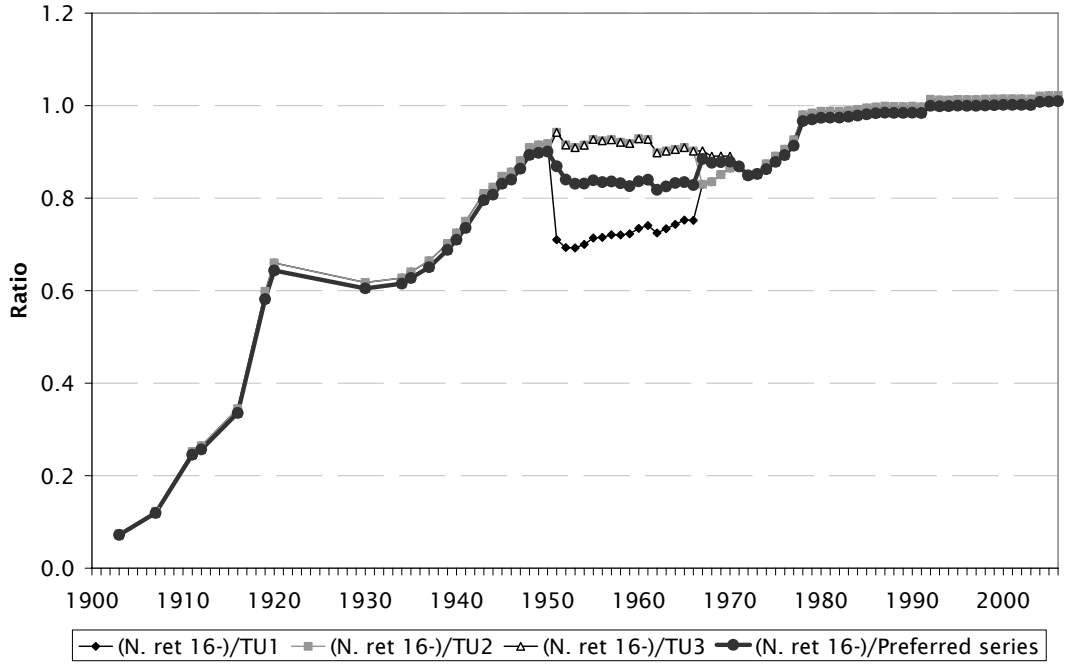
Figure 2.C1: Tax returns and alternative population totals, 1903–2004.



Looking at the behavior of the ratio between the number of tax returns and our reference series, especially around the critical years when there are changes in the definition of tax unit, i.e., 1951, 1967 and 1971, indicates which series seem best. Put simply, we do not want there to be any sudden jumps in the ratio unless there are underlying real changes in the tax base. To exemplify, in 1919 the tax threshold was dropped from SEK

800 to SEK 600 leading to a real major expansion of the tax base. Here we expect the ratio to go up sharply. In 1951, however, the change was only in the type of statistics, not in the actual underlying number of tax eligible individuals (units), so here we should not expect a break in the ratio. To the extent that the number of returns increase this should be compensated by an increase in the reference total. At the same time, we do not, of course, wish to make *ad hoc* adjustments to keep the ratio fixed, since there are also real changes in the number of tax filers. Figure 2.C2 shows the ratio between the number of tax returns and our preferred series with indications of critical breaks.

Figure 2.C2: Ratios between tax returns and alternative reference populations, 1903–2004.



2.10.2 Reference total income

In constructing our reference total income we have used three basic approaches. The first two are based on that we can arrive at the "Preferred Total Income Definition" either by 1) starting with "Total Personal Sector Income" and deducting items not included in our preferred definition, or 2) by starting from the "Tax Statistics Income" and adding items not included in the tax base and income estimates for individuals not included in the tax statistics. The third –which is mainly included as a point of reference – is based on the assumption that our preferred income total can be approximated as a fixed share of GDP.

Starting with the first approach, we need homogenous estimates of "Total Personal Sector Income" from which we want to deduct items not

included in our preferred definition of total income. The best homogenous National Accounts series which span the whole period which we study are those by Edvinsson (2005). These, however, contain only aggregate series for *Wages and salaries of employees (including social benefits)* and *Imputed labor income of self-employed (including social benefits)*. To these we have added aggregate *capital income* and *property income* reported in the tax statistics giving us an estimate of "Personal sector total income".[90] This, hence, becomes:

	Wages and salaries of employees (including social benefits (Edvinsson, 2005)
+	Imputed labor income of self-employed (incl. social benefits) (from Edvinsson, 2005)
+	individual capital income (from *Taxeringarna…*, 1922–1988, and corresponding sources thereafter, and estimated before 1922).
+	individual property income(same as for capital income above)
=	Estimated "Personal sector total income"

This estimate fluctuates around 0.7 times GDP (calculated from the expenditure side, reported in Edvinsson 2005) with a standard deviation of 0.03.

Starting from the tax statistics income we use the following method to get at our preferred reference total for income:

	Tax statistics income (the aggregates from the same sources as the income statistics described above, sometimes corrected for wealth shares)
+	items not included in the tax base (we make the assumption that all important sources of income including certain social security benefits are included in the tax base after 1974 (hence abstracting from child allowances, *allmänt barnbidrag,*

90 These are available from the aggregate taxation statistics *Taxering till inkomst- och förmögenhet* 1922-1988, for the years before we add shares based on the observations 1922, and after 1988 we add the corresponding figures in the new tax statistics.

and study grants, *studiebidrag,* which are tax free) and add aggregate government expenditures for unemployment benefits (*arbetslöshetsersättning*), payments for sickleave (*sjukpenning*) and payments for mothers (*moderskapsförsäkring*, which in 1974 was replaced by "parenthood insurance", *föräldrarförsäkring,* which was taxed) based on figures in the Statistical Yearbook of Sweden from 1948- (before they are not listed but can be assumed to be a small share).

\+ estimated income for "non-filers" (in our preferred specification we take (reference population - tax filers) × (0.8 times the tax threshold). As an alternative specifications we use 0.25 times the average income of tax filers).

= "Preferred reference total" (starting from the tax statistics income)

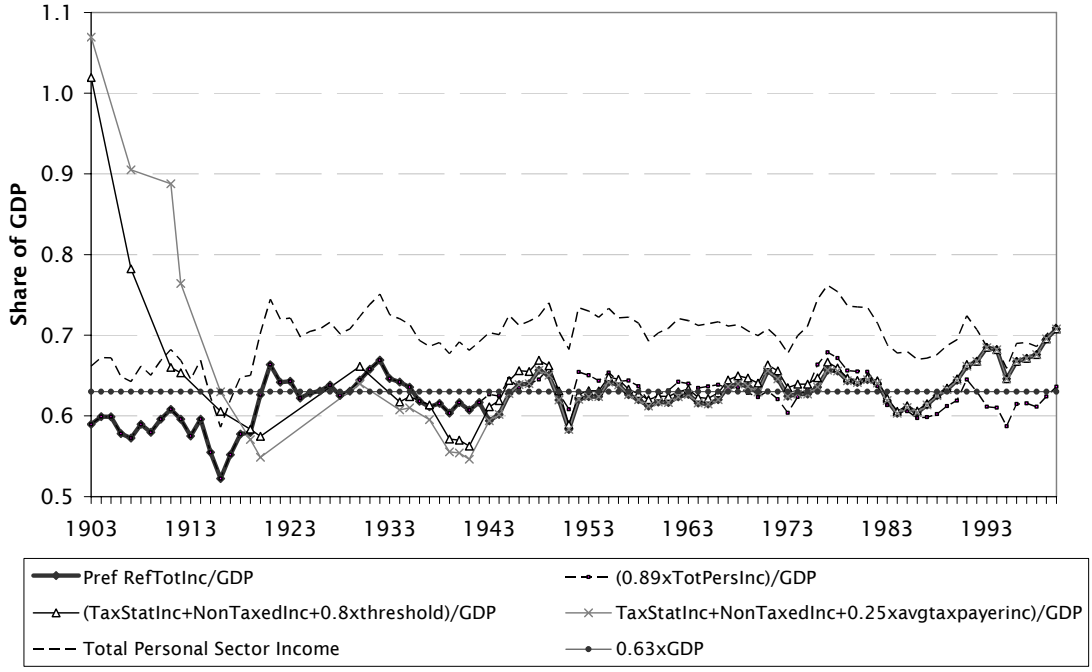
Figure 2.C3 shows the alternative specifications over the whole period as shares of GDP, as well as in relation to 0.63 times GDP. What we can say with some certainty is that the estimate of "Personal sector total income" is an over estimate of our preferred reference total. We can also say with some certainty that at least since 1974 the tax statistics income is relatively close to our preferred reference total since most people file taxes and everything we wish to include as income is included in the tax base.

We can also note that in the period 1930–1990 our "Preferred reference total" calculated starting with the tax statistics income follows the estimated "personal sector total income very closely. In fact, taking 0.89 times the latter, yields numbers which follow the former with very small deviations.[91]

Furthermore, we note that for the early years (1903–1920) imputing 0.8 times the threshold (or 0.25 times average income) clearly yields over estimates of reference income. This is to be expected since when most individuals are below the threshold small changes in assumptions about their average income make a big difference and at this point in time the average income amongst tax payers was certainly much higher then later implying that imputing similar shares to non-filers as later means overestimating their income a lot.

[91] The standard deviation is 0.02 and the maximum deviation is 0.05.

Figure 2.C3: Different reference totals for income as shares of GDP, 1903–2004.

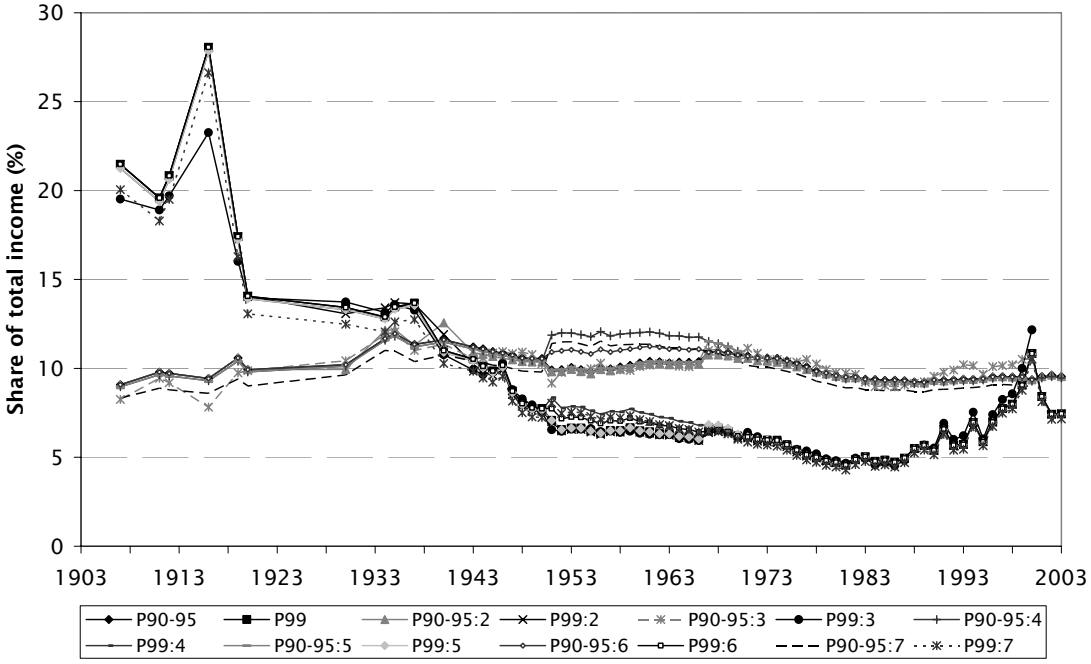


Given the behavior of these series we have chosen to use 0.89 times our estimated "personal sector total income" as our reference total for the period 1903-1942 and then (as tax statistics become yearly) our calculated reference total income starting with tax statistics income. As with the reference total population we have calculated top income shares using a number of alternatives as well.

2.11 Sensitivity of using different reference totals

Using different reference totals can potentially have an important impact on the income shares. For some single years, such as the spike in top income shares in 1916, the difference can be up to five percentage points between the alternative that gives the lowest and highest estimate respectively. For some periods, such as in the 1950s when the treatment of women in the statistics is unclear, the variation can be up to 3 percentage points over some periods. Overall, however, the main trends in the results are robust to which alternative is chosen. Figure 2.C4 shows the variation in the P90-95 and P99-100 shares. The three first alternatives keep our preferred population total and varies the income total, while the following four alternatives change the population total but keep our preferred income total.

Figure 2.C4. P90–95 and P99–100 series using different reference totals.



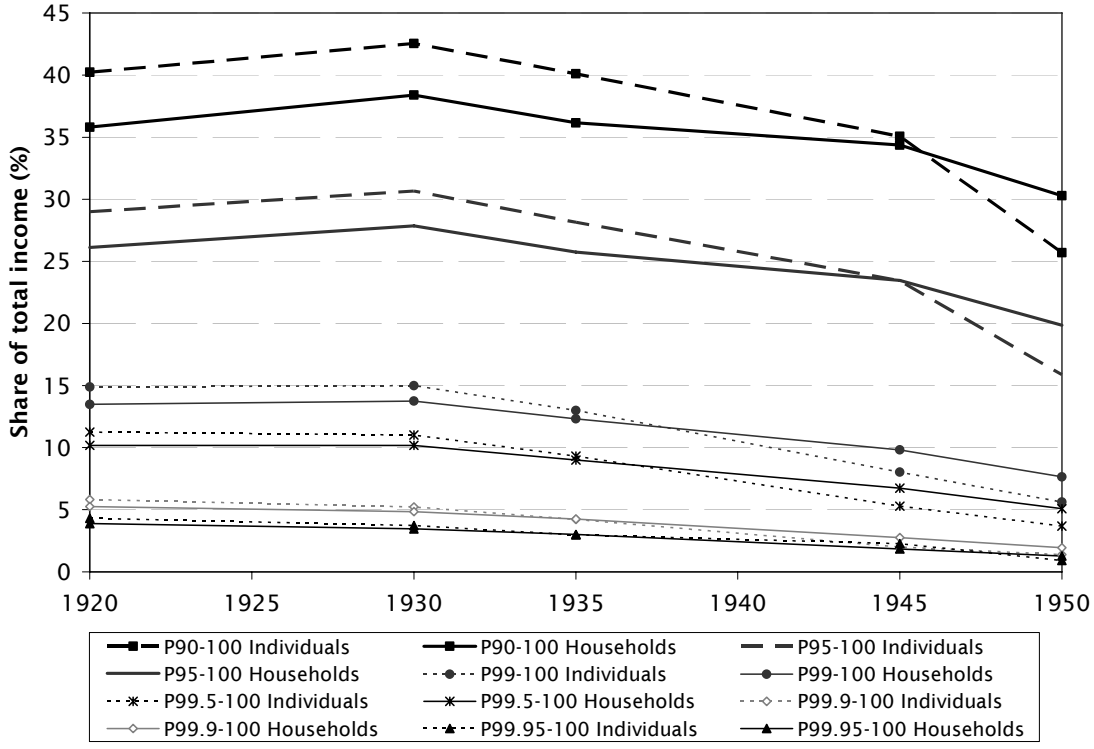
2.12 Sensitivity of using individuals or households as tax units

Our income series are computed from the tax returns-based income statistics for most years, and as we described above this implies that we use two different concepts of income earners over the twentieth century. Before 1951, the income earner in our data is the *household* (or family), i.e., married couples with, or without, children, single men 16 years and older, and single women 16 years or older. From 1951 onwards, our income earner is the *individual*, meaning all men and women 16 years or older. Hence, while we in the first period count married couples as one income earner, they are counted as two income earners in the latter period.

This section offers some partial explorations of how this switch of income earner concept may influence the overall results of our study. As our historical data were chosen largely due to availability constraints, we cannot make a fully-fledged comparison as there are simply no parallel datasets based on tax data available. What we can do, however, is to compare our family-based series with the series in which individuals are the basis. This can be done from the years from which we use the *Census material* (the years 1920, 1930, 1935 (partial census), 1945 (partial census), and 1950) when the primary material is individual-based but adjusted by us and others (especially Bentzel, 1952) to be consistent with the family-based series from the years before 1920 and in between the other years (1934 and 1937).

Figure 2.C5 shows the income shares of the top fractiles (from top 10 percent to the top 0.05 percent). Solid lines represent our main household-based income series used in our analysis (called "Household") whereas the broken lines are the unadjusted, individual-based census series (called "Individual"). Note that since we use different concepts of income earners in the two cases, we must also use two different reference total populations to calculate the correct population shares. In our household-based series, we use the adult population 16 years and above minus married women and in the individual-based series the adult population 16 years and above is used. For this reason, the level of the shares may not be fully corresponding to each other although as Figure 2.C5 shows they as a matter of fact are to quite some extent. As for the changes in shares over the period, they are pretty much coinciding in all cases for all fractiles, and importantly there is no systematic tendency in some direction of either series. For example, whereas the individual-based series produce slightly larger declines between 1935 and 1950 for the top 10 percent to top 0.5 percent income earners, the household-based series do it for the top 0.1 to top 0.05 percent fractiles. Altogether, we feel confident with our choice of income earner concepts and have not found any systematic biases when contrasting them with alternative definitions.

Figure 2.C5: Sensitivity of Census-based top income shares when switching tax unit definitions between individual and household.



2.13 Age adjustments and effects of censoring the young

Similar to previous studies of top incomes, we impose a lower age bound on the analyzed tax population in order to ensure that we do not include under-aged children in the analysis and that the series are conceptually consistent over the years. Specifically, we impose an age cutoff at 16 years, which means that we include all income earners aged 16 and above. We choose this age as it since long has marked the beginning of a person's period in life after completing the compulsory Swedish secondary education. Furthermore, the 16 year-olds were the youngest ones sampled by Statistics Sweden in the income statistics during 1951–1966 and ever since the late 1970's it was also the lowest reported age in the published income statistics. For robustness purposes, however, we have also run our entire analysis using income earners aged 20 and older, but the results are qualitatively the same.[92] The finding that the exact choice of age cutoff is not important for the estimated trends in top income shares has also been found by Atkinson and Leigh (2007b).

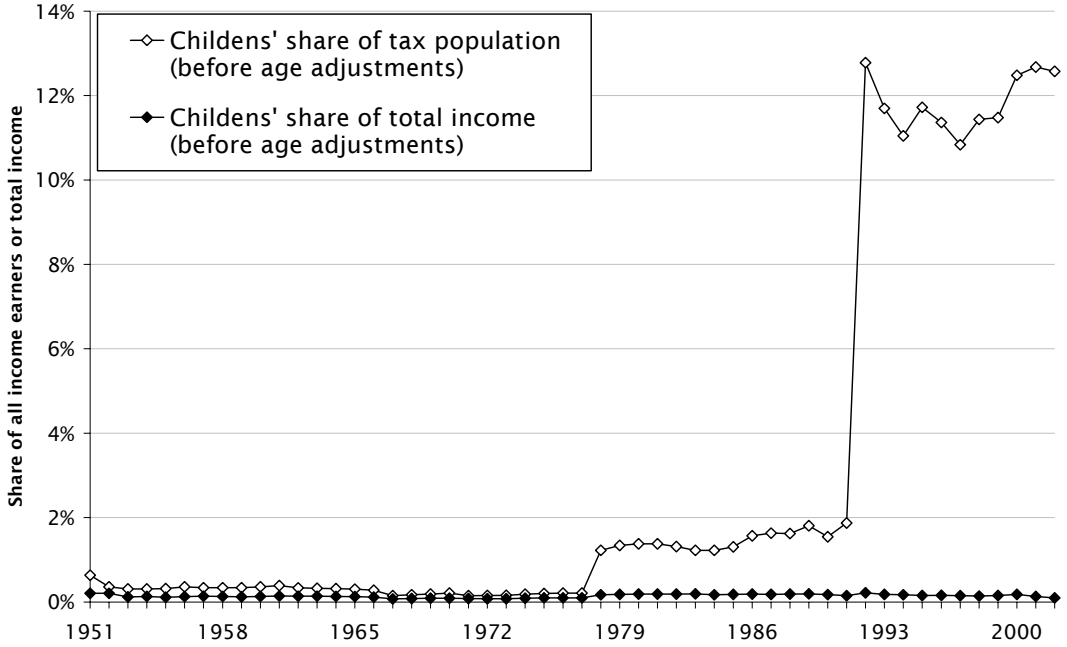
In practice, our age cutoff means that we subtract the number of income earners aged 15 or less from our reference total population and from the main top income series but not from the reference income total. The reason is that we lack specific data on their incomes. However, it turns out that their incomes are quite marginal and leaving them in the reference income does not influence the results of our study.

In Figure 2.C6, we reinforce the aforementioned result that removing children between 0 and 15 years old from our analyzed tax population makes no difference. In fact, the tax reform implemented changes which made almost all children with some bank holdings part of the tax population why if we would not have made any such age adjustments we would have run into great difficulties. The figure shows that throughout the postwar period these youngsters had quite marginal incomes relative to the rest of the population, being about 0.1 percent. Their share of the number of tax units in the tax population increased disproportionately, however, in 1978 and 1992. In 1978, new tax collection routines required employers to submit income statements (*kontrolluppgifter*) for all employees, which implied that a number of children working extra a few weeks during the summer holidays were included in the tax population. More importantly, after the tax reform in 1991 there was a drastic increase in the share of young income earners. This was directly related to

[92] For some postwar years, Statistics Sweden used a different lowest age cutoff in its reported age-income distributions than 16. During 1957–1966 it was 17 and during 1971–1977 it was 18. We interpolate the shares of our (unobserved) 0–15 group based on the continuously observed 0–19 group. This bridging of the series appears to be of minor importance.

new rules in the reform which stated that capital income over SEK 100 was made taxable. As a consequence, almost one million children, roughly one ninth of the entire Swedish population, became tax units overnight.[93] In other words, by excluding the youngest income earners we avoid some unwarranted heterogeneity in the income earner shares caused by the tax reform of 1990–1991.

Figure 2.C6: Shares of population and total income of children under 16 years old, 1951–2003.



[93] Formally, the new rules were in practice already in 1991 but in that year's income statistics Statistics Sweden made an adjustment to exclude the new bulk of very young income earners. They excluded all income earners below 18 years of age with labor income less than SEK 12,000 (Statistics Sweden, *Inkomst- och skattestatistik 1991*, Be 20 SM 9301, p. 9).

Chapter 3

Wealth Concentration over the Path of Development: Sweden, 1873–2006*

3.1 Introduction

Theories about the dynamics of wealth distribution are typically concerned with the long run, as most famously exemplified by Kuznets' hypothesis about the rise and fall of inequality over development. However, comparable data covering sufficiently long periods to evaluate such theories are scarce.[94] The main contribution of this paper is to provide new series of wealth concentration in Sweden for the years 1873–2005, thus covering a period from the early stages of industrialization to present day. By constructing alternative series using both estates and wealth tax data we believe our series give a robust representation of the developments over time.[95]

Besides allowing us to study changes in inequality over the transition from an agrarian to an industrial economy, there are other reasons for why the case of Sweden is particularly interesting. First, over the 20th century Sweden developed the world's most extensive welfare state with a strong egalitarian emphasis. Putting wealth equalization in historical perspective is crucial for understanding the achievements of the Swedish welfare state but also to get further insights to the society in which it gained popular support. Second, comparing wealth concentration over time in Sweden with the patterns for France (Piketty, Postel-Vinay and

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* This chapter is co-authored with Jesper Roine and published in *Scandinavian Journal of Economics*, vol. 111, No. 1, pp. 151–187.

94 Recent studies on long run wealth concentration are Piketty, Postel-Vinay and Rosenthal (2006) on France; Dell, Piketty and Saez (2007) on Switzerland; and Kopczuk and Saez (2004) on the U.S. Out of these it is only the data for France that covers the whole industrialization. Lindert (2000) provides an overview of previous work on historical wealth statistics.

95 Spanning 130 years our series are the longest available estimates of the evolution of wealth distribution in Sweden to date. Spånt (1979, 1987) cover the years 1920–1983. Our main series are, due to availability of data, limited to shares of total wealth held by the top decile of the distribution (and fractiles within this group). This is, however, not very restrictive in terms of capturing most of the wealth since concentration has been very high for most of the period. The share held by the rest of the population is of course captured as a residual but data does not allow us to say anything specific about the lower parts of the distribution.

Rosenthal, 2006), Switzerland (Dell, Piketty and Saez 2007), and the United States (Kopczuk and Saez, 2004) is interesting as Sweden was not affected by the main economic and geopolitical shocks that have been identified as major causes of decreased top wealth shares in these countries.[96]

Several important findings come out of our analysis. Our main series suggest that the period 1873–2005 can be divided into three broad phases based on how wealth concentration has evolved. First, though data are scarce for the period before World War I, our estimates suggest that wealth was concentrated in the agrarian economy but also that it did not change much during the initial phase of industrialization. The slight increase that we find is limited the top one percent gaining at the expense of the other groups, hence, giving only limited support to the idea that inequality increases in the early stages of industrialization.

Second, from around 1910 up to the early 1980s, wealth became significantly less concentrated. In the beginning of this period a number of major institutional changes in society took place. The franchise was extended, first to all men in 1907 and then universally in 1921, progressive taxation was introduced, first for income, in 1903, and then extended to include wealth in 1911. However, none of these changes seem directly related to the initial phase of wealth compression, which was characterized by wealth being more evenly spread within the top decile as the top percentile lost out to the following nine. Instead it looks as if the development before 1950 was mainly driven by accumulation among groups with relatively high incomes but little previous wealth. Thanks to the way in which income and wealth taxes were reported we can calculate the wealth share for different income groups and we find that the wealth shares of high income earners—but not for the very top—increase in the first half of the twentieth century.

After 1950 the wealth compression looks different, with sharp increases in "popular wealth" (mainly owner-occupied housing) among the broader population (the P0–90 group). Between 1950 and 1980, the entire top decile loses ground to the rest of the population. Overall, this development of gradual leveling, first based on accumulation among relatively income rich groups and then moving down the distribution, is consistent with a Kuznets-type process.

While we do not have sufficient data to explicitly test the relative importance of changes in, for example, income distribution, savings be-

96 Sweden did not participate in any of the World Wars and was not affected much by the great depression (but did experience a different stock-market crash in 1932 with important consequences for top wealth holders). Switzerland, of course, did not participate in the World Wars either but on the other hand Sweden and Switzerland differ on many other accounts, in particular with respect to the size of government

havior and real income growth, we can study distributional changes and changes in wealth composition to see which explanations seem most likely.[97] Our conclusion is that this process was most likely driven mainly by economic growth which gradually allowed more and more individuals to start accumulating wealth, but the leveling was also affected by the income distribution becoming more equal as well as by progressive taxation and various government programs (especially generously subsidized loans for owner occupied housing).[98] Furthermore, our results for the period 1910–1980 also suggests that what happened in Sweden was different, from, for example, the French experience where the decline was mainly driven by exogenous shocks as shown by Piketty et al. (2006).

Finally, in the early 1980s the long period of wealth leveling came to a halt. According to official wealth tax-based estimates inequality has, however, remained at historically low levels with only slight increases in the past decades. At the same time there are reasons to believe that these statistics underestimate the recent increases in wealth concentration. In the period after 1985 capital controls were removed and stock market-listed financial assets (known to be concentrated in ownership) surged in value, increasing by over 20 percent per year in real terms. There is also plenty of anecdotal evidence of Swedes having moved themselves or their wealth abroad to avoid high wealth and inheritance taxes. We use the official national statistics over the balance of payments and the financial accounts to estimate the size of "unexplained" financial savings (or "capital flight") of households and use these estimates to get a sense of their possible impact on wealth inequality. Naturally, the great uncertainty associated with these numbers forces us to present a collection of estimates where we use alternative sources and different assumptions about the size and the distribution of foreign wealth, as well as rates of return on accumulated foreign holdings. Our basic finding is that official statistics are likely to underestimate the recent increase in wealth concentration, possibly quite substantially, and that we may have entered a new phase of increased wealth concentration where the measurement of this becomes more difficult as capital in more internationalized.[99]

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[97] See, e.g., Champernowne and Cowell (1998) and Davies and Shorrocks (2000) for overviews on theories of wealth distribution. See also Berg (1988) which contains an explicit model of savings and wealth dynamics for Sweden 1954-1986.

[98] As we will discuss further below the major changes in wealth shares for various groups in the distribution do not seem to correspond to changes in their income shares. This suggests that the gains in wealth shares must come from changed savings behavior or changes in returns (higher compared to the average) or some kind of policy driven advantage, unless there was an increase in income mobility.

[99] Here one can also note that our analysis point to a number of more conceptual problems with measuring wealth (or income) inequality of a country when residency and even citizenship may be "internationalized".

3.2 Measurement issues and data

3.2.1 Measurement issues

Our main *concept of wealth* is net worth, or net marketable wealth, which is defined as the sum of market-valued real and financial assets less debts, excluding human capital wealth. This is the standard measure of personal wealth in wealth inequality research and it is also the by far most common measure in historical tax-based sources of wealth inequality for most countries.[100] In the case of Sweden, net worth is what has been specified in the taxation of estates and of wealth.[101] One item not included in net worth is pension wealth. Pension rights are relatively important in the Swedish case which influences both international comparisons and historical analyses as these systems have grown from non-existence to being important parts of personal wealth. For this reason we also present new estimates of the recent trends in Swedish *augmented wealth* concentration, i.e., top wealth shares when both net worth and contributions into pension schemes and future social security payments are included.

Measuring net worth is sensitive to the valuation of assets. For example, in the early years taxation values are observed and these may deviate from market values. But if this discrepancy is similar across the distribution—and historically this was arguably the case—the biasing effect of valuation on wealth *shares* should be small. In order to get a sense of the effect of valuation on our results, however, we make use of several alternative estimates of aggregate wealth (based on either tax or market values as well as including items which have not been taxable) and also different assumptions about the distribution of the difference between these alternative reference totals and our baseline. This exercise indicates that there are some differences in the levels of wealth shares over the period, but the trends in wealth concentration remain unchanged. Overall, we believe that the comparability of our estimated shares is good over time, while the comparability of the absolute values over time could be more problematic.

The *concept of wealth owner* used in the study varies depending on what data source is used. When we use wealth tax-based data we refer to

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100 For an overview of international wealth concentration data, see Ohlsson, Roine and Waldenström (2008).

101 Naturally, there is a discrepancy between the conceptual and practical contents of net worth. Although they include the same *items* there are potentially vast differences in how they have been *valued*. Spånt (1979) discusses how the differences between market values and tax-assessed values have influenced the composition of wealth. Historically, however, the distributional differences turn out to be relatively small in the aggregate for most items. In the robustness section of the paper we also address the impact of this on our estimated wealth shares.

"households". For the most part, this means tax households where married couples count as one, as do children 18 years or older living at home. For the years after 1975, however, households are defined as cost households, the major difference being that adult children living at home are included in parents' household. The estate tax data are individual-based.[102] Top shares estimated at the individual level may be different from top shares estimated at the household level. The size and direction this difference depends on the extent to which wealth is distributed among spouses within families. In a formal discussion of this issue, Atkinson (2007) shows that for a given top wealth share in the household distribution, the share would be about 20 percent higher in the individual distribution if all the wealthy are unmarried or have spouses with no wealth and about 20 percent lower if all the rich are married to each other and their wealth distributed equally between spouses. As our series below will show, the recorded shifts in Swedish top wealth shares in both the household and individual distributions during the period we study are large enough for them not to be sensitive to the issues discussed by Atkinson.[103]

Our main *measure of wealth concentration* is the wealth share held by various fractions of the population, i.e., the share of total wealth held by the wealthiest five percent or the wealthiest one percent of the population. As is typically the case when using historical data we face a problem with measuring the reference total of net personal wealth of the whole population. The wealth tax data typically only cover the households in the top five percentiles that have paid wealth tax and we must therefore limit our observations to years when attempts to measure the corresponding total for the whole population have been made. This has been done in some of the past Censuses and in a few special public investigations but there are many years for which we have distributional information for the top but no reliable reference total.[104]

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[102] In some cases the estate reports, however, include joint property if there is a surviving spouse and the property of a deceased spouse that has not previously been transferred to heirs.

[103] See also, Kopczuk and Saez (2004) who discuss possible differences between individual based and household based series concluding that the magnitude is not likely to be such that it would explain the large changes in wealth distribution in the US over the century.

[104] For example, Flodström (1914) presents data on the very top for the year 1912 and for all years since 1945 Statistics Sweden published annual reports on wealth tax returns for the top, but with no indications about reliable reference totals for net personal wealth.

3.2.2 Data

Our main series on the Swedish wealth concentration are based on information about personal wealth statements in estate tax returns (various years during 1873–2003) and wealth tax returns, complemented by bank and public registry statements about people's wealth (various years during 1911–2006).[105] Both wealth tax and estate tax data are problematic in several ways (as we discuss below), but they are the only viable alternatives for studying wealth concentration over longer time periods. Comparing the trends of the series based on wealth tax and estate tax data, respectively, is also interesting as it arguably gives a richer picture of the development. In addition to these standard sources, our study also introduces the use of estimated foreign wealth holdings of households drawing on statistical estimates in the balance of payments and the financial accounts from the 1970s. As a consequence of Sweden's high wealth taxes and liberalized capital account (after 1989) these foreign holdings have been claimed to be substantial. Moreover, we use journalistic estimates of wealth of super rich Swedes in order to assess the possible influence of very large closely held family firms (that do not show up on tax returns) on the standard measures of inequality. Finally, we present estimates of the level and trend of augmented wealth concentration.

3.2.3 Estate data

Estate data is a common source for deriving measures of wealth distribution. The time of death is often the only time when an individual's total assets and debts are revealed for the purpose of estate division and estate or inheritance taxation. Assuming that those who die in any given year constitute a random sample of the living population of the same sex and age, one can convert the distribution of wealth among those who died into the distribution for the living using a mortality multiplier, which weights the individual estates in different age groups (controlling for sex and sometimes also for social status) by the death rates in the respective groups.[106]

Our Swedish estate data are in the form of grouped distributions for the diseased. They draw on estate tax reports, beginning in 1873–1877, which are the earliest years for which tabulated estate distributions are available, and continuing with observations for the periods 1906–08,

[105] There are some other sources of wealth data, in particular household surveys, which we do not use. The reason is mainly that they contain too few observations to allow a comprehensive analysis of the top of the distribution.

[106] For a detailed discussion of mortality multipliers, see Atkinson and Harrison (1978, ch. 3).

1942–43, 1954/55, 1967, and 2002–2003, covering a total of 130 years.[107] Only for the year 1908 we have the distribution of estates adjusted with mortality multipliers, i.e., when each estate is multiplied by the inverse age-based mortality rate based on the age of the diseased individual.[108] This allows us to calculate wealth shares for the living population on top of that of the diseased population. Whether these two distributions differ much in terms of level or trends is an open question. Judging from the behavior of our estate series in comparison to our wealth tax-based series for periods when they overlap the effect seems to be marginal, at least in terms of representing the long-run inequality trends.[109]

Another issue with analyzing estate data is that for single years large individual estates may have a disproportionate impact on estimated wealth shares, especially in the top. As we are able to use consecutive years the risk of having influential outliers becomes smaller.[110]

3.2.4 Wealth tax data

Compared to estimating the wealth distribution based on estate data, wealth tax data is a more direct way to measure what we really wish to estimate: the distribution of wealth in the (living) population. Wealth tax returns have also been the main source for studies of Swedish wealth inequality due to its relative availability. However, there are important problems associated with this data source which severely impedes the study of wealth concentration. First, only a minority of the population has paid wealth taxes and the construction of reference wealth totals for the whole population is therefore problematic.[111] Second, consumer durables are quite imperfectly covered in the wealth tax returns, which could imply a

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[107] The sources of the estate data are the Ministry of Finance (1879, 1910) and SOU (1946, 1957, 1969, 2004).

[108] For details of the application of the estate multiplier method on the 1908 data, see Ministry of Finance (1910, pp. 14–34).

[109] According to data from France in Piketty et al. (2006) the differences seem to be marginal. Atkinson (2008), however, point to British wealth studies using estates where the differences have been sizeable.

[110] The sources of the estate data are the Ministry of Finance (1879, 1910) and SOU (1946, 1957, 1969, 2004) where we calculate top wealth shares at death. Estate taxes were being levied already in the eighteenth century but from these early years there is no compiled distributional evidence available on the national level (see Ohlsson, 2009).

[111] Survey data are better since the survey can be designed so as to include (or exclude) items regardless of the tax law and the sample can be drawn so as to represent the whole distribution, but at the same time this particular feature is a major problem when it comes to studying wealth concentration. Wealth is typically very concentrated and, therefore, a randomized sample of the whole population must be very large to cover sufficiently many in the very top to get a reliable picture.

significant underestimation of "popular wealth".[112] Third, pension wealth is not included in our analysis mainly because it is mostly not controlled directly by the households but rather a claim of future cash flows (net of tax). This is perhaps our most problematic coverage issue since tentative analyses suggest that pension wealth could reduce the concentration of wealth most substantially. Fourth, the wedge between tax-assessed and market-based values of personal assets has varied over time. Prior to the 1980s market values in the heavily regulated Swedish economy were in general not much above tax-assessed values, but after 1980 market values have increased dramatically.[113]

Our main series are based on market value-adjusted wealth data computed by Statistics Sweden for various years from 1975 onwards. Data for 1975 come from Spånt (1979). For the period 1978–2006 we use data based on micro-data evidence from the HINK/HEK database run by Statistics Sweden. This database consists of a representative sample of about 10,000–20,000 households for which wealth tax returns and interview material are available, with a full sampling of the richest households.[114] Before 1999, wealth records are entirely based on tax returns with real and financial assets only roughly adjusted to market values. From 1999 onwards, wealth information drawn from the Wealth Register (*Förmögenhetsregistret*), an individual-based database using personal tax assessment and control information from authorities, banks and so forth (see further Statistics Sweden, 2005, 2006, 2007).

Although the post-1975 data are arguably the most reliable in the entire period, they are not without problems. One is that the market values of condominiums are notoriously difficult to assess.[115] Another is that closely held companies are almost completely missing. Yet another problem is that the sample population HINK/HEK is constructed for analyzing the distribution of income, not wealth. One consequence is that the over-

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112 The absence of consumer durables (furniture, household appliances, machinery, art, antiquities etc) could reduce wealth concentration notably. Estimates in Jansson and Johansson (1988, ch. 7) indicate that they would decrease the top wealth percentile's share in 1985 by a third. This is, however based on the assumption that durables not included in the tax material are relatively evenly distributed in the population, which we do not think is likely to be the case (see the further discussion below).

113 Spånt (1979, pp. 87-93) gives estimates for real asset values based on Census information and miscellaneous historical price statistics. In the case of financial asset values, Waldenström (forthcoming) shows that the deflated composite stock price index at the Stockholm Stock Exchange was a basically constant level between the first observation in 1906 and 1986 when prices took off.

114 The sources are Jansson and Johansson (1988), Jansson and Johansson (2000) for the period 1978–1997 and specific tabulations by Statistics Sweden for the years 1999–2006.

115 See further Jansson and Johansson (1988, pp. 68–73, 140–141).

sampling of the richest household is made using an income-based proxy of wealth, realized capital gains, which may or may not be perfect in this respect.

For the historical data before 1975, we use grouped distributions reported in the Censuses in 1920, 1930, 1935, 1945, 1951 and finally some specific investigations from 1966 and 1970.[116] Notable is that in all of these surveys, rich households are oversampled (based on taxable wealth) and their coverage for studying wealth concentration is hence likely to be good.

3.2.5 Foreign household wealth data

In 1989, Sweden removed its capital controls barring capital flows in and out of the country but kept its internationally high taxes on wealth and inheritance intact. This could easily lead to a situation where the rich move their capital overseas for tax avoidance reasons, and if so domestic wealth inequality could be severely underestimated. In this study, we therefore introduce an approach to analyze this by combining the official domestic household wealth distribution data (presented above) with similarly standard estimates of foreign household wealth from the Balance of Payments (B.o.P.) and the Financial Accounts (F.A.).[117] A third source of foreign household wealth is the super rich Swedes who have taken both their wealth and themselves out of the country, but since they do not live and reside in Sweden they are not formally part of the domestic tax population that we examine.[118]

Our computations of foreign household wealth are based on the exact same data and methodologies as are used by the producers of the underlying data, the Swedish Riksbank and Statistics Sweden.[119] The basic

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116 Sources are wealth tax tabulations in Statistics Sweden (1927, 1937, 1938, 1940, 1951, 1956), SOU (1969) and Spånt (1975).

117 Jansson and Johansson (1988, pp. 163–165) come the closest in their discussion of how the emigration of 100 rich families (assuming different sizes of their wealth) would affect domestic wealth inequality. Unlike them, we analyze the foreign wealth of households that have remained in Sweden (i.e., residents). Moreover, we actually do analyzes the emigrated Swedes as well in the robustness section, and then make use of the journalistic estimates of the wealth of the about 30–50 named super rich Swedish households residing in foreign countries. In their study of wealth concentration in Switzerland, Dell et al. (2007) data on foreigner's wealth in the 1990s as reported to Swiss authorities are analyzed. However, the wealth is not related to country of citizenship or systematically linked to inequality estimates in other countries.

118 In the robustness section we analyze the wealth of super rich Swedes living abroad. Examples of rich Swedes living abroad are Ingvar Kamprad (owner of IKEA, living in Switzerland) and the Rausing family (owners of Tetra Pak, living in England and Denmark).

119 These data are available from the authors' personal web pages or upon request.

approach rests on deriving residuals between observed balance sheet entries. In the case of the B.o.P., real sector savings (in the current and capital accounts) should equal net financial flows (in the financial account) each year. This was also the case up until the late 1980s. At that point, the residual, called *net errors and omissions*, started growing negative year after year, signaling continuing unaccounted net capital outflows. About a third of these outflows are not actual outflows but rather accounting and valuation errors when compiling the current, capital or financial accounts. For this reason we use only 65 percent of the observed net errors and omissions as our estimate of foreign household wealth.[120] In the case of the F.A., the residual is called *unexplained financial savings* and is derived from comparing financial savings in the National Accounts (the difference between disposable income and the sum of private consumption and investment) and financial savings in the Financial Accounts (the aggregate value of bank deposits, securities portfolios, cash etc).[121]

Next we need to decide who the Swedish residents holding overseas wealth are. This group should be fairly wealthy, both because the costs of establishing connections with foreign banks in tax havens are non-negligible (especially so a few years ago) and because wealth taxes have been fairly progressive. Throughout we attribute the estimates of foreign wealth to the households in the domestic top wealth percentile, which are 40–50,000 households (varying over time). This number has been reached after discussions with people at Statistics Sweden and the Swedish Riksbank who work with these numbers. If anything, the top percentile may be slightly too large concerning the 1980s and early 1990s (before the internet) whereas it may be slightly too small in the years thereafter.[122] Naturally, we also add the foreign wealth to the reference wealth total in the denominator.

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120 This particular figure has been reached through discussions with those who compile these data. Blomberg et al. (2003) are able to attribute about 14 percent of the net errors and omissions to known valuation errors in the export statistics. Above from that, the authors believe that there are other errors of at least those amounts. We decide to remove 35 percent of the observed sums for our estimated household share.

121 Bergman and Rylander (1984), Persson (2002) and SOU 2002 (p. 298) all use the unexplained savings in the F.A. for analyzing the size of foreign household wealth. We use the newly revised figures for the financial savings in the National Accounts.

122 There are clearly a number of objections that can be raised to these assumptions. Our main purpose is, however, not to come up with an alternative measure of wealth concentration but rather to get a sense of the order of magnitude by which foreign wealth could affect the distribution.

3.2.6 Journalistic wealth estimates for the super rich

Tax authorities have great problems assessing the wealth of citizens who own large closely held companies. These wealthy households therefore often end up paying very low or no wealth taxes at all.[123] In the absence of objective information on these fortunes, journalists in several countries have created alternative wealth estimates of the wealth of the super rich based on subjective valuations. Examples of such listings are the *Forbes 400* in the U.S. and the *Sunday Times Rich List* for the U.K. Because of their subjectivity in the valuation of the fortunes one must treat these numbers with great caution.[124] Yet when carefully treated these lists hold information not otherwise available and they have been used previously by researchers interested in studying the wealth of the super rich (e.g., Kopczuk and Saez, 2004 and Edlund and Kopczuk, 2009).

We use data on the wealth of super rich Swedes reported in "rich lists" published by the Swedish business magazines *Affärsvärlden, Månadens Affärer* and *Veckans Affärer* for single years between 1983 and 2006.[125] Based on these listings, we retrieve information about two groups of super rich for our analysis: Swedish households living in Sweden with wealth in closely held companies (hence not included in the official statistics) and Swedish households living abroad. The named residents owning non-listed wealth are between 100 and 300 in the 1980s and 1990s with fortunes averaging about half a billion SEK. In the 2000s, the lists only include between 40 and 60 of this group, having an average wealth of 2–3 billion SEK. Swedish living abroad are between 10 and 50 in the listings with fortunes between 3 and 17 billion SEK.[126]

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123 In Sweden, some large family firm-owners (those who owned more than 25 percent of a company's shares by the end of 1991) were even exempt from wealth taxation in the Wealth Tax Act of 1997 (1997, p. 233). This rule is generally considered to have been specifically designed for the Persson family (main owners of H&M).

124 For example, their methods comprise of a subjective and typically undisclosed selection of valuation techniques and comparisons with similar companies for which financial information is more openly disclosed. Journalists collect most of their information from publicly available sources such as newspapers, company reports and financial market prices, but at times also interviews with the rich themselves are used. See further the discussions in Davies and Shorrocks (2000) and Atkinson (2008).

125 In fact, earlier calculations of the richest Swedish families were done by Hermansson (1959, 1962) and by the public investigation SOU 1968:7. In all these cases, tax returns formed the basis of personal wealth which is reasonably comparable with today's market-valued numbers as we argue elsewhere in this paper.

126 Detailed information about these data is available from the authors' web pages or upon request.

3.2.7 Retirement wealth data

Pension wealth and social security wealth are important sources of income for most people at their retirement. For this reason, researchers sometimes add estimates of retirement wealth to the net marketable wealth of households, yielding what is often called *augmented wealth*.[127] Conceptually, it is not unproblematic to include retirement wealth in the personal wealth. On one hand, it is a fairly well-defined future benefit stream accruing to each individual in society that highly influences the incentives of individuals to save for retirement. On the other hand, individuals cannot freely access their pension wealth (e.g., to realize it before retirement age), which violates one of the fundamental aspects of private property rights to personal assets. For this reason, the distribution of *augmented wealth* should be treated separately from the conventional wealth inequality measurement.

There are many conceptual and practical problems associated with measuring retirement wealth and its distribution. First, parts of it are defined in collective form and hence not well-defined for all individuals (or households) in the system. Second, the calculation of today's claims on future pensions concerns a number of complex assumptions of people's life expectancy, future rates of return on the capital markets and so forth. Third, there are public and private parts of the pension system, funded and un-funded parts, and some of these are more easily observed and measured than others, which may create systematic measurement errors in the data. Fourth, the distributional features of the different parts of the pension system differ considerably and are also complicated to measure, e.g., in the case of mapping the pensions across the income distribution onto households in the contemporaneous wealth distribution.

Our estimates of the distribution of augmented wealth come from different sources. Generally speaking, historical data on Swedish retirement wealth and its distribution are scarce. We use in this paper three point estimates that have been made with specific application to the distribution of net personal wealth: Ståhlberg (1981) for 1978, Jansson and Johansson (1988) for 1985 (largely building on Ståhlberg's estimate), and our own (rough) estimate for 2004.[128]

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127 This approach was first suggested by Feldstein (1976) and has then been applied by several others.

128 The calculations are based on arriving at net present values of all individuals' current and future claims on the different parts of the pension system. The estimate for 2004 was computed in four steps. First, from the estimated public pension wealth (*pensionsskuld*) of all Swedes in the old-age pension system (Swedish Social Insurance Agency, 2006, pp. 21–23, 74), 6,244 billion SEK, we subtract a latent tax debt of 30 percent since pensions are treated as taxable income, resulting in a net-of-tax pub-

3.3 Wealth concentration 1873–2006

This section presents our main results. We begin by showing the long-run evolution of wealth concentration for groups in the top of the Swedish distribution over the entire period. Then we divide the 130 years into three subperiods based mainly on the observed patterns but also on instances of important structural changes in the Swedish society. For the first period, 1870–1910 which roughly corresponds to the industrial take-off, we rely entirely on estate tax data. In the subsequent period, the 1910–1980 which covers the entire build-up and expansion of the Welfare State, we can compare results from estate data with wealth tax data. Finally, in the period after 1980 when internationalization increased and capital flows were liberalized we also make use of our estimates of foreign household wealth as well as journalistic sources.

3.3.1 Long-run trends

Figure 3.1 shows the development of the wealth share for the top decile over the period 1873–2006. According to this measure wealth concentration was stable at a high level which lasted almost until 1945, with only a small drop in the 1930s (visible in the wealth tax data). Given that 1930s marks the start of the long era of Social Democratic rule under which the welfare state was created (with much of the early implementation interrupted by World War II) this seems to fit well with broad stylized facts.

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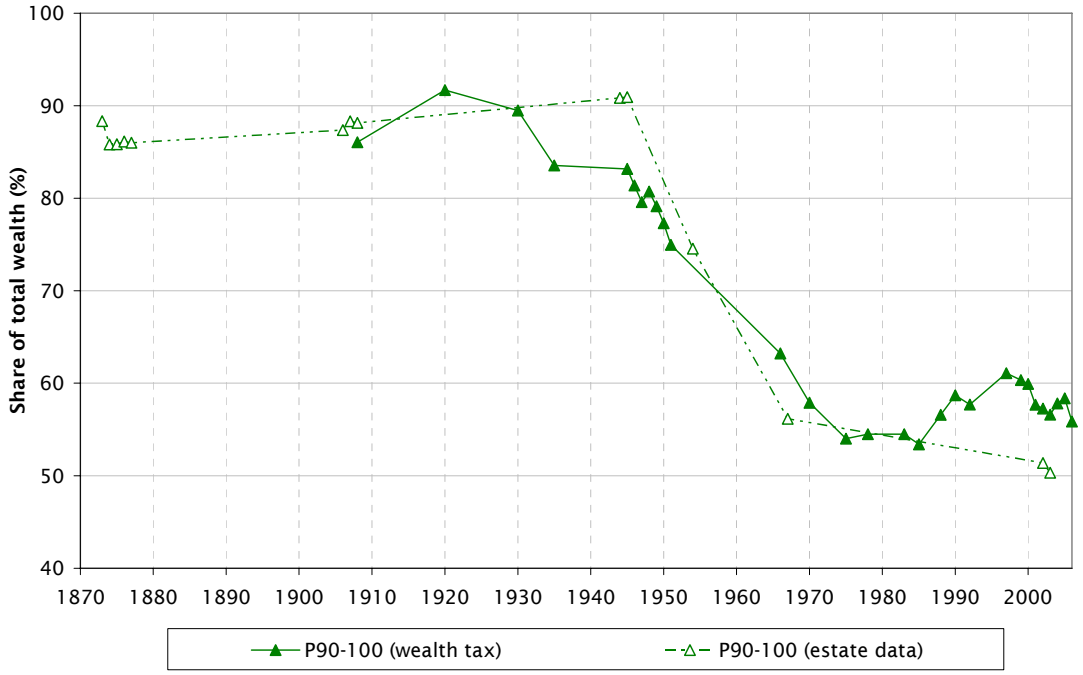
lic pension wealth of 4,271 billion SEK. Second, we add the sum of all funds in the private pension-related complementary benefits system (ITP), 887 billion SEK (Sjögren Lindquist and Wadensjö, 2007), yielding a sum of 4,991 billion SEK. Third, we calculate how much of these amounts that accrue to the top percentile using tabulated data on the Swedish labor income distribution in 2004 from Roine and Waldenström (2008). In the public system (basic, ATP and PPM) all income earners receive about a fifth of their earned income up to 317,250 SEK (7.5 basic income amounts, *inkomstbasbelopp*) as public pension. In the private system (ITP), income earners get 30 percent of their incomes above 294,750 SEK in pension and it turns out that only about the highest quartile received ITP pensions. Combining the distributional data for public and private systems, we land at the following retirement wealth shares in 2004: for P0–75 51.6% (31.7%), for P75–90 22.7% (15.2%), for P90–99 20.3% (17.4%) and for P99–100 5.4% (5.8%). Fourth, and finally, we compute the augmented wealth distribution by adding the retirement wealth for fractiles in the income distribution to the net marketable wealth of the same fractiles in the wealth distribution, hence assuming that they are approximately the same. Further details are available from the authors upon request.

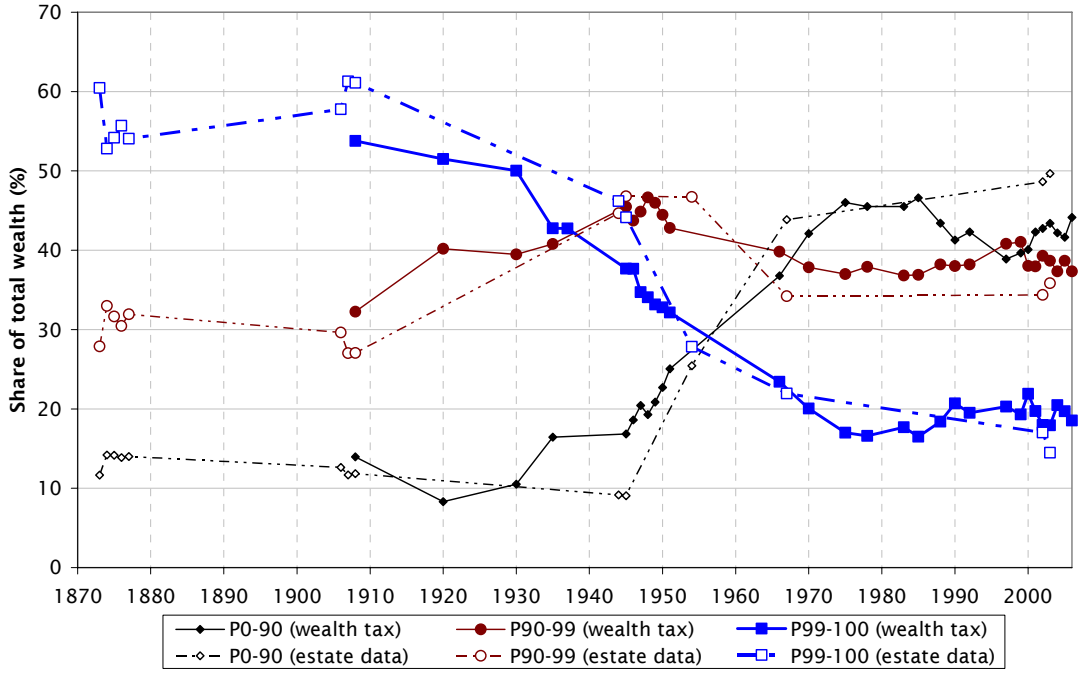
Figure 3.1: Wealth share of top decile using wealth tax and estate tax data, 1873–2006.



Source: Table 3.A1.

However, as has been pointed out several times in recent work on top incomes and wealth, when only looking at the evolution of top decile, one typically fails to see a number of important aspects of the data. Figure 3.2 shows the development of the top percentile (P99–100), the next nine per cent (P90–99) and the residual remaining population (P0–90), revealing a number of interesting facts. The development between the 1870s and the 1900s is now characterized by a slight increase for the top percentile at the expense of the rest of the population. From the 1910s and onward, until around 1980, the wealth share of the top percentile drops by a factor of three. Until around 1950, however, this leveling happens *within* the top decile, giving the impression—seen in Figure 3.1 above—that no big changes occur. In the period 1910 to 1950 the wealth share of the P90–99 increases by a factor of 1.5 while the share of the top percentile is divided by about as much. The rise of "popular wealth", mainly owner-occupied housing held by the lower nine deciles (P0–90), seems to start around 1930 with the major increases coming after the Second World War, and after 1950 the increase for the P0–90 group happens at the expense of the entire top decile. Around 1980 the leveling seems to come to a halt, and the wealth shares for the top groups have increased slightly in the recent past.

Figure 3.2: Wealth shares of top percentile, rest of top decile and bottom nine deciles using wealth tax and estate data, 1870–2006.

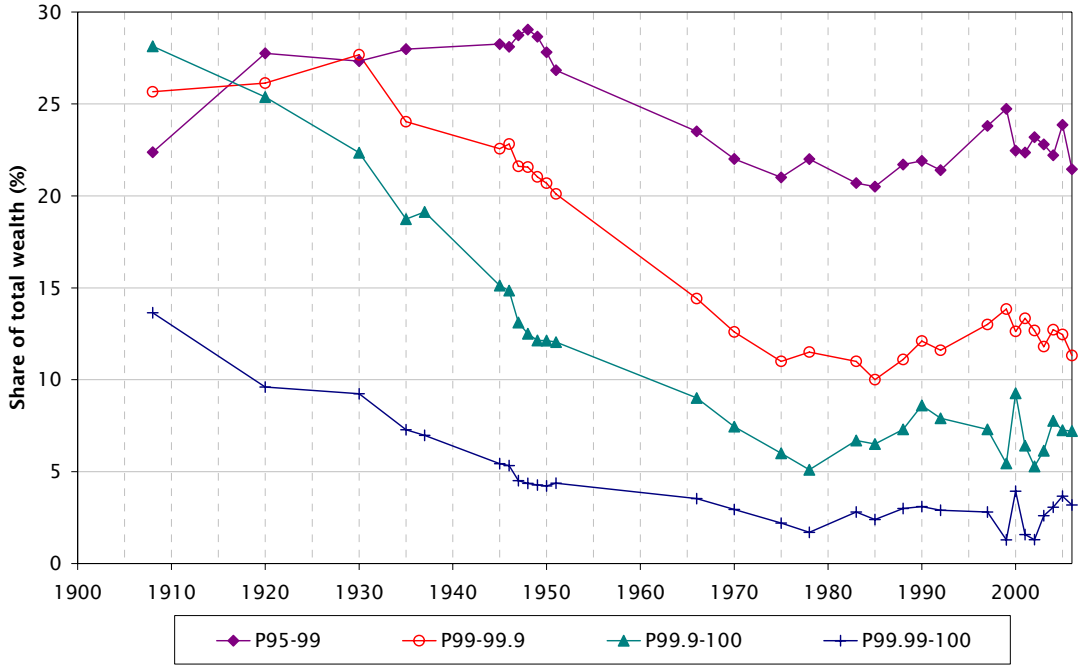


Source: Table 3.A1.

Our data also allow us to analyze the long-run patterns of wealth shares in the very top of the wealth distribution. Figure 3.3 displays the shares of groups within the top vintile: the lowest four percentiles (P95–99), the bottom nine tenths of the top percentile (P99–99.9), the top 0.1 percentile (P99.9–100) and the top 0.01 percentile (P99.99–100).[129] It confirms the previous finding of the very rich losing ground throughout the twentieth century and gives more information about the order of magnitude by which this compression took place. The top 0.1 percentile's share plummeted from 28.1 percent in 1908 to only 5.1 in 1978. The fall of the top 0.01 percentile was even more drastic, from 13.6 percent to 1.7 percent. This pattern becomes even the more striking when contrasted against P95–99 which increased its share until 1950, then experienced a relative fall until around 1980, and has then recovered only to land at a wealth share in 2000 which is almost exactly the same as in 1908.

[129] The estimates for the richest groups may be associated with some uncertainty in the earlier periods as they consist of only some 300–500 households. Recall though that the shares for 1975 onwards draw on complete sampling of roughly the top 0.1 percentile.

Figure 3.3: Wealth shares groups within the top vintile, 1908–2006.



Note: Wealth tax-based data. *Source*: Table 3.A1.

Overall the Swedish development suggests a gradual process, with wealth slowly trickling down from the top as development progresses, possibly with a period of slightly increasing concentration in the first phase of industrialization, much in line with Kuznets' basic idea. Even though our data does not allow us to identify precisely what has been driving this process we can get a number of clues and also get a more precise picture by analyzing the data in some more detail. We do so by looking separately at three sub-periods: 1870–1910, 1910–1980, and 1980–2006.

3.3.2 1870–1910: Wealth concentration during the industrial take-off

Sweden was a latecomer in the process of industrialization, with its industrial take-off being dated sometime in the second half of the nineteenth century.[130] Since our first observation of wealth concentration is 1873 our series capture the evolution of wealth concentration over the whole era of industrialization in Sweden.[131] This is particularly important since Kuznets' influential hypothesis about industrialization is explicit about inequality increasing during the initial stages of economic development.

[130] For example, according to the growth-rate based definition in Maddison's (1982) 'Phases of capitalist development' Sweden achieved growth rates averaging above one percent for the first time in the 1850s and 1860s.

[131] There exists one isolated observation from a wealth survey in 1800 thanks to Soltow (1985). We have not been able to study the data underlying that estimate and we have therefore not incorporated it in this analysis.

Our data suggest that between the 1870s and the first decade of the 20th century, the top one percent increased their wealth share by approximately five percentage points from about 55 percent to around 60. The losses for the rest of the population was relatively evenly spread with the share for the P90–99 and P0–90 groups dropping by about three and two percentage points respectively. While these movements are small they indicate a development consistent with the idea that industrialization initially created wealth which was concentrated in the top of the distribution.[132] However, it should also be noted that for this period we have to rely on estate data without being able to make any mortality multiplier adjustments.

3.3.3 1910–1980: Wealth equalization and the rise of "popular wealth"

Between the 1910s and the years around 1980, Sweden experienced a substantial equalization of the personal wealth distribution. For example, the top percentile went from owning about 60 percent of all wealth in 1908 to owning less than 20 percent in 1980. As Figure 3.3 reveals, however, between 1908 and 1950 it was only the households in the top 0.1 percentile that experienced a steady decrease whereas the wealth share of the next 0.9 percent (P99–99.9) remained constant until 1930 whereas the 4 next percentiles (P95–99) even increased their wealth shares.

These heterogeneous patterns within the top indicate two things about the possible causes of wealth compression. First, the economic and financial shocks in the early 1920s (a banking and deflation crisis) and the early 1930s (the Kreuger-crash of 1932) had a negative effect on top fortunes. However, this effect seems to have been more limited in Sweden than the effects of the world wars and the Great Depression in other countries where a larger share of the wealth was affected (see Ohlsson et al., 2008). Second, a more important driver behind the changed distribution of wealth seems to have been the new wealth creation occurring among the relatively income rich who previously held less wealth. This can be seen by studying a unique feature in Swedish tax data between the years 1911 and 1948 when Sweden practiced a form of progressive income and wealth tax which operated through adding a fraction of taxable wealth (in principal equal to net wealth) to individual income to calculate

[132] While we study very different aspects of inequality, our findings are compatible with Söderberg (1991) who finds an increasing inequality in salaries over the period 1850–1914. However, at this time it is not likely that the top percentile in the wealth distribution was affected much by increased salaries. Rather, a more likely interpretation is that the reason for why the top percentile in the wealth distribution did not go up more, was that some of the gains from industrialization actually went to skilled workers.

what was called the "taxable amount".[133] This information on the size of wealth holdings by income class is tabulated for a number of years and gives important information on changes in wealth concentration. Table 3.1 shows how the wealth share of top percentile in the income distribution decreased before 1950, in particular in the interwar period. By contrast, the "high-wage" income earners in the P90–95 income fractile increased their wealth share substantially over the same period, mainly in the 1910s and 1930s. The natural interpretation of these changes is that wealth as a source of income for the very rich declined in this period while, at the same time, moderately rich groups with high incomes accumulated new wealth. Historically, these patterns are in line with the descriptions in Glete (1994) about the emergence of new corporate owners during the expansive 1910s and the successes of corporate executives in the 1930s.

Table 3.1: Shares of wealth owned by top income earners.

Income fractile:	P90–95 High-wage earners		P95–99 High-wage earners and rentiers		P99–100 Mainly rentiers	
	Wealth sh.	Pct. ch.	Wealth sh.	Pct. ch.	Wealth sh.	Pct. ch.
1911	3.5		10.8		33.8	
1920	6.7	90.7	16.6	53.9	41.9	23.8
1930	6.4	–4.6	15.3	–8.2	38.0	–9.3
1941	13.2	104.6	18.2	19.3	26.5	–30.3

Note: We denote the P90–95 in the income distribution "high-wage earners" since their wealth on average in 1911 was not large enough to live off. According the data used in Roine and Waldenström (2008), it would generate an annual capital income (assumed as five percent nominal return of the observed wealth) of roughly SEK 200, or about a third of the average income in the country as a whole (which was about SEK 700). By contrast, the wealth of income earners in the top percentile, the rentiers as we call them, would on average generate about SEK 6,500, or more than nine times the average income.

An additional clue to how this came about can found from looking at the historical series of income distribution in Roine and Waldenström (2008). These show that the income share of P90–95, the group that more than doubled their wealth share between 1911–1948, increased very little over this period. This suggests that the increase in their wealth share probably did not come from income equalization but rather from increased income mobility or changes in savings behavior.[134]

[133] For details on the Swedish historical income tax, see Roine and Waldenström (2008).

[134] Yet another possibility would be changes in policies that disproportionately benefited this group but at this time such an explanation seems unlikely.

After 1950 the trend of increased accumulation continues down the distribution. The equalization of incomes certainly contributed to this development. Already in 1950 Sweden had established its position as one of the most equal countries in the world in terms of incomes and this trend continued until around 1980.[135] Other sources of continued wealth equalization can be found in the composition of total wealth. Between 1950 and 1980 the share of owner occupied housing in total wealth increases from being 17 percent of all wealth to 45 percent in 1975.[136] This was partly due to increasing values of existing housing (which in turn was partly based on increased infrastructure investment) but mainly due to new developments of owner occupied housing for which the government provided generously subsidized loans.[137] At the same time the fraction of rental property as well as that of shares (listed and unlisted), both highly concentrated in the very top of the distribution, decreased from 17 to 4, and from 14 to 7 percent respectively. The combined effect of these changes was an increase in the share held by the nine "poorest" deciles (P0–90) from just above 20 percent in 1950 to around 45 percent in 1980, with a corresponding fall in the share held by the richest decile (P90–100).

3.3.4 1980–2006: Globalization and higher concentration

Around 1980 the long period of wealth compression came to a halt. A number of previous studies have analyzed Swedish wealth inequality in this period, finding the lowest inequality in the early 1980s and a moderate increase thereafter.[138] Much of the fluctuations in wealth shares in the period after 1980 have been found to depend on asset price movements, with increases in real estate values reducing inequality since many Swedes own their houses, while increases in share prices make the top shares larger as share ownership is concentrated. Still, the official estimates of top wealth shares do not seem to capture the dramatic increases in stock returns at the Stockholm Stock Exchange between 1980 and

135 See Roine and Waldenström (2008).

136 This share has remained relatively constant since when adding owner occupied apartments, houses, and vacations homes (consumer durables also increased a lot but stay a relatively small share of the total), see Spånt (1979, pp. 78–80) and Jansson and Johansson (2000, pp 19–21).

137 See Englund (1993).

138 According to the official estimates at Statistics Sweden (Jansson and Johansson, 2000, and Ohlsson, Roine and Waldenström, 2008), the wealth share of the top percentile increased about ten percent over the 25-year period between 1978 (16.6 percent) and 2002 (18.4 percent). For other recent studies of the Swedish wealth inequality, see Spånt (1987); Jansson and Johansson (1988); Kashefi (1989); Bager-Sjögren and Klevmarken (1998) and Klevmarken (2004, 2006).

2000, with an average annual real rate of return of more than 20 percent.[139]

We believe that there are two main reasons for why some of the potentially most important changes in the Swedish wealth distribution are not captured in the tax statistics (or in surveys). First, over the past decades there has been a substantial increase in wealth holdings outside of Sweden and second, there are large privately held family firms (not captured by the tax statistics) which have grown in value over this same period.

We examine the potential impact of these non-disclosed fortunes on the official wealth inequality estimates of Statistics Sweden by adding estimated sums of foreign household wealth (from the net errors and omissions in the Balance of Payments) and of domestic wealth of super rich residents (from the journalistic listings) to the observed domestic wealth of the top wealth percentile in the official statistics. Table 3.2 shows these sums for years between 1978 and 2006 together with the corresponding official wealth amounts of the whole Swedish household population and its top percentile. The net errors and omissions were basically zero before 1989 after which they started to increase, landing at an accumulated outflow in 2006 of 432 billion SEK, or 66 billion USD in constant 2006 prices.[140] The unexplained financial savings in the F.A. also exhibit substantial outflows, but they start already in the early 1980s which might reflect increased domestic unobserved wealth.[141]

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139 The remarkable value growth at the Stockholm Stock Exchange is not dependent on choice of starting or ending year. In fact, the real stock returns index (see Waldenström, 2009) at year-end were 75.4 in 1980, 689.0 in 1990, 4826.3 in 2000 and 5817.5 in 2005, which results in average increases of between 20 and 25 percent per year.

140 The fact that the net errors and omissions are zero in 1978 does not imply that there was no Swedish private capital placed abroad for tax reasons. It only means that there were practically no "omitted" capital outflows in the balance of payments statistics during this period, since the Swedish Riksbank had indeed approved of some very large capital transfers by private individuals (see further Lindkvist, 1990).

141 Another potential explanation is, of course, statistical errors in the calculations. See Rylander and Bergman (1989) for an analysis of how valuations of different assets could matter for the calculation of the aggregates.

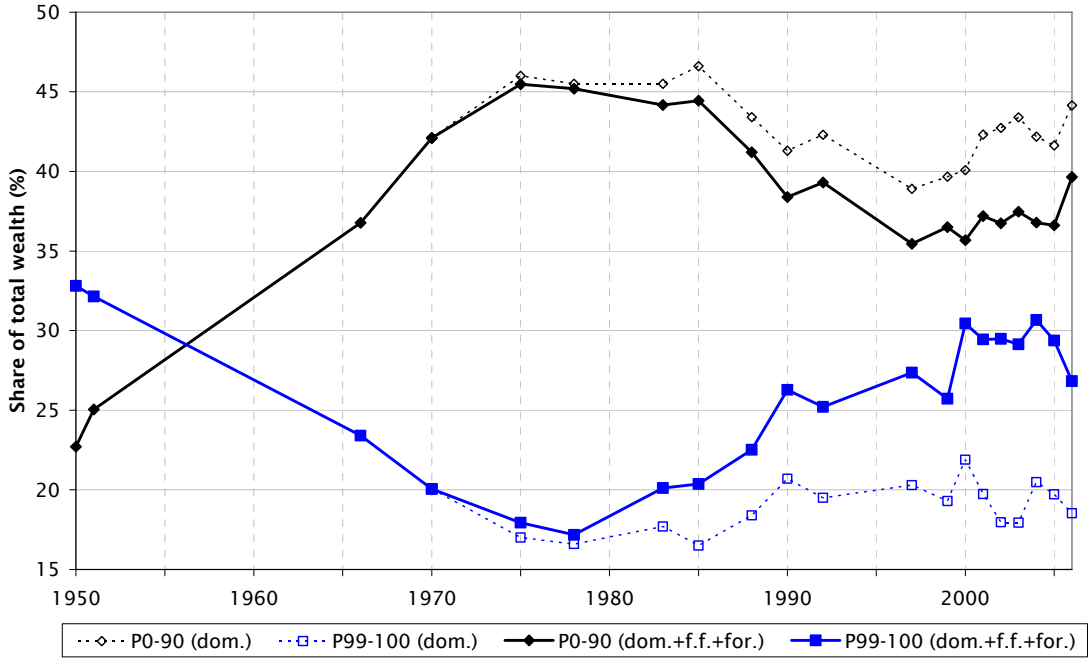
Table 3.2: Sums of foreign and super-rich wealth since 1978.

Year	Domestic wealth		Foreign and family firm wealth			
	Total wealth	P99–100	Foreign wealth (B.o.P.)	Foreign wealth (F.A.)	Wealth of super-rich Swedes *in Sweden*	Wealth of super-rich Swedes living *abroad*
1978	1,766	293	12	87	–	–
1983	1,549	274	0	128	46	27
1990	2,464	510	80	250	107	78
1997	2,521	512	185	395	60	147
2006	5,288	980	432	735	173	797

Note: All sums are in current SEK billion. For sources and details, see the text. We add a five percent annual rate of return on the accumulated foreign wealth as estimated from the Balance of Payments (B.o.P.) and the Financial Accounts (F.A.). The 1990 sums of super-rich wealth are from 1991 because no estimates were made for 1990. Most likely, the 1991 numbers are smaller than the 1990 ones due to the Swedish financial crisis which erupted in 1991. Note that of the 797 billion SEK owned by super-rich Swedes living abroad in 2006 as much as 461 billion SEK, about 65 billion USD, adhere to IKEA founder Ingvar Kamprad.

Figure 3.4 displays the distributional effect from adding foreign and domestic closely held super-rich wealth to the officially disclosed wealth of the richest percentile in the domestic wealth distribution. This adjustment causes a notable trend break in the share of the top percentile around 1980, with the share increasing from about 20 percent to almost 30 percent by in the early 2000s. Much of this increase occurs in connection with Sweden's financial liberalization in 1989 and continues thereafter, in line with the amounts presented in Table 3.2. Note that these data do not contain any assumed accumulated interests on the foreign capital, why they should be interpreted as cautious estimates. Note also the increasing wedge between the new series and the basically flat trend in the official wealth tax-based series.

Figure 3.4: Adding foreign and super-rich wealth to the top percentile, 1950–2006.



Note: Notation "dom." means shares using market-valued tax-based domestic wealth, "f.f." is mainly closely held family firm wealth owned by super rich residents, and "for." means the addition of foreign household wealth estimated from the B.o.P. (see text for further details).
Sources: Tables 3.A1 and 3.A2.

The sizeable impact of foreign wealth on the wealth concentration is probably a phenomenon that is, if not unique, unusually important for Sweden (and possibly for the other Nordic countries). The combination of high taxation of wealth, large increases in especially financial wealth beginning in the early 1980s and the lowered cost of avoiding wealth taxes by moving wealth abroad would suffice to explain the observed patterns. When doing the same additions for the U.S., i.e., adding foreign wealth (in the net errors and omissions in the Balance of Payments) and the often closely held wealth of the super-rich (in the Forbes listings), there is no similar effect on the domestic wealth concentration.[142]

[142] Adding these wealth items increases the 2004 share of the U.S. top wealth percentile increases its share from 33.4 to 34.6, an increase of about 3 percent which is to be compared to the more 50 percent increase in the Swedish case. The calculation is based on top wealth share in the Survey of Consumer Finances (Kennickell, 2006). Then we add 80 percent (assumed share of capital owned by households) of the accumulated net errors and omissions ("Statistical Discrepancy") in the U.S. international transactions accounts data (Bureau of Economic Analysis, 2007), with no rate of return on foreign wealth. Second we add the domestic wealth of the top 400 individuals in the Forbes 400, and an additional 1.2 percent of their wealth which is the assumed amount held by rich Americans abroad (based on comparisons between the

3.4 Robustness of our estimates and alternative measures of concentration

3.4.1 Taxation values or market values, taxable wealth or "all" wealth

As discussed above there are a number of potential problems with translating data to wealth shares. When using tax data, the main types of concern stem from differences between tax values and actual (market) values and differences in what items are included in the wealth taxation. Both of these aspects can (but do not necessarily) affect the wealth shares. While our main series after 1975 are wealth shares calculated based on market values (arguably what should be used), such data do not exist for the period before. There are, however, estimates of the market value of the total (taxed) wealth starting in 1935 as well as the effects of market valuation on the wealth shares in 1975.[143] There are also estimates of market values of "all" household wealth (including items which are not part of taxable wealth) for the period 1950–1987.[144] Using these alternative reference totals and various assumptions about the distribution of the difference between our main reference total and these alternatives we can get a sense of how our main series could change.

In Table 3.3 we show the difference in reference totals and what we consider to be the lower bound for the top percentile share, P99–100 (the qualitative differences are the same for all top shares). The shares are based on the assumption that the amounts which are not included in the tax data (or the difference between tax and market values) are distributed according to the income distribution (we think that the true distribution is likely to be more uneven but this gives a lower bound to the estimates). We also include shares based on the assumption that the difference between tax values and market values are the same as in 1975. The resulting shares are lower than our main series, especially when looking at the alternative based on "all wealth" including what is not taxed.[145] This is hardly surprising given that the totals according to Berg (1988) are about twice our reference total and we assume that the difference is distributed according to income. However, as can be seen by the percentage changes between years, the trend is very similar over time.

Forbes 400 and the Americans living aborad in the Forbes listings of the world's richest people).

143 Spånt (1979) where historical figures from 1945 onwards are based on actual data while the values for 1935 are calculated using the relations in 1945.

144 Berg (1988) gives a detailed account of how these data have been constructed.

145 The substantially lower shares when including "all wealth" (including consumer durables) are in line with what the findings in Jansson and Johansson (1988).

Table 3.3: Alternative reference wealth totals, 1930–1985.
a) Levels

Year	Alternative wealth totals (mil. SEK)			Alternative shares for P99–100			
	Tax value	Market value (Spånt 1979)	All wealth (Berg 1988)	Main series	Market-tax distributed as in 1975	Market-tax distributed as income	All wealth-tax distributed as income
1930	15,304	20,404		50.02	42.52	40.96	
1935	17,600	23,460		42.77	36.35	35.16	
1945	25,290	33,500		37.69	32.03	30.85	
1951	32,950	53,300	77,141	32.15	27.33	22.71	17.99
1966	103,180	144,300	232,611	23.41	19.90	18.57	13.95
1970	147,760	190,200	358,106	20.06	17.05	16.98	11.95
1975	358,700	508,000	622,939	17.00	14.45	13.59	12.08
1985	864,213		1,599,307	16.50			11.03

a) Changes

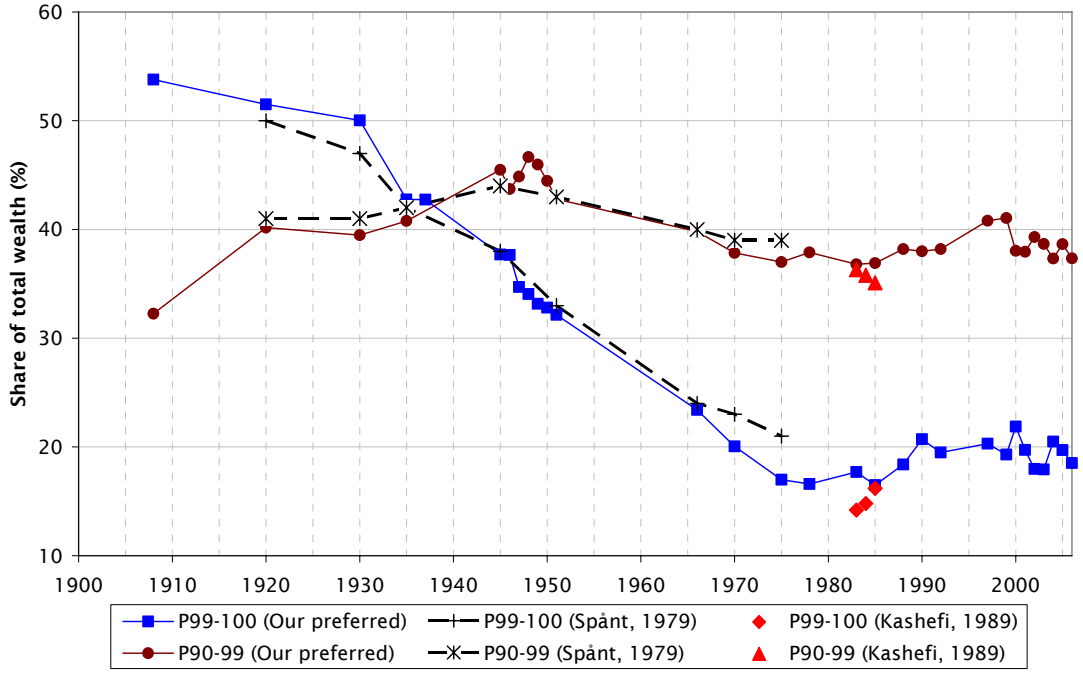
Years	Percentage change of P99–100 (%)			
	Main series	Market-tax distributed as in 1975	Market-tax distributed as income	All wealth-tax distributed as income
1930–35	–14.5	–14.5	–14.1	
1935–45	–11.9	–11.9	–12.3	
1945–51	–14.7	–14.7	–26.4	
1951–66	–27.2	–27.2	–18.2	–22.4
1966–70	–14.3	–14.3	–8.6	–14.4
1970–75	–27.4	–27.4	–26.8	–13.4
1975–85	–2.9			–8.8

3.4.2 Comparing our series with findings in other studies of wealth concentration

An important check of our findings is to contrast them with previous estimates of the Swedish wealth concentration based on slightly different methodologies or sources. Earlier attempts to estimate the distribution of household wealth have used either the same wealth tax sources as we do or completely different sources based on household surveys. Figure 3.5 shows three alternative wealth tax-based estimates of the top wealth percentile (P99–100) and the next nine wealth percentiles in the top decile (P90–99): our main series, those of Spånt (1979) for 1920–1975 and those of Kashefi (1989) of 1983–1985. The main trends and levels are basically the same in all three cases, which maybe is not so surprising given the fact that they all derive from the same wealth data source. Yet it is worth noting that the differences in interpolation techniques, reference

wealth and population totals do not seem to have an important impact on the estimates.

Figure 3.5: Comparison between our series and previous studies.



Note: All series are based on wealth tax statistics. "Our preferred" is the series in Figure 2.

3.4.3 Shares within shares

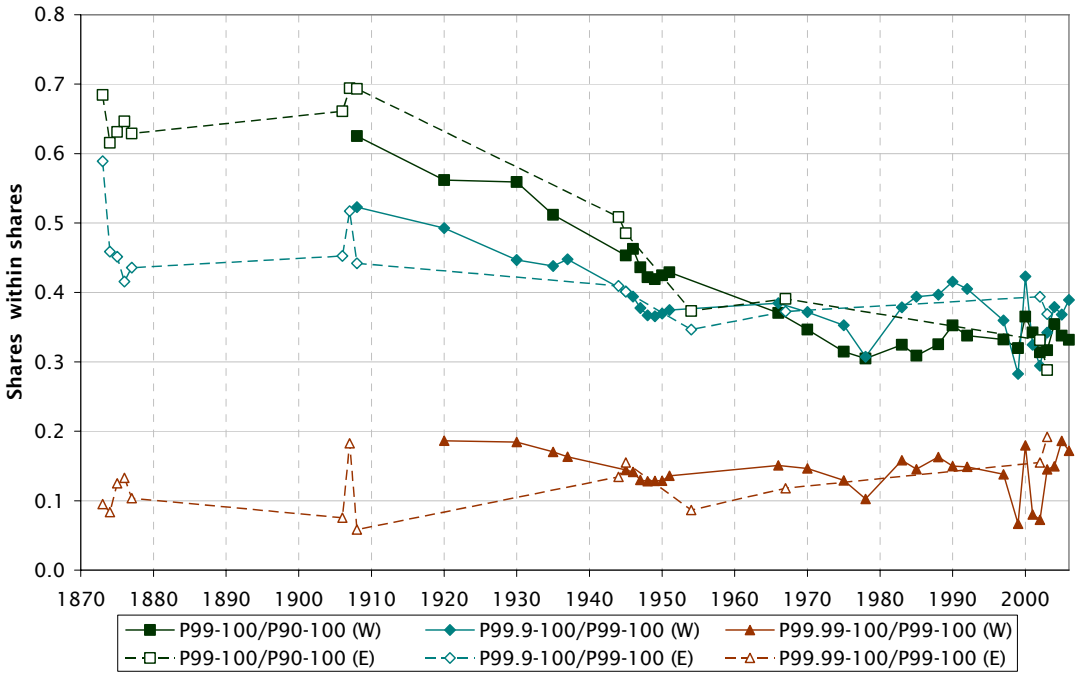
Our top wealth shares may contain measurement error through the estimated reference total wealth held by the full population. An alternative way of studying wealth concentration without having to rely on the reference wealth total of the whole population is to express the concentration in terms of the wealth share of certain top groups within the wealth share of another, larger, top group. For example, by dividing the top wealth percentile by the top wealth decile, P99–100/P90–100, we get a "shares within shares" ratio that eliminates the reference total.[146]

Figure 3.6 depicts the evolution of wealth concentration using shares within shares estimates and hence without any potentially bias from reference wealth totals. Overall, the patterns confirm some of our previous conclusions. The very top of the distribution experience a falling share relative to the group just below, especially in the first half of the century. However, the magnitudes are similar to those observed in our main series, i.e., when the top is related to the wealth of the whole popu-

146 This removes the influence of reference totals because P99–100 = W_{Top1}/W_{All} (for W denoting Wealth) and P90–100 = W_{Top10}/W_{All}. Hence, P99–100/P90–100 = $(W_{Top1}/W_{All})/(W_{Top10}/W_{All}) = W_{Top1}/W_{Top10}$.

lation, implying that the group below the very top behaves similarly to the rest of the population. After around 1950 there is much less change in the concentration within the top group, while top wealth shares in our main series fall. This implies that in this period most of the change is driven not by the changes of the very top in relation to those just below, but by the change of the entire top decile in relation to the rest of the population.

Figure 3.6: Shares within shares-estimates of the wealth concentration.



Note: The notation "W" and "E" refers to wealth tax and estate tax data sources, respectively.
Sources: Calculations based on shares in Table 3.A1.

3.4.4 Altering the definitions of foreign wealth and super rich wealth

Our main analysis showed that foreign household wealth and large domestic family-firm fortunes have a first-order effect on the Swedish wealth concentration after 1980. As was stated, however, the added series were only a subset of all available estimates and also based on restrictive assumptions regarding the return to foreign capital. In the present section we therefore present a number of alternative series using combinations of all available wealth sources (both B.o.P. and F.A. foreign household wealth series as well as journalistic estimates of foreign and domestic wealth of super rich Swedes) and different assumptions about the yield of foreign capital (zero and five percent nominal rate of return).

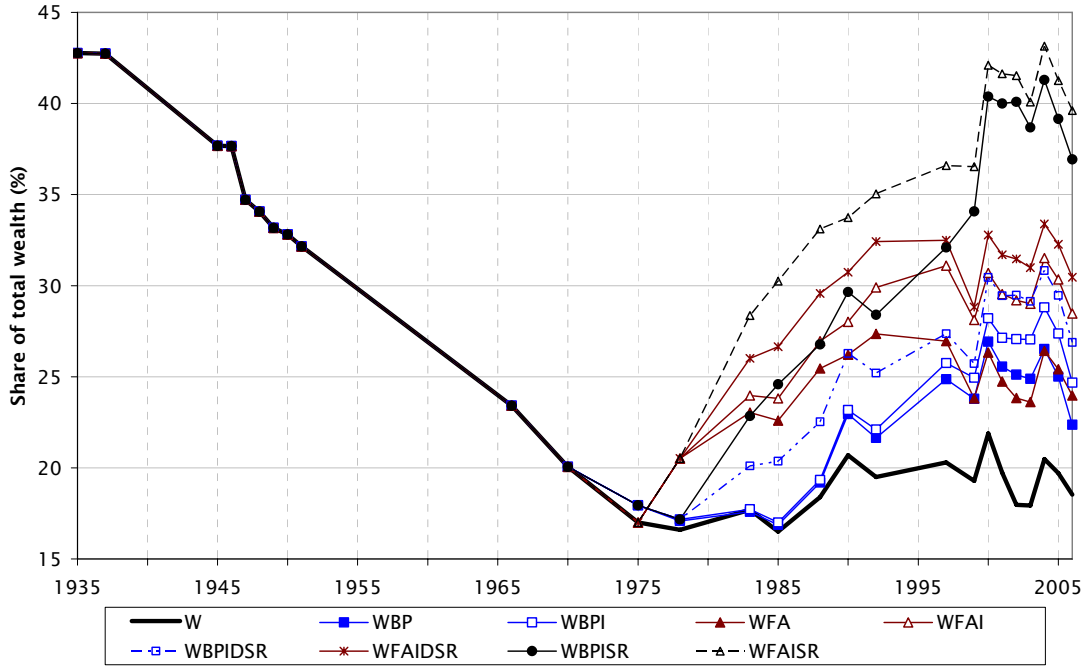
Figure 3.7 depicts the evolution of the top wealth percentile since World War II when different alternative measures of foreign household and domestic family firm wealth are added to the market valued wealth

tax data.[147] The results confirm the sizeable impact on Swedish wealth inequality since 1980, but the degree of impact across the series is quite varying. For example, while the top percentile's share in the unadjusted domestic wealth series is 18.4 percent in 2002, it is 23.9 after adding the (mainly) family-firm wealth of super rich residing in Sweden. Overall, these alternative measures suggest that the impact of foreign wealth and closely held firms is significant and also that the choice of how to view citizens of a country residing abroad can have a very large impact on measures of top wealth concentration.[148]

[147] The domestic benchmark wealth, based on market-valued wealth tax-based data, is denoted "W". Our alternative series then come from adding combinations of different foreign and domestic wealth types to W of the top percentile (P99–100) and, of course, to the reference total. We use the following acronyms: BP (B.o.P.-based estimates of foreign household wealth), FA (F.A.-based estimates of foreign household wealth), BPI and FAI (the two previous but when a 5 percent rate of return is added), DSR (closely held wealth of super rich living in Sweden), and SR (sum of all listed wealth of super rich Swedes living in Sweden and abroad). There are discontinuous jumps in some of the series, in 1978 for those containing F.A.-based foreign wealth (for which we have data from 1978) and in 1983 for those containing domestic super rich wealth for the same reason.

[148] This point is also made by Atkinson (2008).

Figure 3.7: Varying the definition of foreign and journalistic wealth.



Note: The acronyms in the figure are defined as follows: W (Marketable net worth) = Domestic net worth (wealth tax-based), WBP = W + Foreign wealth in B.o.P.; WFA = W + Foreign wealth in F.A.; WBPI = WBP + 5% annual interest on foreign wealth; WFAI = WFA + 5% annual interest on foreign wealth; WBPDSR = WBP + Domestic closely held super-rich wealth; WBPISR = WBPI + Foreign and Domestic closely held super-rich wealth; WFAISR = WFAI + Foreign and Domestic closely held super-rich wealth. See text for details.
Sources: Table 3.A2.

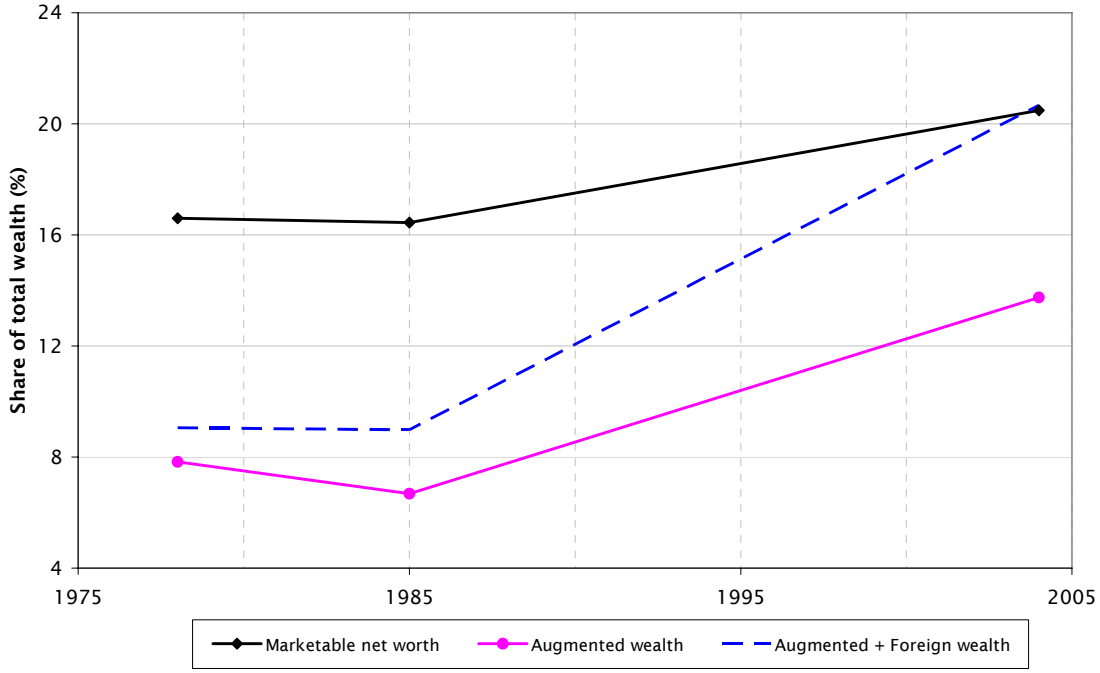
3.4.5 The role of pension and social security wealth

So far we have considered the distribution of net *marketable wealth*, i.e., market-valued real and financial assets less debts. However, as discussed in Section 3.2 researchers have sometimes added the net present value of all current and future claims on the pension and social security systems to the net worth, creating a distribution of *augmented wealth*. The effect of adding the retirement wealth to marketable wealth has typically resulted in a most considerable equalization of wealth (see, e.g., Feldstein, 1976; Feinstein, 1996; Wolff, 2005). For example, the top percentile in the U.K. in 1991 owned 17 percent of marketable wealth but only 10 percent of augmented wealth.

Figure 3.8 depicts the top one percent wealth share in Sweden between 1978 and 2005 using three different concepts of wealth: net marketable wealth, augmented wealth and, to be able to compare the distributional impacts of retirement wealth and foreign wealth, the sum of augmented and foreign wealth. Two findings stand out. First, adding retirement wealth generates, as expected, a much lower level of concentration. Second, the increasing trend in wealth concentration found when adding

foreign wealth to the top percentile is *not* affected by also considering retirement wealth. The trend in augmented wealth concentration follows the largely flat trend in marketable wealth concentration, whereas adding foreign wealth to augmented wealth (the dotted line in the figure) shows that the increasing trend remains unaffected.[149]

Figure 3.8: Top percentile of marketable, augmented and foreign wealth, 1978–2004.



Source: Table 3.A2.

3.5 International comparison

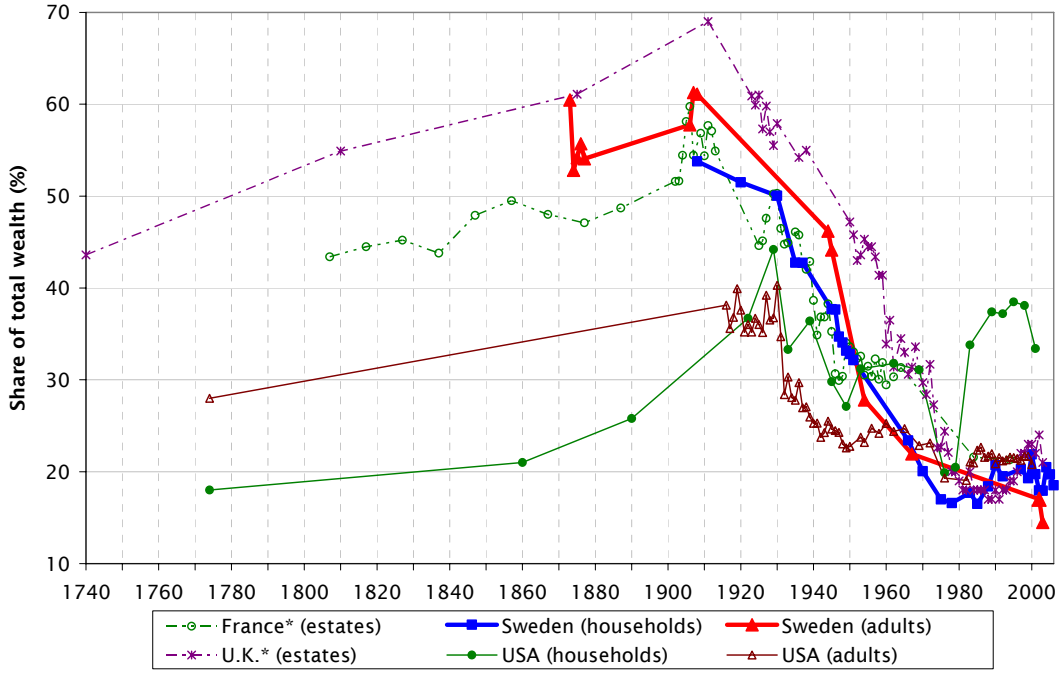
How does the Swedish wealth concentration over the path of development match similar evidence for other countries? In particular, was the distributional impact of industrialization as marginal elsewhere as it seems to have been in Sweden? And was the dramatic wealth compression over the twentieth century a specific Swedish phenomenon based on the development of the extensive welfare state? In this section we make an attempt to address these questions by mapping the Swedish long-run

[149] In fact, the trend increase between 1985 and 2004 is larger when using augmented wealth than when using marketable wealth. A similar result that the equalizing role of retirement wealth has diminished over the past decades has been found for the U.S. in Wolff (2006). However, due to the great uncertainty in the Swedish estimates we refrain from making such a conclusion and confine ourselves with the observation that the trend is basically flat in both the marketable wealth and augmented wealth cases.

experience on that of three other major Western countries: France, the United Kingdom and the United States.

Figure 3.9 depicts the top wealth percentile in these four countries between 1740 and today. The extraordinarily long time period is motivated by the fact that the English industrialization began in the second half of the eighteenth century while it started some 50-100 years later in the U.S. and France and more than 100 years later in Sweden. Clearly, great caution should be taken when comparing these series as they are not based on the same wealth data sources and in all cases but France the outcome of splices between different compilations. Still we are not the first to combine these pieces of evidence and therefore believe that some conclusions can be drawn about the long-run developments we study here.

Figure 3.9: Top wealth percentile in four countries, 1740–2006.



Notes and sources: The estate series for the U.S. (adults and households before 1960) and the U.K. (U.K.* denoting England/Wales up to 1939 and U.K. thereafter) are mortality-adjusted while the Swedish and French ones are not. For U.S. (households) after 1960 survey data were used. For details, see Ohlsson, Roine and Waldenström (2008) and Table 3.A1.

Two broad results can be drawn from the series. First, we do not think that the evidence unambiguously supports the idea that wealth inequality increases in the early stages of industrialization. Looking at the development of the wealth share of the top percentile among the countries analyzed here, the Swedish series exhibit a fairly stable inequality level over the initial stages of industrialization (in the late nineteenth century). The U.K. series (England and Wales) show increasing wealth shares for the top percentile in the period of the two industrial revolutions (1740–1911),

as do the U.S. and French series over the nineteenth century. Overall this suggests that going from a rural to an industrial society, with entirely new stocks and types of wealth being created, may, but does not necessarily, give rise to a large increase in wealth concentration.

Second, while the series do not indicate a clear common pattern over the nineteenth century when industrialization took place the development over the twentieth century seems more uniform. The top percentile wealth share decreased sharply in all countries studied and the order of magnitude seems to be a decrease by about a factor two on average (from around 40-50 per cent in the beginning of the century to around 20–25 per cent today). It also seems that the lowest point in most countries was around 1980 and that the top percentile wealth share has increased in most countries after that. The exception is the U.S. household series which first increases up to 1929, then falls sharply up to 1950 and then goes up and down up to the 1980s when it stabilizes on an internationally high level.

3.6 Concluding remarks

This paper has presented new evidence on trends in wealth concentration in Sweden over the period 1873–2005. Spanning such a long period of time our series allow us to address questions regarding the dynamics of wealth distribution over the path of Sweden's development from an agrarian to a modern economy. It also allows us to put the achievements and the role of the welfare state, as well as the recent increases in wealth concentration, in historical perspective.

The picture that emerges is one of a development with many similarities to what has been found in previous studies for other countries, but also one with some important differences. Overall, our findings suggests that over the path of transition from being a poor agrarian economy to a rich industrialized one, wealth *gradually* spread to wider and wider groups. In terms of how Sweden differs from other countries, and in particular when it comes to the role of the welfare state in explaining this process, two aspects stand out. On the one hand, welfare state policies certainly played an important role in the latter stages of this development and the expansion of the welfare state after World War II coincides with much of the equalization when looking at the relation between wealth shares held by the top decile and the rest of the population. Even if we can not explicitly test their individual influence, data on income equalization, progressive taxation and policies such as subsidized loans to owner occupied housing suggest that these all disproportionately benefited the population below the top ten percent. On the other hand, the gradual

Swedish wealth levelling started much before that. Already around 1910 we see evidence of the groups just below the very top increasing their wealth share and over time the increases move down the distribution. These changes can not be attributed mainly to exogenous shocks to top wealth holders—making the Swedish case different from France, the U.K. and the U.S.—but it is also hard to see what kind of policies enacted in the first half of the century that would cause this pattern.

When looking at the wealth holdings of the P90–95 group in the income distribution, their share more than doubles during 1911–1948. However, during this period the income share of this group remains almost unchanged making it unlikely that the increased wealth share is a reflection of their increased income share. Possible explanations that remain are increased savings in this group or increased income mobility but unfortunately there is very little information on these aspects.[150] What we can say is that, our results once again show the importance of studying developments for smaller subgroups within the top.[151] Looking only at the shares of the top decile and the rest indicates that wealth levelling started around 1950, but a finer decomposition of the shifts within the top decile show that the process of gradual wealth levelling started well before the expansion of the welfare state.

After 1980 wealth concentration has increased, but only slightly according to standard official estimates. The commonly held view is that wealth concentration is still at a historically low level. At the same time there has been an ongoing debate about much of wealth leaving the country (mainly for tax reasons) and also of much wealth being concealed through closely held family firms not captured in tax statistics. Adding what we believe to be cautious estimates of the accumulated wealth that has left the country over the past 25 years as well as estimating the impact of the wealth in large family firms we have shown that Swedish wealth concentration has probably increased by more than what is revealed in the official estimates. We also think that these effects are more important in Sweden than in many other countries. Beside attempting to estimate the magnitudes of these well-known, but typically neglected aspects, these figures also raise some increasingly important questions about how to

150 If the individuals we observe (at a few points in time) in the income group P90–95, so to speak, spend some years in higher income brackets this could explain how they can accumulate wealth even if the income group P90–95 has a constant share of total income. A similar argument has been put forward by Kopczuk and Saez to explain why the very high income inequality over the past decades in the US does not seem to have led to increased wealth inequality

151 Something which is pointed out in many of the recent papers on top incomes including Roine and Waldenström (2008) on Swedish top incomes over the Twentieth Century.

treat foreign wealth (and income) when thinking about questions of economic inequality. Should we consider the distribution of all wealth in a country or of those who live in a country (including their wealth abroad) or should we consider the wealth of all citizens of a country regardless of where they live or have placed their wealth? Regardless of what position one takes on issues such as these, our estimates of recent changes in Sweden suggest that the answer matters a lot for the picture one gets of the wealth distribution.

Appendix: Wealth concentration in Sweden, 1873–2006, main series.

Table 3.A1: Top wealth shares, wealth and estate tax data, 1873–2006.

	Net worth (net marketable wealth)									
	Wealth tax data, market values					Estate tax data, tax values				
Year	P90-100	P95-100	P99-100	P99.9-100	P99.99-100	P90-100	P95-100	P99-100	P99.9-100	P99.99-100
1873						88.34	81.19	60.46	35.60	5.75
1874						85.82	77.35	52.82	24.23	4.41
1875						85.83	77.49	54.18	24.46	6.79
1876						86.14	77.66	55.69	23.15	7.40
1877						85.99	77.39	54.07	23.55	5.60
1906						87.38	78.37	57.75	26.14	4.36
1907						88.32	79.88	61.29	31.70	11.19
1908	86.04	76.17	53.79	28.13	13.64	88.15	79.44	61.10	27.01	3.57
1920	91.69	79.25	51.51	25.37	9.60					
1930	89.49	77.35	50.02	22.35	9.23					
1935	83.55	70.74	42.77	18.73	7.28					
1937			42.74	19.13	6.97					
1945	83.17	65.94	37.69	15.13	5.44	90.93	76.87	44.14	17.70	6.85
1946	81.38	65.77	37.66	14.84	5.32					
1947	79.58	63.45	34.71	13.11	4.51					
1948	80.71	63.11	34.07	12.50	4.36					
1949	79.13	61.82	33.17	12.13	4.27					
1950	77.29	60.62	32.81	12.12	4.22					
1951	74.96	58.98	32.15	12.05	4.37					
1954						74.55	56.63	27.83	9.65	2.41
1966	63.23	46.92	23.41	9.00	3.53					
1967						56.16	42.67	21.95	8.17	2.59
1970	57.90	42.07	20.06	7.45	2.94					
1975	54.00	38.00	17.00	6.00	2.20					
1978	54.50	38.60	16.60	5.10	1.70					
1983	54.50	38.40	17.70	6.70	2.80					
1985	53.40	37.00	16.50	6.50	2.40					
1988	56.60	40.10	18.40	7.30	3.00					
1990	58.70	42.60	20.70	8.60	3.10					
1992	57.70	40.90	19.50	7.90	2.90					
1997	61.10	44.10	20.30	7.30	2.80					
1999	60.34	44.02	19.29	5.45	1.29					
2000	59.93	44.36	21.89	9.26	3.94					
2001	57.69	42.09	19.74	6.41	1.58					
2002	57.27	41.16	17.97	5.29	1.30	51.38	36.55	17.02	6.70	2.64
2003	56.60	40.73	17.93	6.13	2.60	50.33	34.57	14.50	5.35	2.78
2004	57.81	42.69	20.48	7.77	3.06					
2005	58.37	43.58	19.71	7.26	3.67					
2006	55.86	39.98	18.53	7.21	3.19					

Table 3.A2: Top percentile share of marketable wealth after adding foreign, super-rich and retirement wealth, 1975–2006.

	Marketable wealth								Augmented wealth	
	W	WBP	WBPI	WFA	WFAI	WBPIDSR	WFAIDSR	WFAISR	AW	AWX
1975	17.00	17.94	17.94	17.00	17.00	17.94	17.00	17.00		
1978	16.60	17.08	17.17	20.52	20.52	17.17	20.52	20.52	7.82	8.09
1983	17.70	17.59	17.72	23.03	23.97	20.11	26.01	28.36		
1985	16.50	16.87	17.00	22.60	23.81	20.36	26.65	30.25	6.68	8.27
1988	18.40	19.20	19.34	25.45	26.96	22.52	29.58	33.11		
1990	20.70	22.96	23.18	26.21	28.02	26.28	30.74	33.74		
1992	19.50	21.64	22.11	27.36	29.90	25.20	32.42	35.04		
1997	20.30	24.87	25.75	26.96	31.10	27.37	32.49	36.59		
1999	19.29	23.79	24.95	23.81	28.13	25.72	28.83	36.54		
2000	21.89	26.93	28.22	26.33	30.70	30.45	32.78	42.10		
2001	19.74	25.55	27.14	24.73	29.53	29.45	31.69	41.63		
2002	17.97	25.12	27.07	23.83	29.20	29.48	31.47	41.54		
2003	17.93	24.89	27.05	23.61	29.01	29.14	30.99	40.08		
2004	20.48	26.52	28.81	26.42	31.52	30.66	33.24	43.15	13.75	20.69
2005	19.71	25.01	27.37	25.42	30.34	29.38	32.19	41.26		
2006	18.53	22.36	24.68	23.97	28.47	26.83	30.40	39.61		

Note: W (Marketable net worth) = Domestic market valued wealth tax-based wealth; WBP = W + Foreign wealth of B.o.P.; WFA = W + Foreign wealth of F.A.; WBPI = WBP + 5% annual interest; WFAI = WFA + 5% annual interest; WBPDSR = WBP + Domestic super wealth; WBPISR = WBPI + Foreign and Domestic super wealth; WFAISR = WFAI + Foreign and Domestic super wealth; AW (Augmented wealth) = W + pension and social security wealth; AWX = AW + WBPIDSR – W.
Source: See the text.

Chapter 4

Long-Run Changes in the Concentration of Wealth: An Overview of Recent Findings*

4.1 Introduction

In this chapter we review the latest findings on historical wealth concentration in a number of Western countries. We also present new series for Scandinavia, and, finally, we compare these developments over time. The aim is to distinguish between common trends and changes which are more likely to be country specific. In particular we revisit the question of whether wealth inequality increased in the initial phase of industrialization and to what extent later stages of development saw a reversal of such a trend. Ultimately the goal is to present new insights about the dynamics of wealth distribution over the development path. This in turn may have implications for countries currently in early stages of development.[152]

We believe that there are several reasons for why it is interesting to study the evolution of wealth concentration in Scandinavia compared to other

* This chapter is co-authored with Henry Ohlsson and Jesper Roine. It has also been published in Davies, J.B. (ed.), *Personal Wealth from a Global Perspective*, Oxford University Press, Oxford.

152 There is a large theoretical literature on the interplay between wealth distribution and development which emphasizes wealth distribution as a determinant of individual possibilities to pursue different occupations, especially in the presence of credit constraints when assets are essential as collateral or as a means of directly financing entrepreneurial undertakings. This literature does not, however, give a uniform message about the dynamics of wealth distribution over development. Indeed recent models can be classified according to their predictions about how markets affect the distribution of wealth in the long-run (see, e.g., Mookherjee and Ray 2006). Some promote an equalization view, in which the intergenerational transmission of wealth causes convergence (e.g., Becker and Tomes 1979, Loury 1981). Stiglitz (1969) also showed long-run equalization to be the predicted outcome under quite general assumptions in a standard neoclassical framework. Others take the complete opposite view that markets in the long-run increase wealth inequality (e.g., Ljungqvist 1993; Mookherjee and Ray 2003). In between these extremes we find models which permit both initial inequalities and initial equalities to persist. Typically, history determines where a society ends up in the long run view (Banerjee and Newman 1993; Galor and Zeira 1993; Aghion and Bolton 1997; Piketty 1997; Matsuyama 2000; and Ghatak and Jiang 2002). Data on wealth distribution over the transition from agrarian to industrial society is therefore also important to evaluate the various theoretical predictions.

countries. First, compared to most countries for which data on wealth concentration exist, the Scandinavian countries were late to industrialize. This, combined with the fact that we have data stretching as far back as to around 1800, means that we can follow wealth concentration over the whole transition from before industrialization up to now.[153] A second reason for comparing Scandinavia to other Western countries is that the Scandinavian countries are well known to be extremes in the spectrum of welfare states, their achievements in terms of equalizing income and wealth are well known.[154] However, it is not equally established how much of the equalization took part before the welfare state expansion and, in particular, it is not clear why it happened.[155] Finally, a common theme stressed in several recent studies is that a number of exogenous shocks to wealth holdings during the first half of the twentieth century are the main explanation to the dramatic declines in top wealth shares. As Sweden did not take part in the world wars and was less affected by the Great Depression compared to many other countries, the development of wealth concentration over these periods is interesting. If Swedish wealth concentration falls at the same time as in other countries, different mechanisms must be at work than if Sweden (and other countries not involved in the wars) showed no decline in wealth inequality.

We will focus on the most recent studies for France (Piketty et al. 2006), Switzerland (Dell et al. 2007), and the US (Kopczuk and Saez 2004), but we also include UK data from Lindert (1986, 2000) for the nineteenth century, UK data from Atkinson and Harrison (1978) and Atkinson et al. (1989) for the twentieth century, US wealth distribution data from Lindert (2000). Our hope is that focusing on these recent studies we can update the parts of the picture given by Davies and Shorrocks (2000).[156] For Scandinavia we rely on new data based on wealth tax sta-

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153 The first observation for Sweden is 1800, and for Denmark and Norway 1789. These early estimates are due the pioneering work by Soltow (1980, 1981, 1985). In terms of new data our earliest observations are 1868 for Norway, 1873 for Sweden, and 1908 for Denmark.

154 See, for example Esping-Andersen's (1990) famous categorization of different types of welfare states.

155 Spånt (1978) studies Sweden during the period 1920–1975 and establishes that wealth shares did fall substantially before the welfare state expansion. We provide new data for earlier periods and more details for the period 1920–1975 allowing us to draw new conclusions about when the major changes took place.

156 In a way, these recent studies can be seen as a renewed interest in the long-run development wealth concentration, despite the obvious short-comings of early data. As noted by Davies and Shorrocks (2000), the emphasis in the past decades had been shifting away from general distributional characteristics to causes of individual differences in wealth holdings. Such questions require micro data, typically not found before the 1960s, and, therefore, much of the long-term perspective had, until recently,

tistics as well as some new estate tax data. For the case of Sweden using new data allows us to construct comparable series from 1908 until today, while we for Denmark and Norway compile data from a number of previous publications trying to link comparable estimates. These series are the result of our first analysis of the new Scandinavian data and our future work may contain adjusted estimates. A more detailed account for the sources is available in the Data appendix.

4.2 Recent country studies

4.2.1 Some measurement issues

The main conceptual and measurement issues relevant when studying the historical development of wealth inequality relate to how wealth and wealth holders are defined in the different sources and to how this affects the calculation of wealth concentration. More elaborate discussions can be found in, e.g., Davies and Shorrocks (2000) and Atkinson (2008).

The wealth definition in historical sources is usually *net wealth* (also called net worth or net marketable wealth), defined as the sum of real and financial assets less debts. This is the most common concept appearing in the historical tax-based sources (that is wealth and estate taxes) and the main concept used throughout this chapter. For the postwar years, however, *augmented wealth*, defined as net wealth and pension wealth (contributions into pension schemes and future social security payments), has been proposed as an alternative.

Wealth and estate taxation provide the most common sources of historical wealth data. These fiscal instruments have been levied for centuries and the authorities have often been interested not only in collecting the revenues but also to calculate the sizes of the tax bases. In the present study, the series from France, the U.K., and the U.S. are based on the estate tax, specifically on samples of individual estate tax returns.[157] The wealth data from Denmark, Norway, and Switzerland are based on wealth taxes, in most cases as tabulated distributions published by each country's tax authorities. For Sweden we have data based both on wealth and estate taxes.

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been considered, if not less important, then impossible to study due to the lack of data. New research, following Piketty (2001a), Piketty and Saez (2003) and Atkinson (2004), focusing first on income but then also on wealth distribution (some of which we review here) has lately changed this.

[157] These are generally adjusted to reflect the distribution of the living population by use of inverse mortality rates for age, sex and social status classes; see Atkinson and Harrison (1978, ch. 3) for a thorough description of the estate multiplier method.

Tax-based statistics have some well known problems, the most obvious relating to tax evasion and avoidance. Whether such activities lead to errors in estimated wealth shares is, however, not clear. If non-compliance and tax planning is equally prevalent in all parts of the distribution—it may of course take very different forms—this affects the reported wealth levels but not the shares. The same goes for comparisons over time and across countries. Unfortunately there is little systematic evidence on this. Overviews, such as Andreoni, Erard and Feinstein (1998), and Slemrod and Yitzhaki (2002) (which are mainly concerned with personal income taxes) suggest that while avoidance and evasion activities are important in size there are no clear results on the incidence of overall opportunities nor on these activities becoming more or less important over time.[158]

Furthermore it is not clear whether to expect more or less avoidance and evasion in countries with higher tax rates. While incentives to engage in avoidance and evasion clearly increase with taxes, so do the incentives for tax authorities to improve their information.[159] Concerning wealth and estate taxes it seems plausible to think that estate tax data is more reliable since it is typically in the interest of the heirs to formally establish correct valuations of the estate.[160] At the same time tax planning aimed at avoiding the estate tax is an important industry in the US and elsewhere. This may affect the reliability of the data. For wealth tax data problems of underreporting are likely to be similar to those for income data, with items which are double reported being well captured while other items are more difficult. Finally, the use of tax shelters may be a problem. Given the large fixed costs related to advanced tax planning it is likely that such activities are limited to the very top of the distribution. If

158 For example, Agell and Persson (1990) and Gordon and Slemrod (1988) argue that tax arbitrage opportunities generally benefit those at the bottom and top of the tax rate distribution (typically corresponding low- and high income earners) to the disadvantage of those in the middle. Tax evasion (in developed countries) seems to be a relatively minor problem when it comes to income from wages and salaries, and capital income from dividend and interest, but more of a problem for self-employment income and informal small business income (e.g., Slemrod and Yitzhaki, 2002) but again, it is not clear that these activities on aggregate are unevenly spread across the distribution.

159 Friedman, Johnson, Kaufman and Zoido-Lobaton (2000) provide evidence supporting the idea that higher taxes also leads to better administration across a broad sample of countries as they find that higher taxes are associated with less unofficial activity.

160 For 2001, the most recent for which the IRS has final figures, the tax gap in the US (i.e. the difference between taxes owed and taxes paid) was around 16 percent. Out of the 345 billion dollars that make up the tax gap only about 4 billion were associated with estate and exise taxes.

this has become more important over the past decades—something that seems likely—then estimates of wealth concentration for recent periods may understate wealthholdings in the very top and not be directly comparable with estimates produced for earlier years in this century, in particular top wealth shares may be underestimated for recent decades.[161]

Even if there are problems with tax statistics, calling for causion especially when comparing long series across countries, there are some positive aspects as well. First, tax statistics are often available for long time periods. They are also typically quite comprehensive in their coverage implying smaller sampling errors. The fact that tax-based data stems from an administrative process which is part of enforcing the tax legislation means that declining to respond is typically not an option. This means that the "response rate" in tax-based data is likely to be higher than in survey data.[162]

The definition of wealth holders in the tax statistics, i.e., the tax units, differs across the wealth and estate taxes and, therefore, also across the countries studied here. The wealth tax (in Sweden, Denmark, and Switzerland) uses variants of the *household* as tax unit. This, in principle refers to families (i.e., married couples and their under-aged children living under the same roof) and single adults who then make up the relevant tax population.[163] The estate tax data (in France, the U.K., and the U.S.) is based on (deceased) *individuals* and hence the tax population consists of all adults.[164] The tax unit definition actually matters for the distribu-

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161 Dell, Piketty and Saez (2007) find that the number of wealthy foreigners living in Switzerland has increased sharply since the 1950s. However, they also find that the amounts earned in Switzerland from all non-residents is very small relative to the amounts reported by high incomes in the United States (less than 10 percent of all incomes earned by the top 0.01% income earners in the U.S.). But, as they also note, there are other tax havens and, especially for relatively small open economies such as the Scandinavian countries, wealth held abroad may have an important impact on top wealth shares. Roine and Waldenström (2008) show that the share of the top wealth percentile in Sweden increases substantially if one would add the amounts of estimated household wealth placed abroad using capital flow data in the balance of payments statistics.

162 Johansson and Klevmarken (2007) compare survey and register wealth data and find that there is no general tendency of survey data to underestimate mean wealth with the exception of the last percentile. This underestimate is however not due to under-reporting but rather to selective nonresponse.

163 It should be noted that households and families are not fully equivalent, e.g., in the, often historical, cases when households also include servants and other non-related persons. We disregard these distinctions for practical reasons and treat family- and household- based tax systems as essentially identical.

164 An additional problem is that the age cut-off may vary across countries and even within countries over time, which could introduce measurement errors and problems of comparability.

tional estimates as shown by Atkinson and Leigh (2007b). Unless husbands and wives have equal wealth, individual-based data tend to (but must not) give rise to a more unequal wealth distribution than does the household-based data. The wealth holder concept also matters when studying wealth inequality trends over very long time periods, for example from periods when a significant share of the population was represented by slaves, unfree women or improperly registered immigrants. Shammas (1993) shows that the U.S. historical wealth concentration is different depending on how one chooses to include these different subgroups into the reference tax population. Our aim has been to use whichever historical estimate that generates the highest degree of consistency over time for all countries.

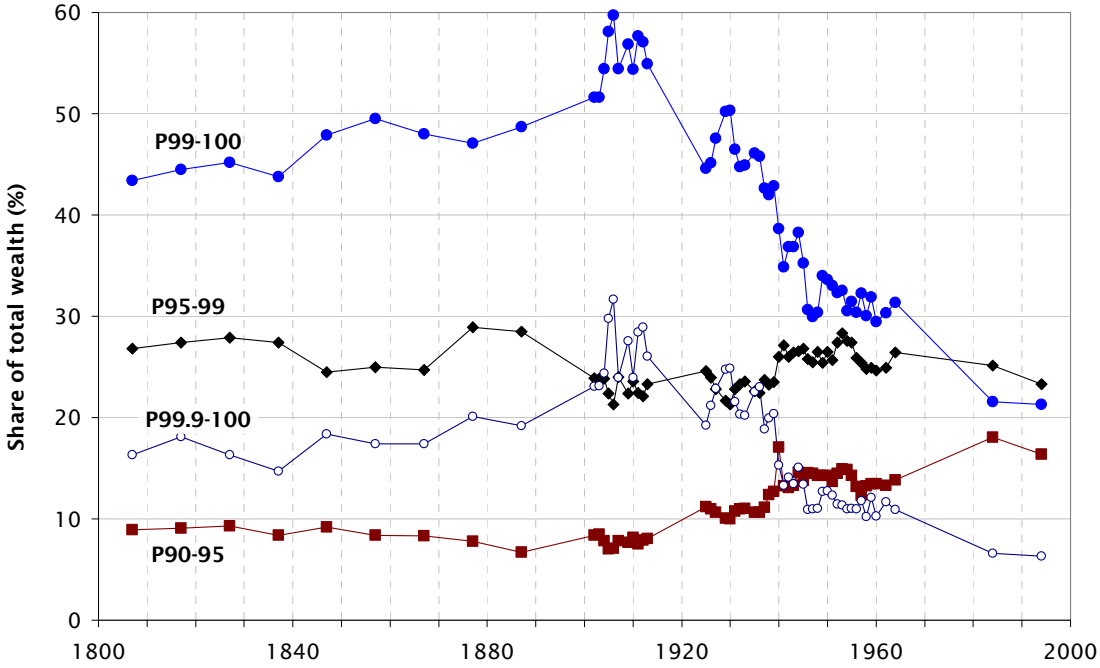
4.2.2 France

The long-run evolution of French wealth inequality is particularly interesting to study given France important role for Europe's economic and political development. Recently Piketty et al. (2006) presented new data on wealth concentration for Paris and France over almost two hundred years, from the Napoleonic era up to today. No previous study on any country has produced such a long homogenous time series offering a complete coverage of the effects of industrialization on wealth inequality. The French wealth data comes from estate sizes collected in relation to an estate tax which was established in 1791 and maintained for more than two centuries. For every tenth year during 1807–1902, the authors manually collected all estate tax returns recorded in the city of Paris—Paris was chosen both for practical reasons but also because it hosted a disproportionally large share of the wealthy in France. Using summary statistics on the national level for the estate tax returns, the top Paris wealth shares were 'extrapolated' to the national level. For the post-1902 period, tabulated estate size distributions published by French tax authorities were used.

Figure 4.1 shows the evolution of the wealth shares for some fractiles within the top wealth decile in Paris (1807–1902) and France (1947–1994). The estimates are from the population of deceased, i.e., directly from the estate tax returns, but comparisons with the equivalent wealth shares for the distribution of the living population (computed using estate multipliers) reveals practically identical trends and levels.[165]

[165] Using data in Piketty et al. (2004: tables A2 and A4) over top wealth shares for both the dead and living populations in Paris and France, it is evident that the trends in wealth shares over time is practically the same for all fractiles and even the levels do not differ much, on average 0.4 per cent for the top decile and 5.1 per cent for the top percentile.

Figure 4.1: Top wealth shares among the deceased in France, 1807–1994.



Source: Piketty et al. (2004, tables A3 and A7).

The figure shows that wealth concentration increased significantly for the top 1 and 0.1 percentiles over the nineteenth century, first slowly up to the 1870s then more quickly until its peak at the eve of the First World War. By contrast, the two lower groups in the top decile are much less volatile during the period. The bottom 5 per cent (P90–95) held about 9 per cent of total wealth until the First World War when its share started to increase slowly until it had doubled by the 1980s. The next 4 per cent (P95–99) stayed put on a level around 27 per cent of total wealth throughout the period.

These patterns suggest that the French industrialization, which took off around mid-century, greatly affected personal wealth. It did so already after a couple of decades, but only in the absolute top. This conclusion is further supported by two other observations. First, the composition of top wealth went from being dominated by real estate assets (mainly land and palaces) in the first half of the century to being dominated by financial assets (cash, stocks and bonds), which were supposedly held by successful industrialists and their financiers. Second, over the same period the share of aristocrats among top wealth holders decreased from about 40 per cent to about 10 per cent.[166] From the First World War to the end of the Second World War, top wealth shares declined sharply, which according to Piketty (2003) is directly linked to the shocks to top capital hold-

[166] These facts are shown in Piketty et al. (2006, figures 4-6).

ings that inflation, bankruptcies and destructions meant. The postwar era was quieter with regard to changes in the wealth concentration, although its decline continued most likely in relation to the increase of progressive taxation (Piketty et al. 2006).

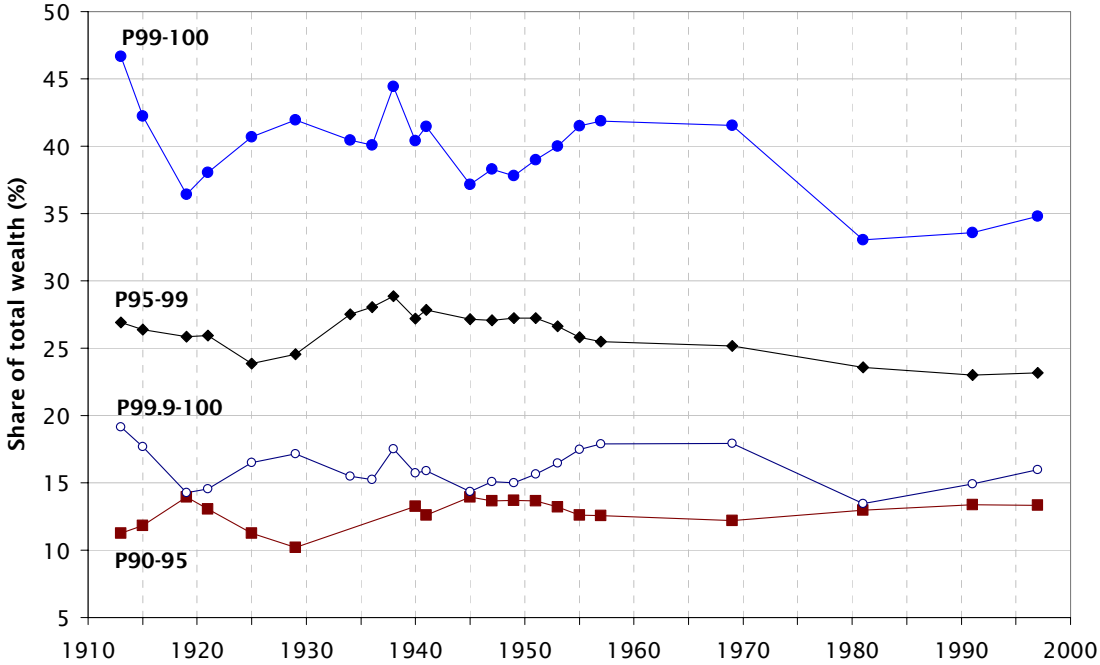
4.2.3 Switzerland

Switzerland is an interesting point of reference to any cross-country analysis of industrialized countries because of its specific institutional setting with little central government interference and low overall taxation levels. Also Switzerland did not take part in the world wars. Data on the Swiss wealth concentration are based on wealth tax returns compiled by tax authorities for disparate years between 1913 and 1997 (Dell et al. 2005). The Swiss wealth tax was levied on a highly irregular basis and the authors have spliced several different point estimates from local as well as federal estimates to get a fairly continuous series for the whole country.

Figure 4.2 depicts top wealth shares within the Swiss top wealth decile over the twentieth century. In stark contrast to the other countries surveyed in this study, wealth concentration in Switzerland appears to have been basically constant throughout the period. The wealth shares at the top of the distribution have decreased but the movements are small compared to all other countries studied.[167] This does not only refer to the top decile vis-à-vis the rest of the population, but perhaps most strikingly also to the concentration of wealth within the top. The highest percentile and the top 0.1 percentile have not gained or lost considerably compared the bottom nine per cent of the top decile, except for some short-run fluctuations. It is not obvious how to account for this long-term stability in terms of the country's relatively low level of wealth taxation, nor can the fact that Switzerland stayed out of both of the world wars alone account for this, as Sweden which also escaped both world wars does not share the Swiss pattern of development of the wealth distribution. In any case, the Swiss top wealth share series seriously question the hypothesis that significant economic development always lead to a lower level of wealth inequality over time for reasons of either redistribution or simply relatively quicker accumulation of household wealth among the middle class.

[167] A simple trend regression yields small but significant negative coefficients.

Figure 4.2: Top wealth shares in Switzerland, 1913–1997.



Source: Dell et al. (2007, table 3).

4.2.4 United Kingdom

The historical data on UK wealth concentration are available from before the country's industrialization. Prior to the twentieth century, however, data are collected from scattered samples of probate records and occasional tax assessments (see Lindert 1986, 2000). It was not until the Inland Revenue Statistics started publishing compilations of estate tax returns after the First World War that the series are fully reliable (see Atkinson and Harrison, 1978; Atkinson et al., 1989).[168] It should be noted that the geographical unit of analysis changes over time, with pre-Second World War numbers almost always being England and Wales while the postwar ones reflect all of the UK. Data in Atkinson et al. (1989, table 1) show, however, that the differences between these entities are fairly small.

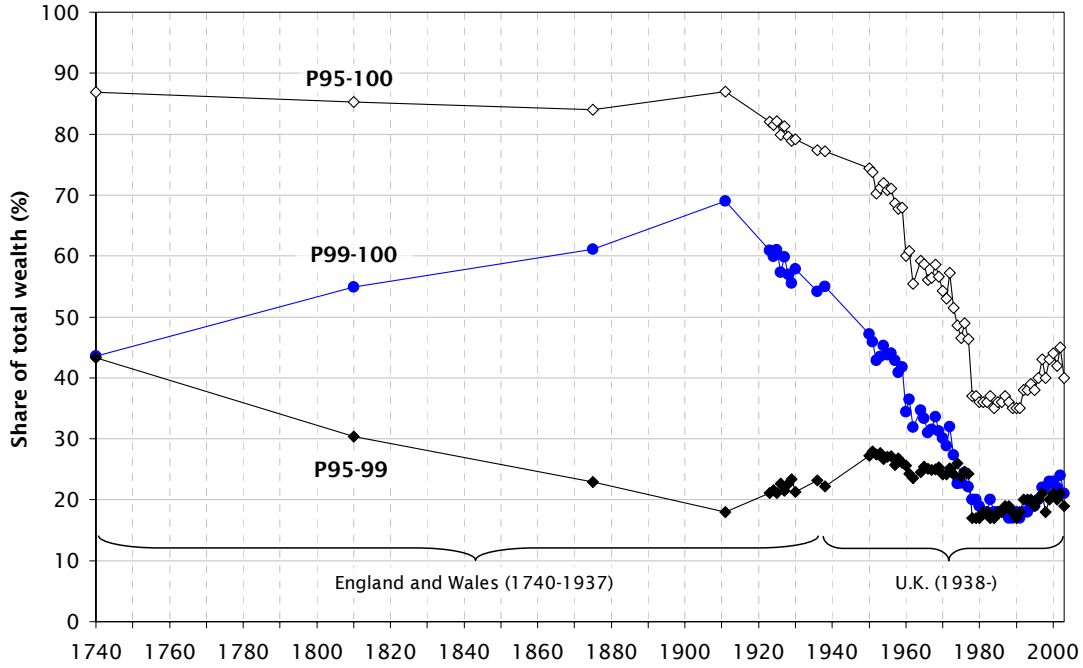
When England industrialized in the second half of the eighteenth century, the build-up of personal wealth also changed. Looking at the overall wealth concentration in Figure 4.3 it is evident that there is great heterogeneity within the top 5 per cent of the distribution.[169] Apparently, wealth concentration at the very top increased while, by contrast, the

[168] Some sources of variation remain, however, such as the fact that for 1911/13 estate multipliers were only based on age whereas they from 1923 onwards were based on both age and gender.

[169] The reader should keep in mind that this figure, and several others in this study, contains spliced series coming from different sources which naturally may impede the degree of homogeneity over time.

wealth share of the next 4 per cent saw its wealth share decline during the same period. Using supplementary evidence on personal wealth, Lindert (1986, 2000) shows that wealth gaps were indeed increasing in the absolute top during the nineteenth century, with large landlords and merchants on the winning side. At the same time, Lindert points out that the middle-class (i.e., those between the 60th and 95th wealth percentiles) were also building up a stock of personal wealth, and this is probably what is causing the drop in the share of the next 4 per cent in Figure 4.3.

Figure 4.3: Top wealth shares in the UK (and England and Wales), 1740–2003.



Sources: See data appendix.

After the First World War, the pattern was the reversed. While the top percentile wealth share dropped dramatically from almost 70 per cent of total wealth in 1913 to less than 20 per cent in 1980, the share of the next 4 remained stable and even gained relative the rest of the population. Atkinson et al. (1989) argue that this development was driven by several factors, but that the evolution of share prices, the ratio of consumer durables and owner-occupied housing (i.e., popular wealth) to the value of other wealth were the most important ones. According to the most recent statistics from the Inland Revenue, the top 1 per cent wealth share has increased by about one third between 1990 and 2003, but this increase has not yet been explained by researchers. Possibly, it reflects the surge in share prices following the financial market deregulation of the 1980s (the

'Big Bang') as the financial wealth are most concentrated to the absolute top of the wealth distribution.[170]

4.2.5 United States

The historical development of US wealth concentration has been extensively studied by economists and historians.[171] Inequality estimates are available back to the time of the American Revolution. In this study, we combine pieces of evidence to create long (fairly) homogenous series of wealth inequality for the US. There are several problems with the final series concerning consistency and comparability over time (for reasons discussed in section 3.1). For the twentieth century we compare complementary series based on different sources and definitions of wealth to get an idea of how large these problems may be.

In Figure 4.4, the evolution of the U.S. top wealth decile is shown over the period 1774–2000 with the top percentile drawn from two different distributions: adults and households. Specifically, the top wealth shares for adults in 1774 come from Shammas (1993), who in turn adjusted earlier estimates of Alice Hanson Jones by adding unfree men and women to the reference total population, and for the years 1916–2000 from Kopczuk and Saez (2004) who use federal estate tax returns. For the household distribution, data come from Shammas (1993), Lindert (2000) and various twentieth century estimates by Wolff (1987, forthcoming).[172]

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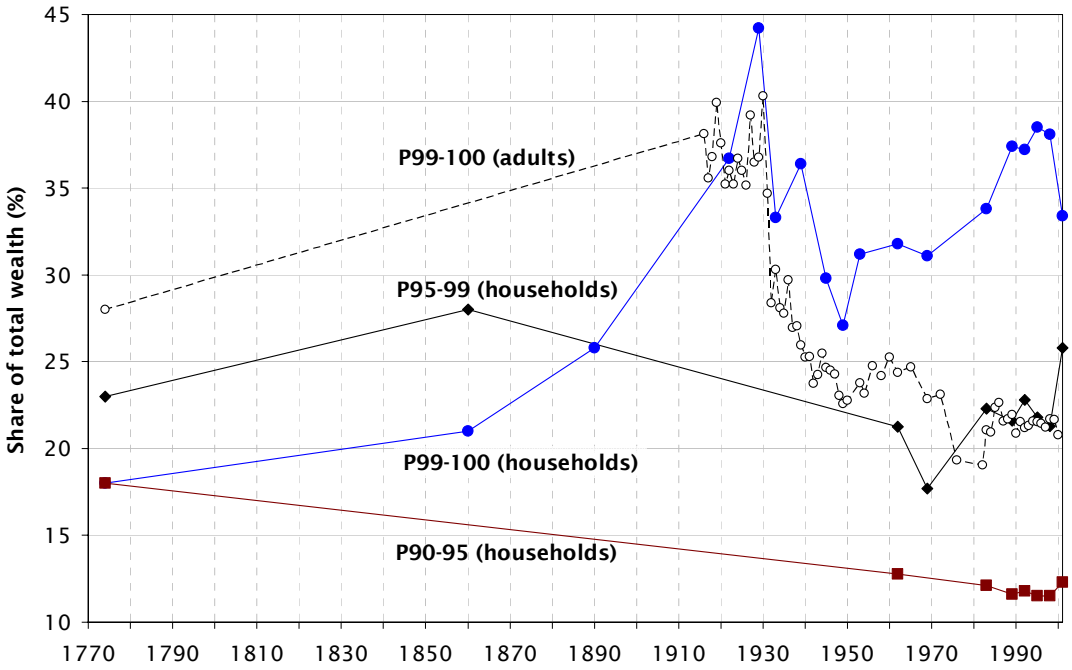
170 This is a stylized fact which is true for many developed countries (see, e.g., the overview of "stylized facts" in Davies and Shorrocks 2000).

171 See, e.g., Williamson and Lindert (1980) and Lindert and Williamson (1980).

172 While the pre-Second World War data are mainly drawn from censuses, the post-1962 observations from Wolff (1987, forthcoming) are based on survey material.

Figure 4.4: Top wealth shares in the US, adult and household populations, 1774–2001.



Source: See data appendix.

The two top percentile series seem inversely U-shaped over the period, with wealth shares increasing slowly between the late eighteenth and the mid-nineteenth century but then much faster between 1860 and 1929, when they more than doubled. The long-run pattern of the lower 9 per cent of the top wealth decile, however, exhibit stable or even decreasing shares of total wealth (although based on rather few observations). This inequality increase in the absolute top coincides with the industrialization era in the U.S. around the mid-nineteenth century. Although the few pre-First World War estimates are uncertain, their basic message is supported by researchers using other sources. For example, Rosenbloom and Stutes (2005) also find in their cross-sectional individual analysis of the 1870 census that regions with a relatively high share of its workforce in manufacturing had relatively more unequal wealth distributions (see also Moehling and Steckel 2001). Another anecdotal piece of evidence in support for a linkage between industrialization and increased inequality is that the fifteen richest Americans in 1915 were industrialists from the oil, steel and railroad industries and their financiers from the financial sector.[173]

The twentieth century development in Figure 4.4 suggests that wealth concentration peaked just before the Great Depression, when the financial holdings of the rich were highly valued on the markets. In the

[173] See the listing of the top 20 fortunes in 1915 by De Long (1996).

depression years, however, top wealth shares plummeted as stocks lost almost two-thirds of their real values. Kopczuk and Saez (2004) show that among corporate equity represented more than half of the net wealth of the top 0.1 percentile wealth holders in 1929. Another contributing factor to wealth compression was surely the redistributive policies in the New Deal. After the Second World War, the top percentile wealth shares remained low until the 1980s when the top household percentile's share increased significantly, peaking around mid-late 1990s and then to decline somewhat in 2001 (Wolff forthcoming). By contrast, the top adult percentile wealth share from the estate series in Kopczuk and Saez (2004) exhibits no such increase, which is surprising given that this period also saw a well-documented surge in US top incomes (Piketty and Saez 2003). Whether the difference in trends between the household and adult distributions reflects inconsistencies in the data or some deeper dissimilarity in the relation between income and wealth accumulation remains to be examined by future research.

4.2.6 Denmark

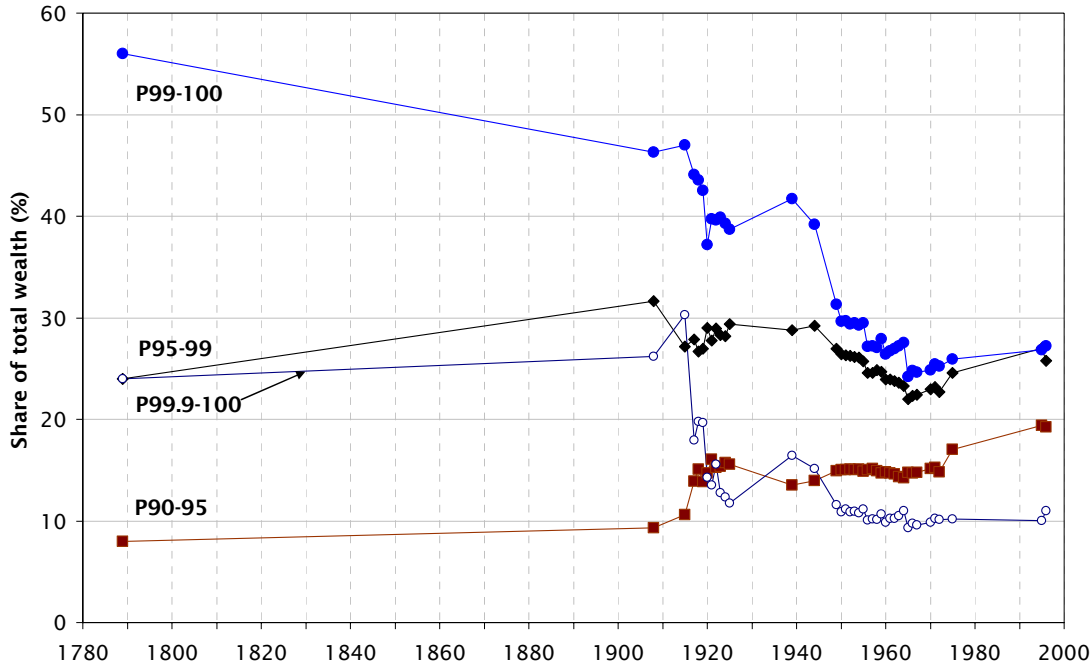
For Denmark, there exist historical estimates of wealth concentration from as early as 1789 and then more frequently from the beginning of the twentieth century onwards. The comparability of these observations is not perfect and the composite series must thus be interpreted cautiously. Nevertheless, this study is the first to present a full range of wealth inequality estimates from the periods before, during and after the industrialization of Denmark that took place in the late nineteenth century.

The earliest data for Danish wealth concentration come from a comprehensive national wealth tax assessment in 1789, from which Soltow (1981) has collected a large individual sample of the gross wealth of households. After this year, however, there is a gap in the data until the early twentieth century when the modern wealth tax had been introduced. For 1908–1925, Zeuthen (1928) lists tabulated wealth distributions (number of households and their wealth sums in different wealth size classes) for Danish households, adjusted so as to include also those households with no taxable wealth. Similar tabulated wealth tax-based data are published in Bjerke (1956) for 1939, 1944, and 1949 and in various official statistical publications of Statistics Denmark for a few years thereafter until the wealth tax was abolished in 1997.[174]

[174] The estimates in 1995 and 1996 were constructed from only the tabulated number of wealth holders (families) and the total net wealth in the whole country. Supplementary Danish top wealth shares exist for the 1980s in Bentzen and Schmidt-Sørensen (1994), but unfortunately wealth size has been top-coded in their data and the resulting estimates are not fully comparable with the other tax-based data.

Figure 4.5 shows the wealth shares of groups within the top decile between 1789 and 1996. The lowest 5 per cent (P90–95) exhibits a flat trend up to 1908 and thereafter doubles its share from 10 to 20 per cent over the twentieth century. The next 4 per cent (P95–99) lies constant between 25 and 30 per cent of total wealth over the entire period whereas the top percentile (P99–100) decreases significantly over the period, with particularly marked decreases after the two world wars. When looking at the very top of the distribution, the top 0.1 percentile (P99.9–100), there is no decrease at all up to 1915, but instead there is a dramatic drop by almost two-thirds of the wealth share between 1915 and 1925. Overall, the Danish wealth concentration decreased over the course of industrialization and this continued throughout the twentieth century, although the development was not uniform at all times and across all groups.

Figure 4.5: Top wealth shares in Denmark, 1789–1996.



Source: See data appendix.

Explaining the wealth compression of the Danish industrialization can be done by comparing the identities of the Danish top wealth holders before and after the late nineteenth century. In 1789, the dominant groups in the top of the wealth distribution were owners of large agricultural estates. Soltow (1981, p. 126) cites an historical source saying that "some 300 Danish landlords owned about 90 per cent of the Danish soil". By contrast, in 1925 the group with the largest private fortunes was the stock brokers (*Veksellerere*) although landlords (*Godsejere, Proprietærer og*

Storforpagterere) were still wealthy, both groups having more than fifty times larger average wealth than the country average.[175]

The drops in top wealth shares after the two world wars were partly associated the sharply progressive wartime wealth taxes.[176] According to Bjerke (1956, p. 140), however, the fall after the Second World War was also largely due to new routines in the collection and valuation of wealth information of the tax authorities, which in particular made middle-class wealth more visible. Towards the end of the century, the wealth concentration continued declining up to the 1980s, largely due to increased share of the relatively equally distributed house-ownership in the total portfolio (Lavindkomstkommissionen 1979, ch. 5), but thereafter started to increase up to the mid 1990s.

4.2.7 Norway

As for the case of Denmark, the Norwegian wealth concentration data also come mostly from various kinds of wealth taxation. The first observation is from 1789, when the wealth tax assessment that also was launched in Denmark came into place (the two countries were in a political union at this time). As in Denmark, both real and personal assets were taxed, including land, houses or farms, factories, livestock, mills, shops inventories and financial instruments. Debts were not deducted, and hence the wealth concept is gross wealth.[177] Our second observation is from 1868, when the Norwegian government launched a national wealth tax assessment. Mohn (1873) presents totals for wealth and households and a tabulation of the wealth held by the top 0.27 per cent (P99.73–100) of all households, including a detailed listing of the fifteen overall largest fortunes.[178] For 1912, we use wealth tax returns from the taxation of 1913–1914 (exempting financial wealth) which are presented in tabulated form in Statistics Norway (1915b).[179] Similarly, for 1930 we use tabu-

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175 The average net personal wealth in 1925 was Danish kronor (DKR) 6,826 for all of Denmark, DKR 366,000 for brokers and DKR 359,000 for large landlords (Zeuthen 1928, p. 447).

176 On the historical development of Danish wealth taxation, see Christensen (2003, p. 8, 14).

177 We use Soltow's (1980) distributional estimates based on 'males or families aged 26 and older', which is not identical to what is used for latter years and probably implies that the 1789 inequality should be adjusted upwards to be fully comparable.

178 There is no information about whether it was the gross or net wealth which was taxed.

179 We use tables of wealth holders in wealth classes in Statistics Norway (1915b, p. 20-21), corroborated by information about reference wealth and tax unit totals in Statistics Norway (1915a, p. 13f) and Kiær (1917, p. 22). The fact that financial assets were exempt in the Norwegian wealth taxation before 1922 is discussed in Statistics Norway (1934, p. 1).

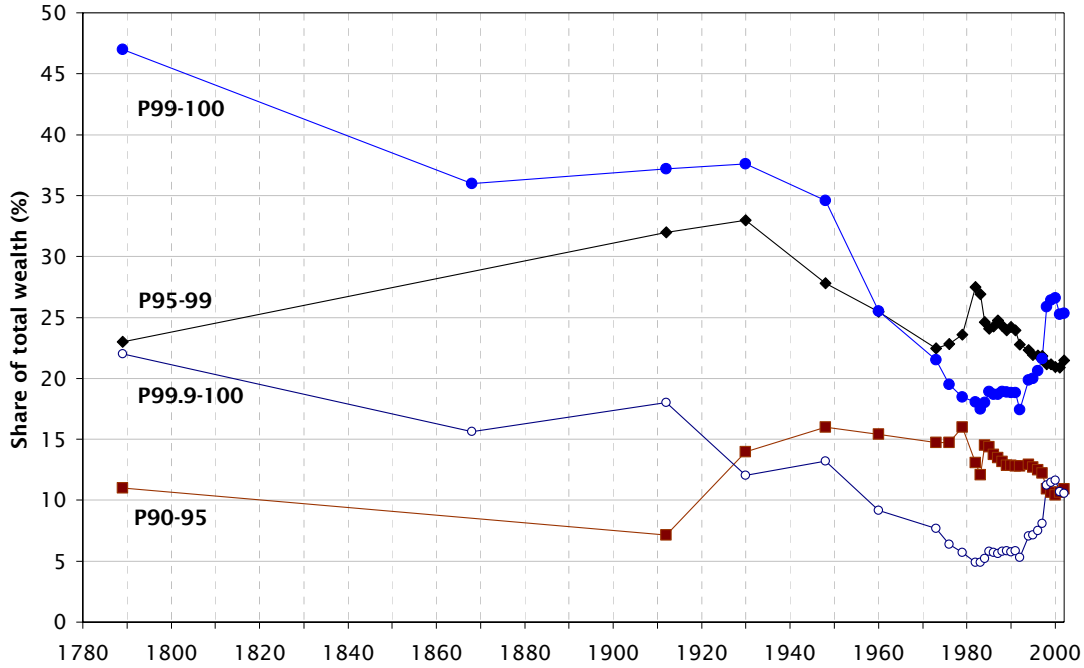
lated wealth distributions (number of wealth holders in wealth classes along with totals for wealth and tax units) presented in Statistics Norway (1934). From 1948 onwards, we use the tabulation of wealth holders and wealth sums in wealth classes published in the Statistical Yearbook various years. In the early 1980s the wealth statistics started being reporting for individual taxpayers instead of, as before, for households. In order to keep our series as consistent as possible, we attempted to convert the post-1982 observations from reflecting the individual distribution to reflect the household distribution using a listing of both types by Statistics Norway for the year of 1979.[180]

Figure 4.6 presents the trends in Norwegian wealth concentration between 1789 and 2002. The figure shows the top wealth decile broken up into the bottom 5 per cent (P90–95) of wealth holders, the next 4 per cent (P95–99), the top percentile, as well as the top 0.1 percentile. Norway's top wealth holders experienced quite different trends in their relative positions over the period. As for the bottom 5 per cent of the top decile, its share decreases between 1789 and 1912 and then jumps up sharply between 1912 and 1930 to land on a fairly stable (though slowly declining) level thereafter. The wealth share of the next 4 per cent, exhibits an inverse-U shaped pattern, increasing sometime in the nineteenth century (we do not know exactly when due to a lack of data), peaking in 1930 and then declining almost monotonically over the rest of the twentieth century. Finally, the share of the top wealth percentile decreases significantly between 1789 and 1868, both dates being before Norway's industrialization period. The share then goes up to slightly 1912 only to start decreasing again. The most dramatic falls occur in the postwar period, with the top percentile dropping from 34.6 per cent to 18.5 per cent during 1948-1979 and the top 0.1 percentile going from 13.2 per cent to 5.7 per cent over the same period. In the 1990s, there is a rapid recovery which may be related to the oil fortunes being built up in recent times, and to the rise in world stock markets prices that produces a rise in the top shares in other countries over this period. The sizeable increase between 1997 and 1998 can also be explained by a change in the Norwegian tax laws speci-

180 The Statistical Yearbook of Norway of 1981 tabulates the net wealth of both households (table 380, p. 316) and personal taxpayers (table 368, p. 306). In the latter case, however, we have no data on the sum of personal wealth of all wealth holders in each wealth class. We therefore insert the sums of wealth observed in household case into the individual case for the exact corresponding wealth classes. The comparison of wealth shares across these two distributions shows that the individual distribution produces shares that are 25%, 21%, 30%, 44% and 60% higher than the household distribution for the top 10%, 5%, 1%, 0.1%, 0.01% fractiles, respectively.

fying an increase in the assessed values of corporate stock on personal tax returns.[181]

Figure 4.6: Top wealth shares in Norway, 1789–2002.



Source: See the Data appendix.

Despite the seeming disparate trends among Norway's top wealth holders, the evidence presented in Figure 3.6 corresponds well with the official economic and political history of Norway over this period. The Norwegian economy was badly hit by the economic crisis after the Napoleonic wars, there was a shift in the political power from the great landlords and landed nobility to a class of civil servants.[182] When merchant shipping expanded in the world after 1850 Norwegian ship owners and manufacturers experienced a tremendous economic boost. When looking at the average wealth of various occupations in 1868 listed in Mohn (1873, p. 24), the four richest groups were manufacturers (having 160 times the country average household wealth), merchants (124 times), ship owners (96 times) and civil servants (87 times). Half a century later, in 1930, a similar comparison between the wealth of top occupations groups and the country average was made (Statistics Norway 1934, p. 6), and only ship owners had kept the distance to the rest of the population (having 119

[181] The tax-assessed values of stocks were raised in 1998, for stocks listed at the Oslo Stock Exchange from 75% to 100% of the market value and for non-listed stocks from 30% to 65% of an assumed market value.

[182] Historical account taken from the section on Norway's history during "The Napoleonic Wars and the 19th Century" in *Encylopædia Britannica Online*.

times the country average wealth), while merchants (22 times) and manufacturers (19 times) had lost wealth relative to the average.

4.2.8 Sweden

Recent studies of wealth distribution in Sweden have mainly used data from household surveys collected in the last three decades (see, e.g., Bager-Sjögren and Klevmarken 1998; Klevmarken 2004).[183] The only previous comprehensive studies on the Swedish historical wealth concentration are those by Spånt (1978, 1979), which are based on wealth tax statistics and published in the Censuses and some special public investigations of the wealth distribution, covering the period 1920–1975.[184] Wealth is defined as share of net-worth (taxation values). We extend these available data both in scope and detail, first by complementing the years covered by Spånt with a number of years for which we have found satisfactory reference totals for "total wealth" and data on distribution (sometimes only for the very top of the distribution as in 1937) in the tax statistics. Moreover, we present new series using the same type of tax data for as long as it remains available, which is the period 1978–1993. Hence, we are able to construct fully homogenous series of wealth concentration over the period 1920–1993, which is the longest available series for Sweden so far. We also add to these series observations based on similar data for the years 2000–2002.[185]

We complement the wealth tax returns based series with new data coming from estate tax material for 1873–1877, 1906–1908, 1954/55, 1967, and 2002–2003[186] as well as with a number of alternative series for wealth concentration over the past decades.[187] We also add the observa-

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183 The main data source in these studies the panel survey database HUS (for more information see web page http://www.nek.uu.se/faculty/klevmark/hus.htm)

184 The material used was the censuses for 1920, 1930, 1935, 1945, 1951 and surveys done in 1966, 1970, 1975. The surveys oversampled rich households so coverage for studying wealth concentration is likely to be good in these studies. For previous periods Soltow (1985) also reports data for 1800.

185 The data for 2000-2002 is taken from the LINDA database, which in turn relies on wealth tax returns (Longitudinal INdividual DAta for Sweden, LINDA is a register-based longitudinal data set intended to complement survey databases used in much of the previous work on wealth distribution in Sweden, see web-page http://linda.nek.uu.se/ for more on LINDA).

186 The sources of the estate data are Finansdepartementet (1879, 1910) and SOU (1957, 1969, 2004). The 1908 wealth data are based on applying the estate multiplier method to the estate data, see Finansdepartementet (1910, p. 14–34).

187 The main complements for the past decades are series from Statistics Sweden based on their HINK-database. This is a population sample where data on wealth is taken from the taxation material and other administrative records using the same household definition as we do in our main series (counting individuals over the age of

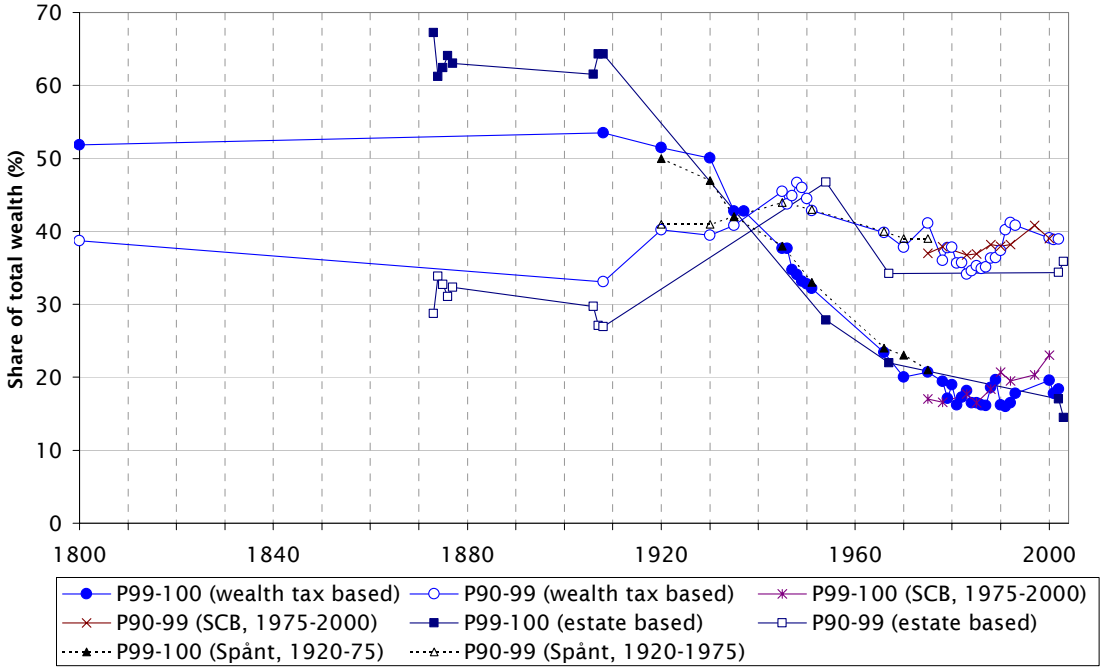
tion for the year 1800 made by Soltow (1985).[188] Overall, we believe our series give a good sense of the evolution of wealth concentration in Sweden at least from the beginning of the twentieth century until present day. We also note that wealth tax data and estate tax data indicate similar patterns of development over the twentieth century.

Looking first at the pattern over the nineteenth century in Figure 4.7, our observations indicate a relatively stable wealth distribution which by today's standards was very unequal. As there are no observations between 1800–1873 there is little that can be said about the development over this period but given the fact that industrialization is typically considered to have started around 1850 and to have accelerated around 1870, we do not, a priori, think that we miss any major changes in the wealth distribution relating to the industrialization.

18 as individual units even if they still live with their parents). This household definition is the main difference between HINK and HUS, a much used detailed household survey but with a relatively small sample, where instead 'kosthushåll' is used, meaning roughly that everyone living together counts as one household. This difference is the major source of discrepancies between estimates from the two sources. The fact that individuals over the age of 18 who live with their parents form separate households in HINK (and in our historical data) means that we get a substantial number of observations of with very low wealth but who still may enjoy access to the wealth of their parents. This is potentially problematic if we are concerned with issues of living standards but not if we want to estimate the distribution of wealth (in terms of ownership and control).

188 This observation is based a wealth census carried out in 1800 and describes the wealth distribution for the population of males aged 20 and older.

Figure 4.7: Top 10% wealth shares in Sweden, split up into a bottom 9% (P90–99) and a top 1% (P99–100) share, 1800–2003.



Source: See the data appendix.

Over the twentieth century the picture is much clearer. We can draw on multiple sources which overlap in time and, even though there is still uncertainty about the levels over time, the trends seem relatively certain. The long run trend in wealth concentration in Sweden over the twentieth century is that the top decile has seen its wealth share drop substantially, from around 90 per cent in the early decades of the century, to around 53 per cent around 1980, and then recovering slightly to a level around 60 per cent in recent years. Looking just at this general trend is, however, incomplete if one is to really comprehend the evolution of wealth concentration. Decomposing the top decile and looking separately at the top per cent (P99–100) and the 9 per cent below that (P90–99), we see that the majority of the top decile actually experiences substantial gains in wealth shares over the first half of the century. The overall drop in the top decile share is explained by such dramatic decreases in the top percentile share that this outweighs the increase for the P90–99 group. In the period 1950-80 both groups experiences declines in wealth shares but the decrease is larger for the top percentile and after 1980 the trend is again the same for both groups but now the gains in wealth shares are somewhat larger for the top percentile.

Looking at decompositions of wealth shares in Figure 4.7, the Swedish wealth distribution exhibits a 'Kuznets-type pattern' over the first eighty years of the twentieth century, with a gradual spread of increasing shares to lower fractiles beginning with the biggest increases in

the wealth share of the P95–99 group before 1930 (even P99–99.5 increases until 1930), followed by increases for P90–95 up until the end of the Second World War, and then continued and large increases for the rest of the population (P0–90) after that.

How can we account for these developments? Focusing first at the decreases in the very top of the distribution over the first half of the century we note that most of the decrease takes place between 1930 and 1950, with the sharpest falls in the early 1930s—a time of financial turbulence and in particular the Kreuger-crash—and just after the Second World War.[189] The period after 1945 was a time when many of the reforms discussed in the 1930s, but put on hold by the war were expected to happen and politically the Communist Party gained ground forcing the Social Democratic Party to move to the left.[190] In particular, the progressive taxes that had been pushed up during the war remained high and also affected wealth holdings as Sweden had a joint income and wealth tax until 1948. However, the main reason for the decreasing share in the very top is likely to be the increasing share for the lower nine per cent of the top decile and this in turn is likely to be increased wealth accumulation among relatively well paid individuals.

After 1945 the trend of increased accumulation of continues down the distribution. Over the next thirty years the most important change is the increased share of owner occupied housing in total wealth which increases from being 17 per cent of all wealth to 45 per cent in 1975 and remains around that in 1997 when adding owner occupied apartments and houses, and vacations homes (consumer durables also increased a lot but stay a relatively small share of the total).[191] Even if this type of wealth was far from evenly accumulated across the distribution it accrued to relatively large groups in the distribution causing wealth concentration to keep falling. Today about half of all households in Sweden own their homes. Over the past decades fluctuations in wealth shares depend largely on movements in real estate prices and share prices. Increases in the former has a tendency to push up the share of the upper half of the distribution at the expense of the very top causing inequality to go down, while increases in share prices makes the very top share larger due to share ownership still being very concentrated causing inequality to increase. In the year 1997 the top percentile in the wealth distribution owns 62 per

189 While Sweden was not as affected by the Great Depression as many other countries, the so called Kreuger-crash in 1932, the bankruptcy of Ivar Kruger's industrial empire, led to major loses of wealth in Sweden. As an indication of how important this event was,18 per cent of all bank lending in Sweden at the time was to companies controlled by Kreuger.

190 See, for example, Steinmo (1993).

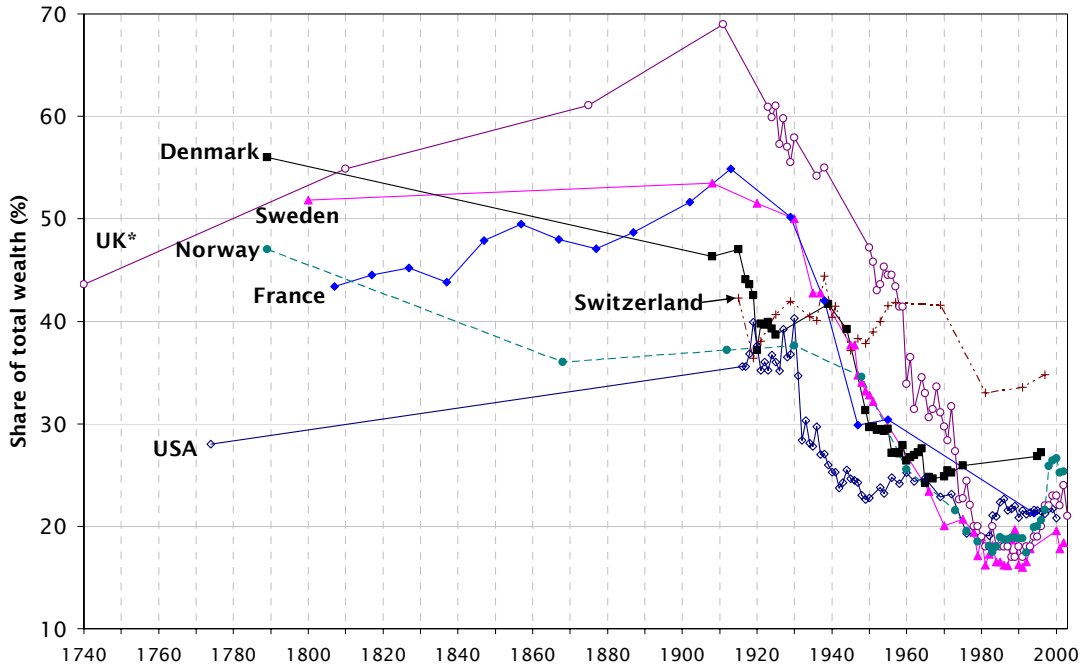
191 See Spånt (1979, p. 78–80) and Statistics Sweden (2000, p. 19–21).

cent of all privately held shares and the top 5 per cent holds 90 per cent.[192]

4.3 Comparing the long-run wealth concentration across countries

Above we have presented a compilation of recent as well as some new evidence on the long-run evolution of wealth inequality in seven Western countries: France, Switzerland, the U.K., the U.S., Denmark, Norway, and Sweden. Figure 4.8 shows the top wealth percentile in each of these countries for various periods during 1740–2003. Even though great caution should be taken when comparing these series we still believe that some conclusions can be drawn about the developments of wealth inequality in these countries over the past two hundred years.

Figure 4.8: Top 1% (P99–100) wealth shares in seven Western countries, 1740–2003.



Sources: See Tables 4.A1 and 4.A2 in the appendix.

Two broad results can be drawn from the series. First, the evidence does not unambiguously support the idea that wealth inequality increases in the early stages of industrialization. Looking at the development of the wealth share of the top percentile among the countries analyzed here, the Scandinavian observations exhibit slightly falling (Denmark and Norway)

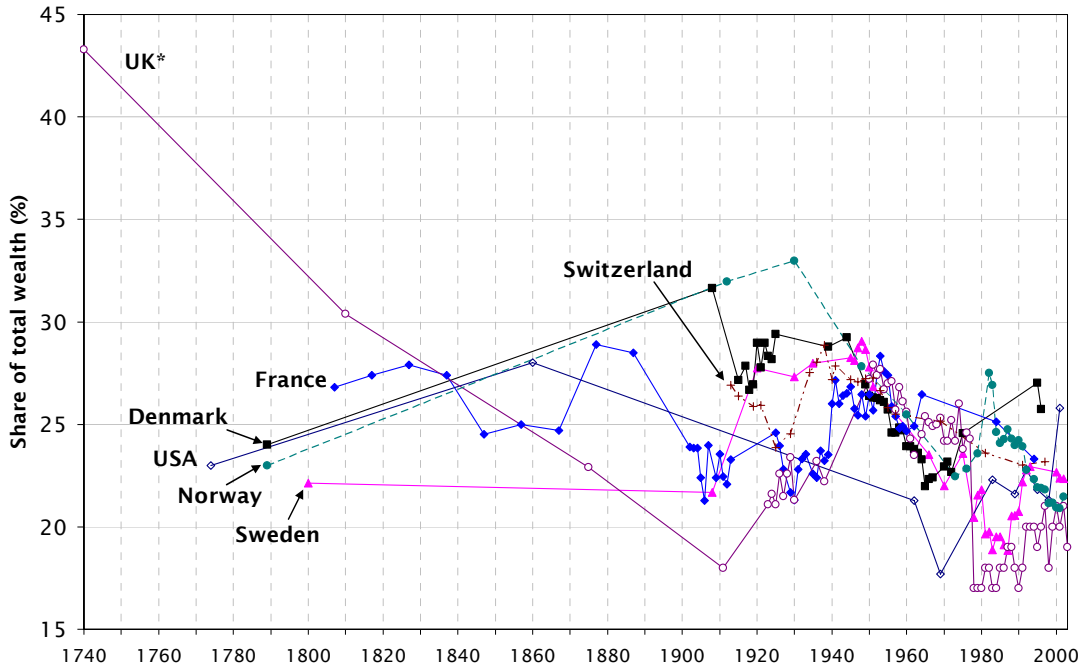
[192] Statistics Sweden (2000, p. 38-40).

or fairly stable (Sweden) inequality levels over the initial stages of industrialization (in the late nineteenth century). The U.K. series (England and Wales) show increasing wealth shares for the top percentile in the period of the two industrial revolutions (1740–1911), as do the US and French series over the nineteenth century. Overall this suggests that going from a rural to an industrial society, with entirely new stocks and types of wealth being created, may, but does not necessarily, give rise to a large increase in wealth concentration. It also suggests that carefully studying smaller fractiles of the distribution is necessary to get a more complete picture of the development.

Second, while the series do not indicate a clear common pattern over the nineteenth century when industrialization took place (first in the U.K., later in the U.S. and France and towards the end of the century in Scandinavia) the development over the twentieth century seems unambiguous. Top wealth shares have decreased sharply in all countries studied in this chapter with the exception of Switzerland where the fall has been small. The magnitude seems to be that the top percentile has decreased their share of total wealth by about a factor of 2 on average (from around 40–50 per cent in the beginning of the century to around 20–25 per cent today). It also seems that the lowest point in most countries was around 1980 and that the top percentile wealth share has increased in most countries after that. Even though the main decreases have taken place at the very top of the distribution, the next 4 per cent (P95–99) also experience decreasing wealth shares in all countries, see Figure 4.9 and Table 4.A2.

The overall pattern, hence, is mixed and also depends on which part of the top one looks at. Overall this suggests that going from a rural to an industrial society, with entirely new stocks and types of wealth being created, may, but does not necessarily, give rise to a large increase in wealth concentration. It also suggests that carefully studying smaller fractiles of the distribution is necessary to get a more complete picture of the development.

Figure 4.9: Next 4% (P95–99) wealth shares in seven Western countries, 1740–2003.



Sources: See Tables 4.A1 and 4.A3 in the appendix.

4.4 Concluding discussion

So what can be said about the relationship between wealth concentration and economic development based on the data provided in this study? Is there a common pattern across countries over the development path? Have initial wealth inequalities been amplified or reduced? Our reading of the data suggests that industrialization was not unambiguously accompanied by increasing wealth inequality. While inequality did increase in the UK, the US and in France, it probably did not change much in Sweden and even decreased slightly in Norway and in Denmark. Noting that the countries in the first group all were large, central economies which were early to industrialize, while the Scandinavian countries were small peripheral economies which industrialized much later, may hold clues to the different experiences but it does not change the fact that industrialization did not increase wealth concentration everywhere.

The twentieth century experience seems much more homogenous. As the countries continued to develop top wealth concentration also dropped substantially. Looking at the details of the pattern by which different fractiles gain wealth shares indicates that this drop was due to a gradual process of wealth spreading in the population—confirming the increase of 'popular wealth' identified in, e.g., Atkinson and Harrison (1978). In a sense this pattern is consistent with a Kuznets-type process

where inequality eventually decreases as the whole economy becomes developed. However, it has recently been suggested that this development was probably not driven by such a process, but mainly by exogenous events. Piketty et al. (2006) argue that it primarily were adverse shocks to top wealth during the period 1914–1945, mainly in the form of the world wars, which decreased French wealth inequality, and that the subsequent introduction of redistributive policies that prevented them from recovering. A similar explanation is given by Kopczuk and Saez (2004) for the US. This reasoning has been supported by the fact that Switzerland, which did not take part in either of the wars exhibits rather stable top wealth shares. Our data on Sweden, which also did not participate in any of the world wars, shows an example of equalization taking place without decreases in top wealth shares driven by exogenous shocks. Even though events such as the Kreuger-crash in 1932 hit top wealth holders in Sweden as well, this does not explain the entire drop. Policy may, at least in Sweden, have played a more active role in equalizing wealth than merely holding back the creation of new fortunes after the Second World War. Suggesting that rising taxation and increased redistribution has been important for the decline of wealth inequality is also consistent with the largest drops taking place in the Scandinavian countries as well as with the smaller decline in Switzerland, with its smaller government.

Overall the data seem to suggest that (1) there was a mixed impact of industrialization and (2) in later stages, after countries became industrial, significant wealth holding spread to wider groups, bringing wealth inequality down. In terms of the often discussed inverse U-shape over the path of development the first upward part does not seem to be present everywhere, while the later stage decrease in inequality does fit all countries we have studied. An important addition to this characterization is that this analogy misses an important point which is present in the series. While the inverse U-shape suggests that the distribution of wealth starts at some level in a non-industrialized society, then rises, and later returns to the same level of inequality, all our series indicate that development has unambiguously lowered wealth concentration. The proper characterization of wealth inequality over the path of development hence seems to be that it follows an inverse J-shape with wealth being more equally distributed today than before industrialization started.

Appendix

Table 4.A1: List of sources and definitions of wealth distribution data.

Country	Year(s)	Wealth holder unit	Source
Denmark	1789	males > 19 years	Soltow (1985, table 4)
	1908-25	households	Zeuthen (1928, table IV 4, p. 521)
	1939, 1944, 1949	households	Bjerke (1956, table 32)
	1950-75	households	Statistics Denmark, *Statistisk Årbog*
	1995-96	households	Statistics Denmark (1995, 1996, table 2)
France	1807-1994	adults	Piketty et al. (2004, table A3, A7)
Norway	1789	households	Soltow (1980, table 3)
	1868	households (?)	Mohn (1873, p. 10, 30)
	1912	households	Statistics Norway (1915a, p. 6*, 20*-21*)
	1930	households	Statistics Norway (1934, p. 63*f)
	1948-2002	households (1983-2002 adjusted individuals as described in text)	Statistics Norway, *Statistisk Årbok*
Sweden	1800	males > 19 years	Soltow (1985, tables 4, 5,)
	1908	households	Finansdepartementet (1910, p. 31)
	1920	households	Statistics Sweden (1927), Census 1920
	1930	households	Statistics Sweden (1937, 1938), Census 1930
	1935	households	Statistics Sweden (1940), Partial Census
	1937	households	SOU (1942, p.52)
	1945	households	Statistics Sweden (1951), Census 1945
	1946-50	households	SOS Skattetaxeringarna
	1951	households	Statistics Sweden (1956), Census 1950
	1966	households	SOU (1969, p.54)
	1970	households	SOS Inkomst och Förmögenhet 1970, Budgetundersökningen
	1975	households	SOU (1979, p. 9)
	1978-93	households	SOS, Skattetaxeringarna, Statisktisk Årsbok, and Statistiska Meddelanden
	2002-03	households	Own calculations based on the LINDA database (see fn 31 above for details)
Switzerland	1913-97	households	Dell et al. (2005, table 3)
UK (-1938: England and Wales)	1740, 1810, 1875	adults	Lindert (2000, table 2)
	1911-13	adults	Atkinson and Harrison (1978, table 6.1)
	1923-77	adults	Atkinson et al. (1989, table 1)
	1978-2003	adults	Inland Revenue Statistics (2006, table 13.5)
USA (P99-100)	1774	adults > 19 years	Shammas (1993, table 4)

	1916-2000	adults > 19 years	Kopczuk and Saez (2004, table 3 2)
USA (P95-100, P99-100)	1774	households (free adult men and unmarried women)	Shammas (1993, table 2)
	1860	households (free adult male heads of households)	Shammas (1993, table 2)
	1890	families	Lindert (2000, table. 3)
	1922-79	households	Wolff (1987, table 3, 1995)
	1983-2001	households	Wolff (forthcoming, table 2)

Note: List of sources and data definitions of the wealth distribution data used in Figures 8 and 9 and in Tables 1 and 2. See text for further descriptions of the data. The definition of "household" used here is one where individuals (aged 18 or above) and married couples count as one household (see the section on Sweden above for details). Some of the data sources (such as the censuses 1920, 1930, 1940, 1950) report individual data, which has been adjusted to fit this definition. As also noted by Spånt (1979, p. 86) such corrections make little difference for the estimated shares.

Table 4.A2: Top 1% (P99–100) wealth shares in Denmark, France, Norway, Sweden, Switzerland, the U.K. and the U.S., 1740–2003.

Year	Denmark	France	Norway	Sweden	Switzerland	U.K.	USA (adults)	USA (households)
1740						43.6		
1774							28.0	18.0
1789	56.0		47.0					
1800				51.9				
1807		43.4						
1810						54.9		
1817		44.5						
1827		45.2						
1837		43.8						
1847		47.9						
1857		49.5						
1860								21.0
1867		48.0						
1868			36.0					
1875						61.1		
1877		47.1						
1887		48.7						
1890								25.8
1902		51.6						
1903		51.6						
1904		54.4						
1905		58.1						
1906		59.8						
1907		54.5						
1908	46.3			53.5				
1909		56.8						
1910		54.4						
1911		57.7				69.0		
1912		57.1	37.2					
1913		54.9						

Year	Denmark	France	Norway	Sweden	Switzerland	U.K.	USA (adults)	USA (households)
1915	47.0				42.3			
1916							38.1	
1917	44.1						35.6	
1918	43.6						36.8	
1919	42.6				36.4		39.9	
1920	37.2			51.5			37.6	
1921	39.7				38.1		35.2	
1922	39.6						36.0	36.7
1923	39.9					60.9	35.2	
1924	39.3					59.9	36.7	
1925	38.7	44.6			40.7	61.0	36.0	
1926		45.1				57.3	35.1	
1927		47.6				59.8	39.2	
1928						57.0	36.5	
1929		50.2			42.0	55.5	36.8	44.2
1930		50.3	37.6	50.0		57.9	40.3	
1931		46.5					34.7	
1932		44.8					28.4	
1933		44.9					30.3	33.3
1934					40.4		28.1	
1935		46.1		42.8			27.8	
1936		45.8			40.1	54.2	29.7	
1937		42.6		42.7			27.0	
1938		42.0			44.4	55.0	27.1	
1939	41.7	42.9					26.0	36.4
1940		38.7			40.4		25.3	
1941		34.9			41.5		25.3	
1942		36.9					23.7	
1943		36.8					24.3	
1944	39.2	38.3					25.5	
1945		35.3		37.7	37.1		24.7	29.8
1946		30.7		37.7			24.5	
1947		29.9		34.7	38.3		24.3	
1948		30.4	34.6	34.1			23.0	
1949	31.3	34.0		33.2	37.8		22.6	27.1
1950	29.6	33.6		32.8		47.2	22.8	
1951	29.7	33.0		32.2	39.0	45.8		
1952	29.4	32.3				43.0		
1953	29.5	32.6			40.0	43.6	23.8	31.2
1954	29.3	30.5				45.3	23.2	
1955	29.5	31.5			41.5	44.5		
1956	27.1	30.4				44.5	24.7	
1957	27.2	32.3			41.9	43.4		
1958	27.1	30.1				41.4	24.2	
1959	27.9	31.9				41.4		
1960	26.4	29.5	25.5			33.9	25.2	
1961	26.7					36.5		
1962	26.9	30.3				31.4	24.4	31.8
1963	27.2							
1964	27.6	31.3				34.5		
1965	24.2					33.0	24.7	34.4
1966	24.8			23.4		30.6		
1967	24.6					31.4		

Year	Denmark	France	Norway	Sweden	Switzerland	U.K.	USA (adults)	USA (households)
1968						33.6		
1969					41.6	31.1	22.9	31.1
1970	24.8			20.1		29.7		
1971	25.5					28.4		
1972	25.3					31.7	23.1	29.1
1973			21.5			27.3		
1974						22.6		
1975	25.9			20.7		22.7		
1976			19.5			24.4	19.3	19.9
1977						22.1		
1978				19.4		20.0		
1979			18.5	17.1		20.0		20.5
1980				19.0		19.0		
1981				16.2	33.0	18.0		
1982			18.0	17.3		18.0	19.1	
1983			17.5	18.1		20.0	21.1	33.8
1984		21.6	18.0	16.5		18.0	21.0	
1985			18.9	16.5		18.0	22.4	
1986			18.7	16.2		18.0	22.7	
1987			18.7	16.2		18.0	21.6	
1988			18.9	18.6		17.0	21.7	
1989			18.9	19.7		17.0	22.0	37.4
1990			18.8	16.2		18.0	20.9	
1991			18.8	16.0	33.6	17.0	21.5	
1992			17.5	16.5		18.0	21.2	37.2
1993				17.8		18.0	21.3	
1994		21.3	19.9			19.0	21.6	
1995	26.9		20.0			19.0	21.5	38.5
1996	27.2		20.6			20.0	21.4	
1997			21.6		34.8	22.0	21.2	
1998			25.9			22.0	21.7	38.1
1999			26.4			23.0	21.7	
2000			26.6	19.5		23.0	20.8	
2001			25.2	17.8		22.0		33.4
2002			25.4	18.4		24.0		
2003						21.0		

Note: Data sources in Table 4.A1.

Table 4.A3: Next 4% (P95–99) wealth shares in Denmark, France, Norway, Sweden, Switzerland, the U.K. and the U.S., 1740–2003.

Year	Denmark	France	Norway	Sweden	Switzerland	U.K.	USA (households)
1740						43.3	
1774							23.0
1789	24.0		23.0				
1800				38.7			
1807		26.8					
1810						30.4	
1817		27.4					
1827		27.9					
1837		27.4					
1847		24.5					
1857		25.0					
1860							28.0
1867		24.7					
1875						22.9	
1877		28.9					
1887		28.5					
1902		23.9					
1903		23.8					
1904		23.8					
1905		22.4					
1906		21.3					
1907		24.0					
1908	31.7			21.7			
1909		22.4					
1910		23.6					
1911		22.5	32.0			18.0	
1912		22.1					
1913		23.3					
1915	27.2				26.4		
1916							
1917	27.9						
1918	26.7						
1919	26.9				25.9		
1920	29.0			27.7			
1921	27.8				25.9		
1922	29.0						
1923	28.3					21.1	
1924	28.2					21.6	
1925	29.4	24.6			23.9	21.1	
1926		23.9				22.6	
1927		22.8				21.5	
1928						22.6	
1929		21.7			24.6	23.4	
1930		21.3	33.0	27.3		21.3	
1931		22.8					
1932		23.3					
1933		23.6					
1934					27.5		
1935		22.6		28.0			
1936		22.4			28.0	23.2	

Year	Denmark	France	Norway	Sweden	Switzerland	U.K.	USA (households)
1937		23.7					
1938		23.2			28.9	22.2	
1939	28.8	23.5					
1940		26.0			27.2		
1941		27.2			27.9		
1942		26.0					
1943		26.4					
1944	29.2	26.5					
1945		26.8		28.3	27.2		
1946		25.8		28.1			
1947		25.5		28.7	27.1		
1948		26.5	27.8	29.0			
1949	26.9	25.4		28.7	27.2		
1950	26.4	26.5		27.8		27.2	
1951	26.3	25.7		26.8	27.3	27.9	
1952	26.3	27.4				27.4	
1953	26.2	28.3			26.6	27.7	
1954	26.1	27.6				26.7	
1955	25.7	27.4			25.8	27.0	
1956	24.6	25.9				27.1	
1957	24.6	25.4			25.5	25.7	
1958	24.8	24.8				26.8	
1959	24.7	24.9				26.1	
1960	23.9	24.7	25.5			25.6	
1961	23.9					24.3	
1962	23.8	24.9				23.5	21.3
1963	23.6						
1964	23.3	26.5				24.5	
1965	22.0					25.4	
1966	22.3			23.5		25.1	
1967	22.4					24.9	
1968						25.0	
1969					25.2	25.3	17.7
1970	22.9			22.0		24.2	
1971	23.2					24.2	
1972	22.7					25.2	
1973			22.5			24.2	
1974						26.0	
1975	24.6			23.6		23.8	
1976			22.8			24.6	
1977						24.3	
1978				20.4		17.0	
1979			23.6	21.5		17.0	
1980				21.8		17.0	
1981				19.7	23.6	18.0	
1982			27.5	19.7		18.0	
1983			26.9	18.9		17.0	22.3
1984		25.1	24.6	19.5		17.0	
1985			24.1	19.5		18.0	
1986			24.3	19.1		18.0	
1987			24.7	18.8		19.0	
1988			24.3	20.5		19.0	

Year	Denmark	France	Norway	Sweden	Switzerland	U.K.	USA (households)
1989			24.0	20.6		18.0	21.6
1990			24.2	20.7		17.0	
1991			23.9	22.2	23.0	18.0	
1992			22.8	22.8		20.0	22.8
1993				22.9		20.0	
1994		23.3	22.3			20.0	
1995	27.0		21.9			19.0	21.8
1996	25.8		21.9			20.0	
1997			21.8		23.2	21.0	
1998			21.1			18.0	21.3
1999			21.2			20.0	
2000			20.9	22.7		21.0	
2001			20.9	22.4		20.0	25.8
2002			21.5	22.3		21.0	
2003						19.0	

Note: Data sources in Table 4.A1.

Chapter 5

The Long-Run Determinants of Inequality: What Can We Learn From Top Income Data?*

5.1 Introduction

The relationship between inequality and development is central in the study of economics. From fundamental issues about whether markets forces have an innate tendency to increase or decrease differences in economic outcomes, to much debated questions about the effects of "globalization", distributional concerns are always present: Does economic growth really benefit everyone equally or does it come at the price of increased inequality? Is the effect perhaps different over the path of development? Is it the case that increased openness benefits everyone equally, is it perhaps especially the poor that gain, or is it the case that it strengthens the position only of those who can take full advantage of increased international trade? Does financial development really increase the opportunities for previously credit constrained individuals or does it only create increased opportunities for the already rich? What is the role of government in all this? Theoretically such questions are difficult to resolve as there are plausible models suggesting equalizing effects from these developments, as well as models suggesting the opposite.[193] Empirically

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193 Just to give some examples: one may distinguish between theories that predict markets to be innately equalizing, disequalizing or both (depending on initial conditions). Mookherjee and Ray (2006) give a useful overview of the literature on development and endogenous inequality based on such a division. Winters, McCollough and McCay (2004) give an overview of evidence on the relation between trade and inequality, Cline (1997) summarizes different theoretical effects of trade on income

problems often arise because these effects should be evaluated over long periods of time and data is typically only available for short periods.

This paper empirically examines the long-run associations between income inequality and economic growth, financial development, trade openness, top marginal tax rates, and the size of government.[194] While these variables are not direct measures of typically suggested causes of changes in income distribution, such as globalization, technological change or social norms, studying their relation to inequality over time seems as an important step toward understanding such broader concepts. The main novelties of our study lie in the uniquely long time period for which we have data and in the focus on top income shares. We use the newly compiled Atkinson-Piketty dataset for 16 countries over the whole of the twentieth century (see Atkinson and Piketty, 2007, 2010).[195] While previous studies have only had comparable data from the 1960s (at best), our series begin at the end of the "first wave" of globalization (1870–1913), continues over the interwar de-globalization era (1913–1950), the postwar "golden age" (1950–1973) and ends with the current "second wave" of globalization.[196] Hence, in contrast to relying on shorter periods of broader cross-country evidence, our dataset allows us to study how inequality has changed over a full wave of shifts in openness as well as several major developments in the financial sector. In terms of the role of government, our long period of analysis implies that we basically cover

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distribution, while Claessens and Perotti (2005) provide references for the links between finance and inequality, presenting theories which suggest both equalizing effects as well as the opposite. We will discuss some of the suggested mechanisms in more detail in Section 2 below.

194 As our focus is on *pre-tax* income we do not explicitly address questions of redistributive policy but rather the effects of taxes and government size on income before taxes and transfers. See Bardhan, Bowles and Wallerstein (eds.), 2006, for several contributions on the relation between various facets of globalization and their impact on the possibilities to redistribute income).

195 Even though the choice of countries - mostly developed economies - is mainly a result of data availability it has some positive side effects. We are, for example, able to trace a fixed set of relatively similar countries as they develop rather than letting different countries represent stages of development. Having similar countries is also important especially when thinking about theoretical predictions from openness which are often diametrically different for countries with different factor endowments, technology levels etc. Parallel to our work, Andrews, Jencks, and Leigh (2009) also use the new top income inequality data to study the relation between inequality and growth, while we focus on determinants of inequality.

196 These periods are quoted in, for example, O'Rourke and Williamson (2000), O'Rourke (2001), and Bourguignon and Morrison (2002). These studies discuss various aspects of globalization and inequality over these early periods but they did not have sufficient data to analyze developments in detail. Also see Cornia (2003) for a discussion of within-country inequality in the first and second globalization.

the entire expansion of the public sector and the same is true for the role of income taxation, which was non-existent or negligible at the beginning of the twentieth century.[197]

The focus on top incomes, and on concentration within the top, means that we can address a special subset of questions regarding the extent to which economic development is particularly pro-rich.[198] More precisely, our data allows us to distinguish between the effects on, broadly speaking, the "*rich*" (top executives and individuals with important shares of capital income), the "*upper middle class*" (high income wage earners), and the rest of the population.[199] As has frequently been pointed out in the recent top income literature the top decile is a very heterogeneous group. The lower parts of it typically consists of employed wage earners with relatively stable income shares, while the top has a different composition of income with larger capital shares and with much larger fluctuations over time.[200] Examining whether some development affects everyone in the top of the distribution in similar ways, or if there are clear differences within the top, holds important keys to what is driving developments of inequality.

Our empirical analysis exploits the variation within countries to examine how *changes in top income shares* are related to *changes in economic development*, financial development, trade openness, government expenditure, and taxation.[201] Using a panel data approach allows us to

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[197] In fact, the introduction of a modern tax system is typically what limits the availability of data on income concentration.

[198] Examples include, models of how aspects of these developments creates extreme returns to "superstars", or models of capitalists and workers where capitalists benefit disproportionately would, when taken to the data, translate to isolated effects for a small group in the top of the income distribution.

[199] Clearly, any such division is arbitrary but the results are not sensitive to variations in the definitions of these top groups, e.g., by choosing to look at the top 0.5 percent instead of the top percentile as "the rich". Furthermore, data on the composition of incomes indicate clearly that the top percent as a whole is very different from the rest of the top decile, especially with regard to capital income shares (we discuss this in section 3). A similar classification, but with respect to wealth, is made in Hoffman, Postel-Vinay and Rosenthal (2007).

[200] For evidence on much of changes in top income concentration stemming from the very top, see Atkinson and Piketty (2007, 2010) and Leigh (2009).

[201] We will discuss our empirical strategy in more detail below, but it is important to note, right from the outset, the distinction between our first difference approach and correlations in levels. For example, our result that periods of high growth increases the income share of the rich disproportionately does not imply a positive correlation between growth and top income shares. Indeed a key observation, made in e.g., Piketty (2005) and Piketty and Saez (2006), is that when inequality was at its highest, in the beginning of the twentieth century, growth was relatively modest, compared to the post-war period when growth was high and inequality levels low.

take all unobservable time-invariant factors, as well as country specific trends into account. We also allow the effects to differ depending on the level of economic development, between Anglo-Saxon countries and others, and between bank- and market-oriented financial systems.[202]

Several findings come out of the analysis. First, we find that periods of high economic growth are strongly pro-rich. In periods when a country's GDP per capita growth has been above average, the income share of the top percentile has also increased. By contrast, the next nine percentiles (P90-99) seem to loose out in these same periods. As we find this relation to be similar at different stages of economic development, it could indicate that recent findings of high productivity growth mainly benefiting the rich in the U.S. postwar era (Dew-Becker and Gordon, 2005), is a more general phenomenon across both countries and time. This result is in line with top incomes being more responsive to growth (e.g., through compensation being related to profits).

Furthermore, we find that financial development, measured as the relative share of the banking and stock market sectors in the economy, also seems to increase the income share of the top percentile. That these effects are causal is supported by our finding that banking crises a have a strong negative impact on the income shares of the rich (while this is not the case for currency crises). When interacted with the level of economic development it turns out that the result is mostly driven from a strong effect in the early stages of development. This result is in line with the model suggested by Greenwood and Jovanovic (1990) where financial markets initially benefit only the rich but as income levels increase (and with them the development of financial markets) the gains spread down through the distribution.[203] It is also of particular interest since a recent study by Beck, Demirguc-Kunt and Levine (2007) finds that financial development disproportionately benefits the poor.[204]

Our results with respect to the role of government indicate that government spending as share of GDP has no clear effect on the incomes of the top percentile, but seem to be negative for the upper middle class and positive for the rest of the population. Higher marginal taxes, however, have a robustly negative effect on top income shares both in the top

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[202] As we will discuss in more detail below, these are some of the dimensions in which we may expect differences in development of inequality either on theoretical ground or based on previous empirical findings.

[203] We do also find weak support for positive effects of financial development spreading down the distribution over the path of development.

[204] These findings are not necessarily conflicting. For example, both the poor and the richest group can benefit at the expense of the middle. IMF (2007) also finds that financial development is related to increases in income inequality.

and the bottom of the top decile.[205] Even though the estimated instantaneous effect is fairly modest, this effect could be sizeable over time. Our simulations of cumulative effects of taxation indicate that they, especially in combination with shocks to capital holdings, can explain large long-run drops in top income shares.[206].

Finally, with respect to the elusive concept of globalization there are at least two findings that relate to its effects on income inequality. First, openness to trade (the trade share of GDP), which is often used as a measure of "globalization", does not have a clear effect on inequality, but if anything, seems to have a negative effect on top income shares. Second, the effects of growth can be interpreted as casting doubt on the idea that top income earners have their incomes set on a global market while others have theirs set locally. Assuming that domestic development determines incomes on the local labor market while global growth determines the compensation for the elite, domestic economic growth (above the world average) should decrease inequality between the two groups, not increase it as we find.[207]

The remainder of the paper is organized as follows. Section 2 outlines some common theoretical arguments linking the incomes of the rich and the variables included in the study. Section 3 describes the data and their sources while Section 4 provides a brief overview of the relationships between the different variables. Section 5 presents the econometric framework and Section 6 presents the main results and a number of robustness checks. Section 7 concludes.

5.2 Potential determinants of trends in top income shares

A number of recent contributions to the study of income inequality have increased the availability of comparable top income data over the long-

[205] This is in line with Atkinson and Leigh (2007c), who find slightly stronger negative effects of marginal taxation on top income shares in their study focusing on Anglo-Saxon countries.

[206] The combination of shocks to capital holdings and increased marginal taxes have been suggested to be a major sources of decreasing top income shares after World War II (see in particular Piketty, 2007, and Piketty and Saez, 2007). Our simulations indicate that our estimated effects are well in line with this type of explanation.

[207] Note that our result is not in conflict with Gersbach and Schmutzler (2007) or Manasse and Turrini (2001) that emphasize the distribution of incomes within the elite group (rather than the average) and predict that globalization leads to an increased spread in incomes for the elite. Others such as Gabaix and Landier (2007) emphasis the firm size effect, while Kaplan and Rauh (2007) stress technological change, superstar effects (Rosen, 1981), and scale effects as plausible explanations for increasing top incomes.

run. Following the seminal contribution by Piketty (2001a) on the evolution of top income shares in France, series on top income shares over the twentieth century have been constructed for a number of countries using a common methodology.[208] The focus in this literature has mainly been on establishing facts and to suggest possible explanations for individual countries. To the extent that general themes have been discussed these have focused on accounting for some common trends such as the impact from the Great Depression and World War II (on countries that participated in it) and on the differences between Anglo-Saxon countries and Continental Europe since around 1980.

Broadly speaking the explanations for the sharp drop in top income shares in the first half of the twentieth century have revolved around shocks to capital owners, leading to them losing large parts of the wealth that provided them with much of their income, thus decreasing their income share substantially. High taxes after World War II (and the decades thereafter) prevented the recovery of wealth for these groups. As we will show, our estimates of the effect of top marginal taxes are compatible with this type of explanation. After roughly 1980 top income shares have increased substantially in Anglo-Saxon countries but not in Continental European countries. However, this has not been due to increases in capital incomes but rather due to increased wage inequality (see Piketty and Saez, 2006 for more details on the proposed explanations for the developments).

Even though a number of plausible explanations have been suggested in this literature it is fair to say that, so far, few attempts at exploiting the variation across countries and across time in an econometrically rigorous way has been made.[209] In fact, in overviews (Piketty 2005 and Piketty and Saez, 2006) of this literature it is suggested that—even though there will always be severe identification problems—cross country analysis seems a natural next step. A first question when contemplating such an analysis is, of course, what variables that could be expected to have a clear relationship to top income shares. Beside variables suggested in the top income literature, such as growth, taxation and the growth of

[208] Other recent studies include Australia (Atkinson and Leigh, 2007a), Canada (Saez and Veall, 2007), Germany (Dell, 2007), Ireland (Nolan, 2007), Japan (Moriguchi and Saez, 2010), the Netherlands (Atkinson and Salverda, 2007), New Zealand (Atkinson and Leigh, 2007b), Spain (Alvaredo and Saez, 2007), Sweden (Roine and Waldenström, 2008, 2010) and Switzerland (Dell, Piketty and Saez, 2007).

[209] One paper that does use a panel of top income data is Scheve and Stasavage (2009) that test hypotheses concerning institutional determinants of income inequality (such as wage bargaining centralization, government partisanship, and the presence of an electoral system based on proportional representation).

government, we think variables capturing financial development and openness to trade, are especially interesting.

The next question is; what should we expect these relationships to look like? Here our strategy is to draw on the vast existing literature. As is apparent from the selection of results reviewed below, there are models suggesting positive, negative, as well as non-linear effects on inequality from just about every variable that we include in our econometric specifications. Our main contribution lies in using data over a uniquely long period to test whether there are robust partial correlations over time, as well as to address the possibility that these relationships may change over the path of development.

When it comes to the impact of financial development, it is fair to say that standard theory typically predicts that financial development should decrease inequality, at least if we think of financial development as increasing the availability for previously credit constrained individuals to access capital (or that financial markets allow individuals with initially too little capital to "pool their resources" to be able to reach a critical minimum level needed for an investment).[210] This is the standard mechanism in growth theories where a country can be caught in a situation where badly developed financial markets make it impossible for much of the population to realize projects that would increase growth (as, for example, in Galor and Zeira, 1993, and in Aghion and Bolton, 1997). The situation would be one of low growth (compared to the country's potential), high inequality and badly developed financial markets. With the development of financial markets, increased growth goes hand in hand with less inequality as the financial markets improve the allocation of resources. A larger fraction of individuals are then given the possibility to realize profitable projects.

There are, however, a number of suggested mechanisms that could turn this prediction around. In an overview of the links between finance and inequality, Claessens and Perotti (2005) give a number of references (e.g., Rajan and Zingales, 2003 and Perotti and Volpin, 2004) to theory, as well as evidence, of financial development, which benefits insiders disproportionately (consequently leading to increased inequality). The idea, in various garbs, is that understanding the potential threat to their position from certain types of development of capital markets, the political elites, implicitly the top income earners, would block such developments, possibly to the detriment of the economy. Hence, these theories agree that *in principle* the development of financial markets could have

[210] Recent evidence for financial development being pro-poor is given in Beck, Demirguc-Kunt and Levine (2007).

an equalizing effect but *in practice* only developments that disproportionately benefit the elite will materialize.

Beside theories suggesting either increased equality or increased inequality from financial development there are also a number of theories suggesting that financial development, much like the classic Kuznets curve, leads to increased inequality in early stages of development but at later stages also benefits the poor, leading to increased equality. An influential article suggesting precisely this is Greenwood and Jovanovic (1990). Their idea is that at low levels of development when capital markets are non-existent or at an early stage of development only relatively rich individuals can access the benefits of these (as there are certain fixed costs involved). At this stage further developments of financial markets increase growth but disproportionately benefit the rich. However, as the economy grows richer, a larger and larger portion of the population will be able to access the capital market and more and more individuals will benefit. Consequently resource allocation improves even more, growth continues to increase, but now accompanied by decreasing inequality. Eventually the economy reaches a new steady state where financial markets are fully developed, growth is higher and inequality has gone through a cycle of first increasing and then decreasing over the path of development.

When it comes to standard Heckscher-Ohlin trade theory the inequality effect of openness varies depending on relative factor abundance and productivity differences, and also on the extent to which individuals get income from wages or capital. Easterly (2005) provides a good overview of the arguments, stressing the importance between differences (between countries) stemming from variations in endowments or productivity. Assuming, which seems realistic, that our sample contains countries that (over the whole of the twentieth century) have been relatively capital rich compared to the global average and are places where capital owners coincide with the income rich, we should, in general, expect trade openness to increase the income shares of the rich in our sample.[211] Even if theory is far from clear cut in its predictions, the basic argument that trade openness—as well as other aspects of globalization—may somehow "naturally" benefit the rich underlie calls for political intervention whereby a "loosing majority" could be compensated given that the total

[211] An example of when this is not the case would be if differences between countries are due to productivity differences that are so large that the richer countries (the ones in our sample) can export labor intensive goods (productivity advantage offsets labor scarcity). Then trade would reduce inequality in the rich countries. Another potentially important point is the fact that these countries have largely traded with each other, and therefore the predictions could still be different for different countries in our sample.

gains are large enough (as shown in Rodrik, 1997). The importance for such compensation has recently forcefully been argued in Scheve and Slaughter, 2007 (see also the recent collection of articles in Bardhan, Bowles and Wallerstein, 2006).

Looking at the possible effects of taxation the theoretical predictions are again ambiguous. Higher taxes have immediate effects on work incentives and on capital accumulation (and hence on capital income over time) and if these are relatively more important for the top income groups we should expect higher taxes to be negatively related to top income shares.[212] However, as pointed out in Atkinson (2004), there are theoretical reasons to expect gross income inequality to *increase* as a result of increased taxation. Even in the simplest model, an increased tax for the rich (or increased progressivity) has a substitution effect causing a decrease in effort but also an income effect pulling in the other direction. Unless this is zero, such an increase should be expected to increase *gross* income inequality.[213]

Overall, the conclusion we draw from reviewing parts of the literature on possible determinants of top income shares is that theory provides us with many plausible alternatives. The main contribution we can make lies in using the uniquely long period for which we have data to test whether there are robust relationships over time as well as to address issues of changing relationships along the path of development (such as testing whether financial market development has a different effect in early stages of development compared to later stages).

5.3 Data description

This section describes the variables included in the analysis and their sources. Tables 1 and 2 define the variables used and present their sources.[214] Tables 3 and 4 show summary statistics and pair-wise correlations.

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[212] It should be emphasized that the dynamic effects on capital accumulation, stressed in the literature on top incomes are not captured well in the econometric estimates (as the impact from these are cumulative). As we discuss the results below we will therefore combine our results with simulations to get a better sense of the order of magnitude over time.

[213] Atkinson (2004) also point to taxes having ambiguous effects in "tournament theory" (Lazear and Rosen, 1981) where an increased tax decreases the return of advancement to the next level but also reduces the risk of attempting such advancement, and in the "winner-take-all" context considered in Frank (2000) where progressive taxation reduces the expected returns of entry. See Atkinson (2004, p. 135–138).

[214] A more detailed source description and more facts about the data can be found in a web appendix on the authors' web pages.

Table 5.1: Variable definitions.

Variable	Variable definition	Source
Top1	Share of total income of those with the 1% highest incomes (P99–100).	See Table 5.2.
Top10–1	Income share of top 10% less share of top 1% (P90–99).	See Table 5.2.
Bot90	Income share of bottom nine deciles of the entire income distribution (P0–90).	See Table 5.2.
Top1/10	Top1/Top10–1 (P99–100/P90–99).	See Table 5.2.
Top01/1	Income share of top 0.1% divided by income share earned by the rest of top 1% (P99.9–100/P99–99.9).	See Table 5.2.
Findev	Financial development: Total capitalization = Bankdeposits + Marketcap.	-1950: Mitchell, RZ, Bordo; 1950-: IFS, FSD, RZ.
Bankdeposits	Bank deposits: Share of commercial and savings bank deposits in GDP.	-1950: Mitchell, Bordo; 1950-: IFS, FSD.
Marketcap	Stock market capitalization: Market value of publicly listed stocks divided by GDP.	-1975: RZ; 1975-: IFS, FSD.
Openness	Trade openness: Imports plus exports divided by GDP.	-1950: Mitchell, LM, Bordo; 1950-: IFS, FSD.
Govspend	Central government expenditure divided by GDP.	-1950: Mitchell, RS, Bordo; 1950-: IFS, FSD.
Margtax1	Top marginal tax rate: Margtax2 except Germany, Japan, Sweden, UK and US (rate paid by incomes ≈ 5×GDPpc).	Table 5.2, OECD, BCS, RW and RSS.
Margtax2	Top marginal tax rate (statutory top rates)	Table 5.2, OECD
Bank crisis	Share of bank crisis years in 5-year period	Bordo, LV
Currency crisis	Share of currency crisis years in 5-year period	Bordo, LV
Tariffs	Paid import taxes divided by imports	Clemens and Williamson (2004)
Agrishare	Share of agricultural production in GDP	Mitchell, WDI
Patents	Stock of domestic patents	Madsen (2007)
GDPpc	GDP per capita	Maddison (2006)
Pop	Population	Maddison (2006)

Note: The exact set of sources for each country-period observation can be found in our web appendix at www.ifn.se/danielw.
Abbreviations: BCS = Bach, Corneo and Steiner (2005); Bordo = Bordo, Eichengreen, Klingebiel and Martinez-Peria (2001); CW = Clemens and Williamson (2007); FSD = Financial Structure Database; IFS = International Financial Statistics; LM = López-Córdoba and Meissner (2005); LV = Laeven and Valencia (2008); Mitchell = Mitchell (1995, 1998a, 1998b); OECD = OECDE world tax database; RS = Rousseau and Sylla (2003); RSS = Rydqvist, Spizman and Strebulaev (2007); RW = Roine and Waldenström (2006); RZ = Rajan and Zingales (2003); WDI = World Development Indicators (World Bank).

Table 5.2: Income inequality data.

Country	Source	Full sample period	No. 5-year periods	
			Top1	Top10-1
Argentina	Alvaredo (2010)	1932-1973[a],1997-2004	9	0
Australia	Atkinson and Leigh (2007)	1921-2002	17	13
Canada	Saez and Veall (2007)	1920-2001	17	13
Finland	Jäntti et al. (2010)	1966-1985[a],1990-2002	8	8
France	Piketty (2007)	1915-1998	18	18
Germany	Dell (2007)	1925-1938,1944-1998	13	13
India	Banerjee and Piketty (2010)	1922-1999	16	0
Ireland	Nolan (2007)	1938, 1943, -65,73-2000	8	8
Japan	Moriguchi and Saez (2007)	1886-2002	21	17[b]
Netherlands	Atkinson and Salverda (2007)	1914-1999	17	17
New Zealand	Atkinson and Leigh (2007)	1921-2002	17	17
Spain	Alvaredo and Saez (2010)	1981-2002	5	5
Sweden	Roine and Waldenström (2010)	1903-1935[a],1941-2004	20	20
Switzerland	Dell et al. (2007)	1933-1996	14	14
U.K.	Atkinson and Salverda (2007)	1908-1999	14	14
USA	Piketty and Saez (2007)	1913-2002	19	18

[a] There are years with missing values in this subperiod
[b] The shares-within-shares data for Japan is based on the top five percent (P95–100).

Table 5.3: Summary statistics for our main variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
Top1	237	10.69	4.68	2.95	26.99
Top9	182	23.36	2.89	16.00	30.68
Bot90	182	66.76	5.99	49.86	81.05
Top10_1	199	0.45	0.24	0.18	1.63
Top1_01	236	0.46	0.17	0.17	0.93
GDPpc	508	72,73	6,070	513	28,581
Pop	516	82,073	181,844	847	128,7576
Govspend	475	0.14	0.06	0.01	0.49
Findev	280	0.94	0.54	0.06	3.61
Openness	446	0.40	0.36	0.02	3.66
Margtax1	131	0.53	0.13	0.22	0.86
Tariffs	411	0.10	0.08	0.01	0.48
Bankdeposits	461	0.44	0.26	0.00	1.56
Marketcap	283	0.48	0.43	0.00	2.32
Privatecredit	264	0.60	0.39	0.04	1.95
Bank crisis	357	0.05	0.15	0.00	1.00
Currency crisis	357	0.06	0.12	0.00	0.60
Agrishare	296	16.34	14.50	1.00	61.00
Patents	399	14,122	40,091	3	370,677

Table 5.4: Correlation matrix for our main variables.

	Top1	Top9	Bot90	GDPpc	Pop	Govspend	Findev	Openness	Margtax1
Top1	1.00								
Top9	0.41*	1.00							
Bot90	–0.90*	–0.77*	1.00						
GDPpc	–0.45*	–0.01	0.29*	1.00					
Pop	–0.14	–0.19	0.19	–0.20*	1.00				
Govspend	–0.40*	–0.11	0.33*	0.52*	–0.07	1.00			
Findev	0.03	0.15	–0.17	0.42*	–0.21*	0.09	1.00		
Openness	–0.27*	–0.03	0.17	0.29*	–0.18*	0.10	0.27*	1.00	
Margtax1	–0.49*	–0.20	0.34*	–0.16	–0.18	0.05	–0.37*	–0.02	1.00

Top income shares. In income inequality research, top income earners are often defined as everyone in the top decile (P90–100) of the income distribution. However, recent studies following Piketty (2001a) have shown that the top decile is very heterogeneous.[215] For example, the income share of the bottom nine percentiles of the top decile (P90–99) has been remarkably stable over the past century in contrast to the share of the top percentile (P99–100), which fluctuated considerably. Moreover, while labor incomes dominate in the lower group of the top decile, capital incomes are relatively more important to the top percentile. In order to analyze the determinants of top income shares in detail we will differentiate between these groups of income earners within the top decile.

Based on the work of several researchers following the methodology first outlined in Piketty (2001a), we have constructed a new panel dataset over top income shares for 16 countries covering most of the twentieth century.[216] The main source is personal income tax returns, and income reported is typically *gross total income*, including labor, business and capital income (and in a few cases realized capital gains) before taxes and transfers. Top income shares are then computed by dividing the observed top incomes by the equivalent total income earned by the entire (tax) population, had everyone filed a personal tax return. In most countries only a minority of the people filed taxes before World War II and the computation of reference totals for income regularly include both tax statistics and various estimates from the national accounts. For this reason the reference total income is likely to be measured with some error. Despite the explicit efforts to make the series consistent and comparable there remain some known discrepancies in the data that are potentially problematic.[217]

215 See Atkinson and Piketty (2007).

216 See Table 5.2 for specific references and Atkinson and Piketty (2007) for details.

217 Some differences in both income and income earner (tax unit) definitions remain. For example, realized capital gains are excluded from the income concept in all countries except for Australia, New Zealand and (partly) the UK. Tax unit definitions vary

We use three income variables to capture what we think are key aspects of the whole income distribution given the data limitations. *Top1* (P99–100) measures the fraction of total income received by the percentile with the highest incomes, *Top10-1* (P90–99) is the share received by the next nine percentiles, and *Bot90* (P0–90) is the residual share received by the lowest ninety percent of the population. As already mentioned we think there are good reasons to approximate *the rich* by *Top1*, in that their income share is of a different makeup in terms of sources compared to the rest of the population and also shows considerable variation over time. Similarly it is fair to describe *Top10-1* as *the upper middle class* since this group, with remarkable consistency across countries and over time, has been composed of mainly (highly) salaried wage earners. In fact, when examining the share of capital income of total income for these two top income groups in Canada, France, Sweden and the U.S. over the twentieth century, there is not a single point in time when the rich has lower capital income shares than the upper middle class.[218] Finally, *Bot90* consists clearly not of a homogenous group of income earners. Nonetheless this group, by construction, captures the aggregate outcome for the rest of the population and, as we will show, there seem to be some clear patterns of outcomes for "the top" and "the rest" of the population.

Beside the measures of shares out of total income we also use some measures of inequality *within the top* of the distribution. Specifically we use *Top1/10,* defined as the share of the top percentile in relation to the top decile, i.e., P99–100/P90–99, as well as *Top01/1*, the top 0.1 percentile income share divided by the rest of the top percentile's income share, P99.9–100/P99–99.9. These measures serve two purposes. First, they measure the inequality within the top of the distribution, which is differ-

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even more. In Argentina, Australia, Canada, China, India and Spain they are *individuals* but in Finland, France, Ireland, the Netherlands, Switzerland and the United States they are *households* (i.e., married couples or single individuals). Moreover, in Japan, New Zealand, Sweden and the United Kingdom the tax authorities switched from household to individual filing. In Germany there is a mixture of the two, with the majority of taxpayers being household tax units whereas the very rich filing as individuals. For a longer and more detailed discussion of these problems, see Atkinson and Piketty (2007, ch. 13).

218 The average capital income shares between 1920 and 2000 in these four countries are about 6 percent for the upper middle class and about 19 percent for the rich Hence, although this division is as artificial as the classical distinction between workers and capitalists and it is likely that the precise division between the rich (whatever one means by this term) and the upper middle class is different across time and between countries. Nevertheless, the results from the top income literature indicate a surprisingly stable relation in that at least the lower half of the top decile is very different from the top percentile. We therefore use this terminology hoping that it invokes key distinctions between the very top and the group just below.

ent from inequality overall especially when considering theories that predict a widening gap among high income earners. Second, these measures are not sensitive to measurement error in the reference total income mentioned above.[219]

Financial development. The challenge in estimating financial sector development over the whole twentieth century is to find variables that are available and comparable for all countries for such a long period. We use three different measures aimed at capturing the relative importance of private external finance: *Bank deposits* (deposits at private commercial and savings banks divided by GDP), *Stock market capitalization* (the market value of listed stocks and corporate bonds divided by GDP), and *Total market capitalization* (the sum of the first two, which is also our preferred measure). The variable *Bank deposits* closely matches private credit in the economy.[220] By using these three different measures, we are also able to address possible distributional differences between bank-based and market-based financial development.

Our sources for bank deposits are Mitchell (1995, 1998a, 1998b) for the pre-1950 period and International Financial Statistics (IFS) and Financial Structure Database (FSD) for the post-1950 period. Data on stock market capitalization before 1975 come from Rajan and Zingales (2003), who present data for the years 1913, 1929, 1938, 1950, 1960 and 1970. We linearly interpolate between these years to get 5-year averages except for over the world wars as we deem such interpolated values to be highly uncertain. For this reason, the world wars are left out from most of our regressions. We then link these series with post-1975 data from FSD. One problem with the stock market capitalization measure is its potentially close connection to our income measure, which includes capital income (although not realized capital gains), i.e., returns on stocks and bonds. Hence, there could be a mechanical relation between top income shares and financial development if, for example, dividends tend to be high when stock market capitalization is high. This potential problem is, however, considerably smaller in the case of bank deposits, which hence also serves as a robustness check on the market capitalization results.

Openness. Our main measure of trade openness is a standard *de facto* measure: the sum of exports and imports as a share of GDP. For the

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[219] To see this in the case of *Top1/10*, note that P99–100 = Inc_{Top1}/Inc_{All} and P90–100 = Inc_{Top10}/Inc_{All}, which means that *Top1/10* = $(Inc_{Top1}/Inc_{All})/(Inc_{Top10}/Inc_{All} - Inc_{Top1}/Inc_{All}) = Inc_{Top1}/(Inc_{Top10} - Inc_{Top1})$.

[220] We use bank deposits instead of private credit since we have much longer series of deposit data. For the country-years when the two measures overlap, however, the correlation is high (0.82). When replacing bank deposits with private credit in postwar regressions, moreover, the main results are qualitatively identical in both cases though somewhat weaker when using private credit.

pre-1960 period data come from Mitchell (1995, 1998a, 1998b), Rousseau and Sylla (2003) and López-Córdoba and Meissner (2005) and for the post-1960 period we use data from IFS. Data are generally lacking for wartime years. An alternative way to measure openness is to use rules-based measures. We use data on average tariffs, sum of paid tariffs over imports, from Clemens and Williamson (2007) which is the only *de jure* measure with acceptable time-space coverage that we are aware of. Still, average tariffs is a quite problematic measure of trade openness for several reasons, e.g., by not capturing the variation in tariff rates and import values across different goods and also since a zero average tariff could reflect both complete openness (tariff rates are zero) or complete autarchy (tariff rates are so high that imports are zero). For this reason, we only use it for sensitivity purposes.

Central government spending. In order to account for the activity and growth of government over the period, we include a measure of *Central government spending*, defined as central government expenditure as a share of GDP. Data are from Rousseau and Sylla (2003). Ideally we would have liked to include both central and local governments since the spending patterns at these two administrative levels may both vary systematically across countries and within countries over time. For example, Swedish municipalities and counties have gradually taken over the state's responsibility for the provision of traditional public sector goods such as health care and schooling, thereby potentially causing a decrease in central government spending but not in total government spending. However, lacking a measure of total government spending, we think that our chosen alternative is the best available measure for capturing the growth of government over time.[221]

Top marginal tax rate. We use two measures of top marginal tax rates. Our first measure, called *Margtax1*, combines data on the statutory top marginal tax rates with some newly created series of marginal tax rates paid by those with incomes equal to five times GDP per capita, an income level approximately equal to the 99th income percentile. The reason for not only using statutory top rates is that these rates have been binding to quite varying degrees on top income across countries as well as within countries over time.[222] New series with actual marginal tax rates

[221] Rousseau and Sylla (2003) use this variable in their study of the determinants of economic growth in an historical context. Central government spending to GDP is also the variable that is available in databases such as the *Penn World Tables*, the World Bank's *World Development Indicators*, and the IMF:s *International Financial Statistics*.

[222] For example, Roine and Waldenström (2010) shows for Sweden that over the entire century the top income percentile only paid a marginal tax rate equal to the statutory top rate in the years around 1980. More generally, the statutory top rates have

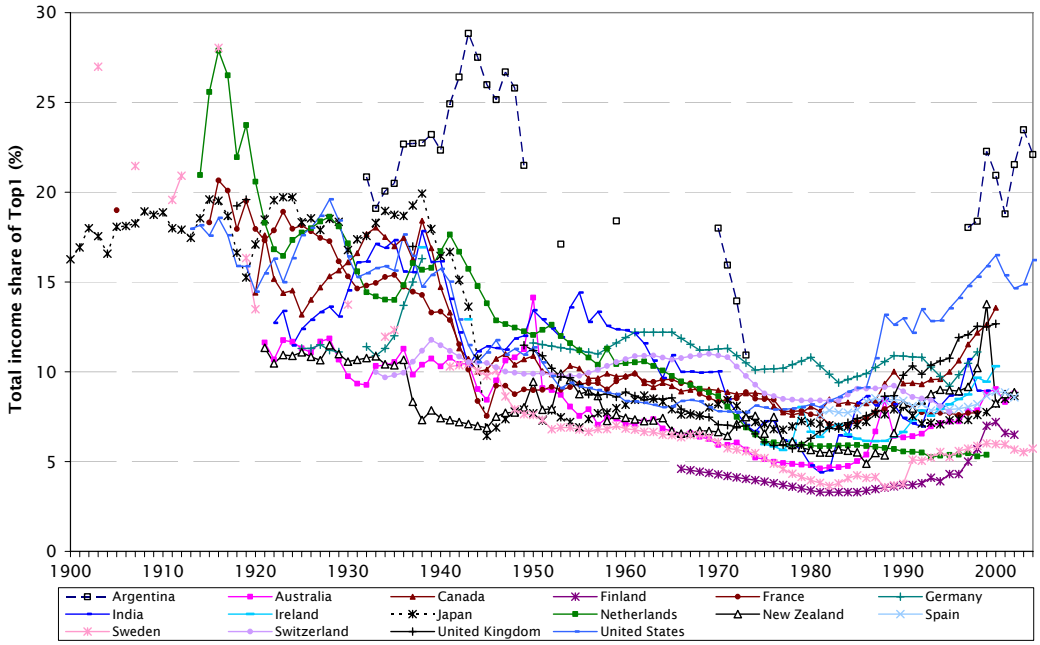
paid are available thanks to previous efforts by Bach, Corneo and Steiner (2005) for Germany (since 1958), Roine and Waldenström (2010) for Sweden (whole period), and Rydqvist, Spizman and Strebulaev (2007) for Canada, the UK, and the US (postwar period). These series were calculated from national tax schedules for each of the countries. Our second measure of marginal tax rates, *Margtax2*, consists simply of the full set of statutory rates from all countries for which such data are available.

GDP per capita and *Population size*. For the variables *GDP per capita* and *Population size* we use data from Maddison (2006).[223]

5.4 A first look at the data

To get a sense of the relationships between our variables of interest it is useful to just look at the trends over time. After all, when it comes to some of the main findings in the individual country studies on top incomes, such as the effects of the Great Depression and World War II, these are apparent just from looking at the data. Figure 5.1 shows the development of our main dependent variable, the income share of the top percentile group (*Top1*) over the twentieth century for all countries.

Figure 5.1: Top income percentiles for 16 countries since 1900.



Source: See Table A2.

been relatively more binding to larger groups of income earners in Scandinavia and the U.K than in, e.g., Japan or the U.S.

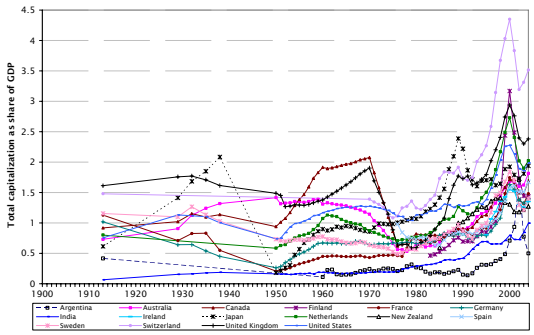
[223] When computing GDP shares for financial development and trade volumes, however, we use nominal GDP series in Bordo et al. (2001), Mitchell (1995, 1998a, 1998b) and Rousseau and Sylla (2003).

Besides clearly showing the impact of the depression and World War II for many countries, another striking feature of the series is the strong common trend. With the exception of a few countries the development is remarkably similar over time, at least until around 1980. The same is, in varying degree, true for the main right-hand-side variables (at least for the development of GDP/capita, top marginal tax rates and central government spending). The panels in Figure 5.2 show the development of these since 1900.

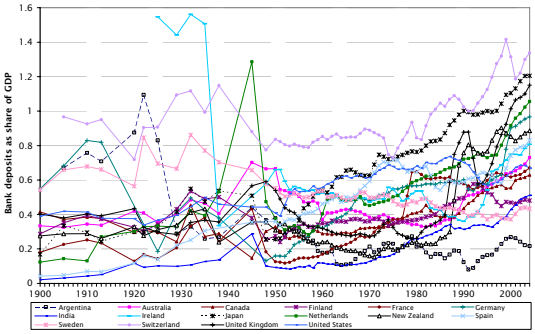
These signs of interdependencies are perhaps not so surprising given our focus on economies that have been relatively closely interconnected through events such as the Great Depression affecting top incomes in many of these countries in similar ways. One may also think of broad policies (taxation, liberalization, etc.) or changes in technology (financial innovation, factor flows, etc.) as being reflected in common trends of top income shares across countries. In the extreme this could be a problem for our econometric approach since we rely on within country changes in the relevant variables to identify effects, holding common trends constant. If there are changes across time in the explanatory variables but these are exactly the same everywhere, we would not find any effect even if there may be a relation. In other words, by taking out common trends, we run the risk of falsely rejecting a hypothesis because the patterns are too similar across countries. However, since no two countries are affected in exactly the same way by the developments throughout the 20th century, there should be enough variation in the data to disentangle the effects (see section 5.5 below). This problem is not unique to our study; exploiting the residual variation after having controlled for common effects is the standard way of approaching cross-country data.

Figure 5.2: Variables included in the regression analysis, all countries.

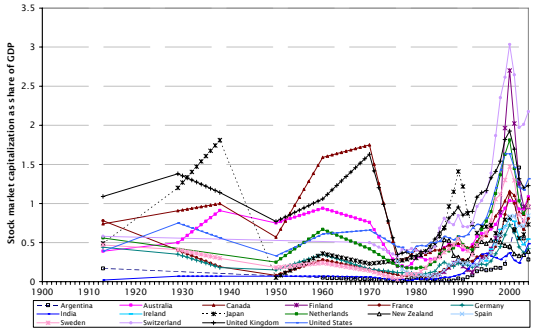
a) Total capitalization



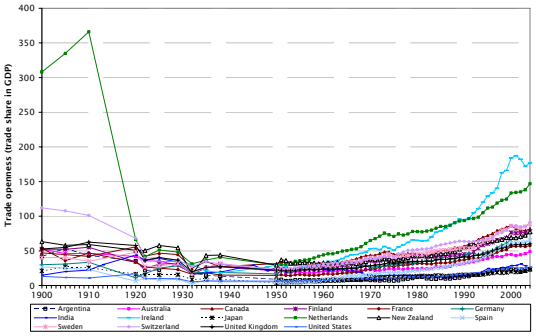
b) Bank deposits



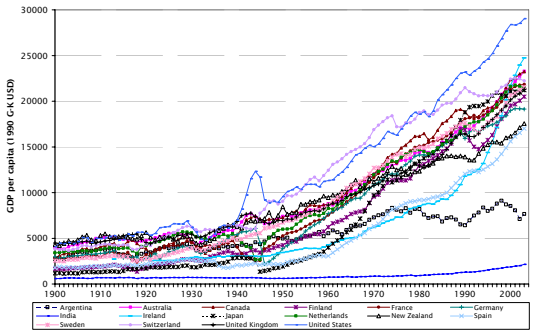
c) Stock market capitalization



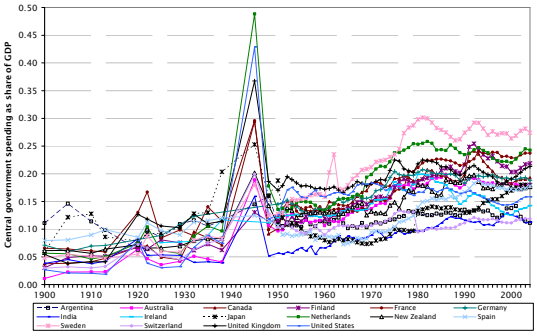
d) Trade openness



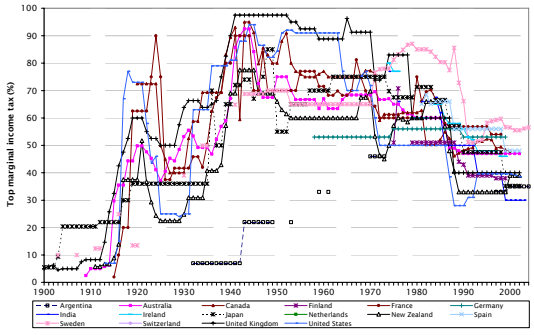
e) GDP per capita



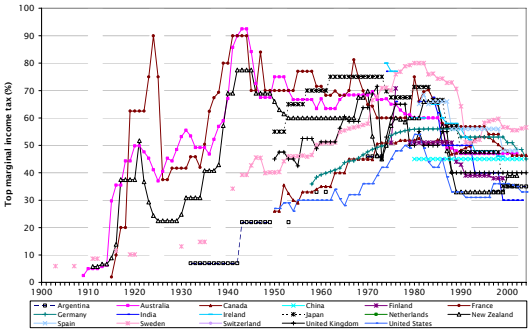
f) Government spending



g) Top marginal tax rate 1



h) Top marginal tax rate 2



Can we by just looking at the data find any clear patterns between the top income shares and the proposed explanatory variables over time? The short answer would have to be "no". As can be seen in Figure 5.2 the

level of financial development is quite volatile up until the middle of the postwar period when it starts to increase. Trade openness, on the other hand, exhibits a more monotonic increase (except for the drastic drop in the Netherlands during World War I), and a similar pattern goes for GDP per capita. Government spending is increasing in all countries, with the well-known war-related spike in the 1940s. Top marginal taxation increases before World War II, but continues to be high throughout the postwar period up to its peak around 1980 when it mostly starts to decrease. Overall, there are no obvious links between any of these variables and the top income shares, although there is quite notable cross-country variation to use in a more sophisticated analysis of the panel. Piketty (2005) and Piketty and Saez (2006) make a similar simple eyeballing exercise to provide some suggestive evidence on the inequality-growth links, but in the end conclude that using all countries in the database might produce more convincing results and renew the analysis of the interplay between inequality and growth. The natural next step, therefore, is to study these relationships more rigorously.

5.5 Panel estimations: Econometric method

The theoretical discussion concerning the potential determinants of top income shares is suggestive, but inconclusive. Financial development has been suggested to increase as well as to decrease top income shares and the same goes for trade openness and the effect of economic growth. Even if theory on the effect on taxation is ambiguous, we do, however, expect to find that a larger government and higher tax rates (especially higher top marginal taxes) are associated with lower top income shares.[224] When it comes to finding possible relations between variables based on simply eye-balling the time series, we have concluded that there are no obvious links to be suggested. We therefore proceed with panel estimates of the effects on these variables on top income shares. Panel estimations allow us to take all unobservable time-invariant factors into account. Further, it allows us to control for both common and country specific trends. Thus, we can test for specific hypotheses regarding the relation between different variables on top income shares.

When estimating the determinants of top income shares using a long and narrow panel of countries, the assumptions underlying the standard fixed effects model are likely to be violated. In particular, serial cor-

[224] This is partly assuming that disincentive effects dominate, but also based on the potential dynamic effects on capital accumulation. Some of the individual country studies on top incomes have also found that higher marginal taxes have indeed lowered top income shares.

relation in the error terms can be expected. We therefore apply the less demanding first difference estimator which relies on the assumption that the first differences of the error terms are serially uncorrelated. As annual data can be quite noisy in a first-differenced setting, we use 5-year averages of the data rather than annual values. Assuming a linear relationship between the variables of interest, this means that we start by estimating the following regression:

$$\Delta y_{it} = \Delta \mathbf{X}'_{\mathbf{it}} b_1 + \gamma_t + \mu_i + \varepsilon_{it} \tag{5.1}$$

This is a standard first difference regression including fixed time effects γ_t and country specific trends (here captured by a country specific effect μ_i). Further, $\Delta \mathbf{X_{it}}$ is the vector of (first-differenced) variables that we are interested in as well as other control variables. Of course, the assumption of no serial correlation in the error terms does not necessarily hold, even after first-differencing. Indeed, some preliminary tests suggest that serial correlation is a problem in this setting.[225] To account for serial correlation, we follow two different strategies. Our main approach is to estimate (5.1) using GLS and directly allow for country specific serial correlation in the error terms. The assumption of a linear relationship is by no means innocuous, especially considering the long time-frame of our study. A important part of our study therefore analyses potential non-linearities in the data. For example, we analyze if various effects differ across different levels of economic development.[226]

As an alternative approach, one could include the lagged dependent variable, thereby explicitly allowing for the dynamics that give rise to serial correlation. This means that we estimate the following regression:

$$\Delta y_{it} = b_0 \Delta y_{it-1} + \Delta \mathbf{X}'_{\mathbf{it}} b_1 + \gamma_t + \mu_i + \varepsilon_{it} \tag{5.2}$$

Applying the same test as above shows that serial correlation is no longer a problem when using a dynamic specification. However, the inclusion of the lagged dependent variable is not unproblematic since it is correlated with the unobserved fixed effects. Thereby, we could get biased esti-

225 The test procedure follows Wooldridge (2002, ch. 10.6): We run regression (1) and keep the residuals. We then rerun the regression and include the lagged residuals in the estimation. Since the coefficient on the lagged residual is positive and significant, we can conclude that serial correlation is a problem even after taking first differences.

226 Another issue is that our dependent variable is bounded between 1 and 100. In practice, this is likely to be a minor concern as the top income share is never close to these extreme values. Linearizing the dependent variable using the transformation y=ln(top income share/(100–top income share)) matters little for the results.

mates. This bias is reduced when *T* is large (Nickell, 1981). *T* does in this case depend on the actual time horizon on which the data is based. In other words, in our case where *T* is 100 years, the bias is not likely to be a major problem even if we only use 20 periods based on 5-year averages. Furthermore, the standard way of dealing with the dynamic panel data problem is to use GMM-procedures along the lines of Arellano and Bond (1991) or Arellano and Bover (1995).[227] But these GMM-procedures are not appropriate in a setting with small *N* and large *T* such as ours (Roodman, 2007). For these reasons we run regression (2) without any adjustments or instrumentation. Both when using dynamic first differences and first differenced GLS, we allow for heteroskedasticity in the error terms. In order to limit the number of tables, we only report the GLS results in the main paper, but all regressions are also run using the first difference approach.

The fact that we control for trends and time invariant country factors does not mean that we have fully addressed potential endogeneity problems. First of all, we could have direct reverse causality from top income shares to our explanatory variables. This would be the case if, for example, top income shares would have a direct effect on economic growth, rather than the other way around. Similarly, high top income shares could affect financial development positively if individuals in the top of the income distribution are relatively prone to make use of the financial markets for saving and investment. It is more difficult to see a problem of reverse causality from top incomes to trade and government spending, but a high income concentration can of course affect the political trade-offs facing a government. This, in turn, can affect trade policies, government spending and how the tax system is structured. Second, it is possible that some uncontrolled factor affects both top income shares and the respective control variables. This would then give rise to an omitted variable bias of our estimates.

The ideal way of dealing with these endogeneity problems is to find some credible instrument for each respective explanatory variable. Since our approach here is to take an agnostic view on several potential explanations for top incomes over a long period, instrumentation is not feasible for all variables. However, when estimating the impact of internationalization we will rely on both *de facto* and *de jure* measures of openness. In order to get at the impact of financial development, we will both use direct measures and analyze the effects of banking crises on top income shares. Neither of these approaches is ideal so we cannot claim to fully establish causality. Despite these shortcomings we regard our contribu-

[227] Lagged levels and differences of the endogenous variable/s are used as instruments in these GMM-procedures.

tion as being a first systematic take on the various explanations of top income shares that have been proposed in the literature.

5.6 Results

In this section, we report the results from panel regressions using the above estimation methods. Throughout, we have used both first differenced GLS (FDGLS) and dynamic first differences (DFD), but as these give very similar results we only display the FDGLS results in our main tables while the DFD output is available from the authors upon request.[228] In all tables showing the results, the dependent variables are the five different income shares presented in the data section: the top percentile (*Top1*), the next nine percentiles in the top decile (*Top10–1*), the bottom nine deciles (*Bot90*), the top percentile divided by the rest of the top decile (*Top1/10*) and, finally, the top 0.1 percentile divided by the rest of the top percentile (*Top01/1*). As has already been stated, the results are not sensitive to altering the exact percentile limits between these income earner groups.[229]

The presentation of the results starts by looking at average long-run effects over the whole income distribution. We then allow for: different effects across levels of development, differences between Anglo-Saxon and other countries and differences between bank- and market-oriented financial systems. Thereafter we show that our results are robust to restricting the sample in a number of ways as well to using alternative marginal tax measures.[230]

5.6.1 Main results

Table 5.5 presents the results from our baseline FDGLS regressions. The explanatory variables in all regressions are growth in GDP per capita, financial development (as measured by total capitalization), population

[228] We choose to present the results from FDGLS because it deals more directly with serially correlated errors.

[229] Using all possible variants of top income share groups that are available to us from the different country case studies, we find no important variation in our results (available upon request). For example, we try splitting the rich in Top1 (P99–100) into two halves (P99–99.5 and P99.5–100) and, similarly, redefining the upper middle class as the next four percent (P95–99) in the top decile instead of the next nine percent (P90–99), finding qualitatively identical results.

[230] Judging from the descriptive analysis of Section 3, it is obvious that the two world wars had an impact on top income shares. As we lack data on several variables for the war years they are excluded from the empirical analysis. Even if data had been available, it would have been difficult to separate different explanations during periods of such dramatic changes as the war years.

size, central government spending, and openness to trade. The difference between odd and even numbered columns is that the latter also includes top marginal tax rates.

A number of clear and interesting results are shown in Table 5.5. First, there is a strong positive relation between GDP per capita growth and the changes in the top income share. The regression coefficients for *Top1*, *Top1/10* and *Top01/1* are all significantly positive suggesting that in periods of high growth the rich have benefitted more than proportionately over the entire twentieth century. Furthermore this relationship is stronger the higher up the distribution one gets. In sharp contrast to those results is the *negative* relationship between growth and changes in the income share for the next nine percentiles in the top decile, *Top10–1*, which we think of as the upper middle class group. The most plausible explanation for this finding is perhaps simply that the top percentile group has a larger share of their income tied to the actual development of the economy, while the following nine, as pointed out in much of the top income literature, are mainly highly salaried workers but with relatively limited bonus programs, stock options, and other performance related payments. As shown in the above section describing the income data, their capital income share is also significantly lower than that of the rich. The unclear result for the rest of the population is likely to reflect the heterogeneous experiences within this group. Quantitatively the estimated effects suggest that an average growth rate of 10 percent, which seems reasonable over a five year period, increases the income share of the top percentile by about 0.6 percentage points (the mean of *Top1* is 10.6). As for the effects within top income earner, columns 7 and 8 shows an increase of approximately 0.03 (the mean of *Top1/10* is 0.45).

Table 5.5: The determinants of top income shares.

	(1) Δtop1	(2) Δtop1	(3) Δtop10–1	(4) Δtop10–1	(5) Δbot90	(6) Δbot90	(7) Δtop1/10	(8) Δtop1/10	(9) Δtop01/1	(10) Δtop01/1
ΔGDPpc	5.77***	6.42***	–8.78***	–6.90***	5.56**	–1.30	0.28***	0.36***	0.23***	0.26***
	(1.03)	(1.34)	(1.73)	(2.61)	(2.73)	(3.53)	(0.05)	(0.06)	(0.05)	(0.06)
ΔPop	–4.62	–12.98**	–0.57	–12.20	9.83	24.09**	–0.23	–0.66***	0.02	–0.37*
	(5.03)	(5.62)	(6.31)	(8.04)	(11.54)	(12.02)	(0.22)	(0.22)	(0.21)	(0.22)
ΔGovspend	5.77	3.35	–16.28***	–23.40***	22.39***	23.96***	–0.10	0.12	–0.20	–0.25
	(4.62)	(4.66)	(4.99)	(7.11)	(8.53)	(8.89)	(0.18)	(0.19)	(0.20)	(0.21)
ΔFindev	0.99***	1.27***	0.16	0.19	–0.53	–1.89***	0.03***	0.06***	0.02	0.03***
	(0.32)	(0.30)	(0.33)	(0.44)	(0.62)	(0.66)	(0.01)	(0.01)	(0.01)	(0.01)
ΔOpenness	–8.83***	–2.46	–0.24	0.41	3.29	0.14	–0.01	–0.06	–0.07	0.14
	(2.26)	(2.55)	(2.42)	(3.75)	(4.40)	(5.05)	(0.08)	(0.09)	(0.09)	(0.11)
ΔMargtax1		–4.34***		–3.22**		10.22***		–0.15***		–0.30***
		(1.21)		(1.56)		(2.21)		(0.04)		(0.05)
Obs	126	92	99	77	99	77	109	87	126	92
N countries	14	12	12	10	12	10	13	11	14	12

Notes: FDGLS estimations allowing for country specific AR(1) processes and heteroskedasticity in the error terms. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Financial development also turns out to have been pro-rich over the past century, with increases in total capitalization being significantly associated with increases in the top income percentile. Unlike the growth effects, however, the effect for the following nine percentiles is statistically insignificant, while the effect on the nine lowest deciles seems to be negative (although with varying degree of statistical certainty). It is not trivial to gauge the size of the estimated effects, but the following exercise can be useful. Increasing total capitalization by one standard deviation (0.5, or 50 percent of GDP), is related to an increase in income share of the top percentile by about 0.5 percentage points. As the mean income share of this group is about 10 percent, this effect is quite small. If we instead use the estimates from *within* the top decile (columns 7 and 8), we see that the same increase in is related to an increase in the income share of the top percentile by about 0.15. As the top percentile on average has an income share of 0.45 of the *Top10–1* group, this effect must be considered very large. In other words, financial development has large redistributive consequences within the group of high-income earners, but the consequences for the overall distribution of income are more limited.

Looking at the role of the state, the effects on inequality are in line with what one might expect. Central government expenditures increases the income share of the nine lowest deciles, decreases the share of the upper middle class group, but has no significant effect on the top percentile. Increasing central government spending by one standard deviation (about 0.07) is related to a reduction in the income share of the upper middle class by about 1.6 percentage points (the average income share of this group is about 23 percent). The most surprising finding regarding the amount of government spending is that the highest income earners appear to be unaffected.

Furthermore, top marginal taxes have a negative effect on the whole top group, both the top percentile and the following nine percentiles, while the effect for the lower nine deciles is strongly positive. As our income shares are *pre-tax* this suggests that high marginal tax rates have an equalizing effect beyond the direct impact of taxation, something which is not theoretically obvious.[231] The direct effects of taxation are relatively small. Increasing top marginal taxes from 50 to 70 percent (approximately one standard deviation), reduces the income share of the top percentile by 0.86 percentage points. Within the top decile, the same increase in taxes leads to a reduction of the earnings of the top percentile by 0.03 which should be compared to the mean of 0.45. However, when taking the cumulative effects of taxation into account may still be important in explaining changes in inequality.

[231] See e.g., Atkinson (2004) and the discussion in Section 5.2 above.

The appendix contains results from simple simulations of the dynamic effects under different assumptions about capital accumulation in response to tax increases and shocks to the capital stock (as well as their combined effect).[232] Assuming that capital owners (overrepresented in the top of the distribution) use some of their capital to uphold consumption the tax increase will not only affect disposable income in the current period but also future (capital) income. Piketty and Saez (2006) argue that the tax increases in the 1940s and 1950s had precisely this type of effect when combined with the shocks to capital during World War II. Our stylized simulations show that tax increases in the order of magnitude that took place in many countries around the 1950s could indeed have important cumulative effects. For example, in response to a tax increase from 0.3 to 0.5, the income share of the top percentile would decrease from 15 percent to 14.2 percent in five periods (assuming they uphold consumption by decreasing savings). After ten periods it would be 13.5 percent and after 15 periods 12.6 percent. When combined with a shock to capital the numbers would be 12.3, 11.2, and 9.9 percent after 5, 10, and 15 periods respectively. As illustrated in the appendix, changing the consumption response or altering the level of tax increase or capital shock does not alter the basic insight: Small short term effects – of the size that we find in our panel estimation – can be significant over time through their effect on capital accumulation.

Finally, contrary to what is often asserted *openness,* i.e., the trade to GDP-ratio, is not strongly related to top income shares at all. If anything the relationship is negative but when we use average tariff protection as measure of openness the coefficients for the rich are positive but insignificantly different from zero.[233] As we include time fixed effects and thereby control for any general changes in globalization it is still possible that while "general globalization" increases income inequality country specific trade openness does not. However, the mechanism behind such a result would be quite difficult to spell out.

The issue of "general globalization" brings us to the question of how much of the variation in top income shares that can be explained by common time shocks and what the explanatory power of the time varying control variables is. As we noted in section 4, one of the few things that can be said about the data just by looking at it is that there seems to be a strong common trend. It is therefore interesting to see exactly how much of variation that can be explained by this. Our estimates suggest that a full 35 percent of the variation in the first-differenced top income share can

232 These simulations are very similar to those in Piketty (2001b).
233 Results using average tariffs are available upon request.

be explained by the time fixed effects.[234] Adding the base set of controls explains another 7 percent, and the inclusion of country time trends adds another 12 percentage points of explanatory power. Hence, a substantial amount of the variation can be attributed to general changes in economic conditions.

5.6.2 Different effects depending on the level of economic development

As discussed in section 2, the effect of several variables on top income shares could theoretically be expected to depend on the level of economic development. In this section, we analyze this possibility by splitting the sample into three similar sized groups based on per capita GDP.[235] Thereafter we interact these groups with the respective variable of interest. Table 5.6 presents the results from this exercise.

Overall, there is little evidence that the effect of GDP growth on top incomes depends on the level of development. The point estimates have the same signs and levels of significance in almost all cases and F-tests of equal coefficients across development groups are mostly not rejected.

When it comes to the effect of financial development depending on the level of economic development, however, a more interesting variation is observed. According to the basic idea of Greenwood and Jovanovic (1990), financial development should benefit the rich in early stages of development, but then spread to benefit everyone as the economy becomes more developed. Our results seem to be in line with this idea; the very richest among the top income earners benefit more from financial development especially at low levels of development. Note that once again it seems to be primarily the rest of the top decile (P90–99) that loose out on this development.

We also analyzed the effects on inequality coming from trade openness and central government spending over the level of economic development but could not find any observable differences and therefore suppress these results in our tables.

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234 The estimated coefficients for the time fixed effects in the main regressions are about zero before the 1980s. After that, however, they increase constantly, peaking during the 1995–2000 period.

235 High income if GDP per capita is greater or equal to 15,365 USD per year, middle income if GDP per capita is between 15,365 and 9,701 USD per year, and low income if GDP per capita is less than or equal to 9,701 USD per year.

Table 5.6: The effects at different levels of economic development.

	(1) Δtop1	(2) Δtop1	(3) Δtop10–1	(4) Δtop10–1
ΔGDPpc		5.39***		–8.52***
		(1.06)		(1.71)
ΔPop	–4.90	–5.86	–2.78	4.16
	(5.03)	(5.18)	(6.64)	(6.44)
ΔGovspend	3.38	5.75	–17.79***	–18.87***
	(4.72)	(4.65)	(5.39)	(4.83)
ΔFindev	1.05***		0.20	
	(0.33)		(0.33)	
ΔOpenness	–9.15***	–8.49***	–0.34	–0.78
	(2.26)	(2.26)	(2.45)	(2.31)
ΔGDPpc×Lowdev	5.04***		–9.02***	
	(1.13)		(2.08)	
ΔGDPpc×Meddev	6.37***		–7.32***	
	(1.50)		(2.40)	
ΔGDPpc×Highdev	2.45		–9.77***	
	(2.26)		(2.69)	
ΔFindev×Lowdev		1.67*		–3.27**
		(0.94)		(1.37)
ΔFindev×Meddev		0.88*		0.33
		(0.52)		(0.63)
ΔFindev×Highdev		0.86*		0.38
		(0.44)		(0.37)
F–test: Low=Med[a]	0.31	0.45	0.52	0.02
F–test: Low=High[a]	0.25	0.42	0.80	0.01
F–test: Med=High[a]	0.07	0.98	0.34	0.94
Obs	126	126	99	99
N countries	14	14	12	12

Notes: Interactions between low, medium and high GDP per capita and ΔGDPpc and ΔFindev. See also the notes of Table 5.5. [a] P-value of an F-test of equality of coefficients.

5.6.3 Banking crises and financial systems: A deeper look at the role of finance

Among the strongest result so far is that financial development is highly positively related to top income shares. Establishing a causal relationship from financial development to top income shares would therefore be valuable. To this end we use the fact that banking crises cause drastic contractions of the financial sector. Using data from Bordo et al. (2001) and Laeven and Valencia (2008) on banking crises, we can estimate the impact of these events on top income shares. When doing this, we naturally do not include any direct controls for financial development as these are endogenous to the crises itself. In the first column of Table 5.7, we

see that the share of years during each 5-year time period that a country was exposed to a banking crises has a substantive negative impact on top income shares (results are similar when using a binary indicator for a crisis period).

Table 5.7: The impact of banking and currency crises.

	(1) Δtop1	(2) Δtop1	(3) Δtop10–1	(4) Δtop10–1
Bank crisis	–1.07***	–1.08***	0.33	0.35
	(0.39)	(0.39)	(0.38)	(0.37)
Currency crisis		–0.06		–0.31
		(0.45)		(0.55)
Control variables incl.	Yes	Yes	Yes	Yes
Obs	171	171	132	132
N countries	17	17	14	14

Note: FDGLS regressions with constant and fixed effects for period and country trends suppressed. Bank crises and currency crises is the share of years in each 5-year period being classified as "crises years" by Bordo et al. (2001) and Laeven and Valencia (2008). The regressions include ΔGDPpc, ΔOpenness, ΔPop and ΔGovspend. See also the notes of Table 5.5.

One possibility is that this relation is due to some general crisis effect, rather than the banking crises *per se.* In the second column therefore, we include a similar variable representing periods during which currency crises occurred. As can be seen, however, these episodes do not have a significant impact on top incomes. In the next two columns, we see that neither type of crises had a significant impact on the income shares of the upper middle class. This is consistent with our original findings that the income shares of this group in unaffected by financial development.

In the literature on top income shares, the diverging pattern between Anglo-Saxon countries and continental Europe has been stressed.[236] One possibility is that this is due to differences in the financial systems. While Anglo-Saxon countries tend to have stock market based financial systems, most of continental Europe and the rest of the world have relatively bank based financial systems (see, e.g., Boot and Thakor, 1997, Allen and Gale, 2000, and Levine, 2005). Hence, if there are differences between these systems in terms of allocating capital and generate returns to savings that would give rise to differences in the rela-

236 This difference is one of the main findings in the recent research on top incomes. Indeed, the title of the recent volume edited by Anthony Atkinson and Thomas Piketty, collecting much of this work is *Top Incomes over the Twentieth Century: A Contrast between European and English-Speaking Countries.*

tive size of capital income and hence the development of income inequality across Anglo-Saxon and other countries.

In Table 5.8, we analyze this issue explicitly by breaking up our combined measure of financial development, total capitalization, into its components. In columns (1) and (4) we use *Bank deposits* and in columns (2) and (5) we use *Stock market capitalization* to measure financial development. The main findings in Table 5.8 show, however, that there are no systematic differences in distributional influences across the two types of financial systems. This does not only tell us that different types of financial development are unlikely to have a differential impact on top income shares. As bank deposits are much less affected by current market conditions than stock market capitalization, it these findings also reduce the likelihood that we capture a mechanical relationship between stock market capitalization and top incomes.

Table 5.8: Bank- and market based financial systems.

	(1) Δtop1	(2) Δtop1	(3) Δtop1	(4) Δtop10–1	(5) Δtop10–1	(6) Δtop10–1
ΔBankdeposits	3.01***			0.30		
	(0.80)			(0.89)		
ΔMarketcap		0.88**			0.33	
		(0.38)			(0.39)	
ΔPrivate credit			0.87**			–0.77
			(0.44)			(0.61)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Obs	168	128	130	129	101	112
N countries	16	15	15	13	13	13

Note: Financial development is split into Bank deposits and Market capitalization. The regressions include ΔGDPpc, ΔOpenness, ΔPop and ΔGovspend. See also the notes of Table 5.5.

Finally, there are several different ways to proxy for financial development. We make use of *bank deposits* to capture the amount of credit in the economy. An alternative measure of this is the share of *private credit* to GDP. The two proxies are highly correlated and as can be seen in columns (3) and (6) the results are qualitatively similar regardless of which proxy we use.

In sum, the results for banking crises suggest a causal relationship between financial development and top income shares. Moreover, that the pattern is the same for bank based measures of financial development (bank deposits and private credit) and market based measures (stock market capitalization) means that this is not likely to be due to a mechanical relation between market capitalization and top income shares.

5.6.4 Are Anglo-Saxon countries different?

Based on the different developments from 1980 and onwards, it has been suggested that the evolution of top income shares in Anglo-Saxon countries differs from that of continental Europe.[237] Empirically speaking, there are two possibilities: Anglo-Saxon countries may either have had a different development in the underlying determinants of top income shares, or the response of top incomes to the underlying determinants differs—for some reason—between the two groups of countries. In Table 5.9, we address this issue by interacting a dummy variable indicating that a country is Anglo-Saxon with the main variables of interest.[238] We can then directly answer the question if the slope coefficients differ between Anglo-Saxon and other countries.

Table 5.9: Are Anglo-Saxon countries different?

	(1) Δtop1	(2) Δtop1	(3) Δtop10–1	(4) Δtop10–1
ΔGDPpc	5.62***	5.50***	–9.44***	–9.21***
	(1.13)	(1.04)	(1.98)	(1.73)
ΔPop	–4.79	–4.42	–0.29	1.79
	(5.06)	(4.94)	(6.29)	(6.42)
ΔGovspend	5.87	5.64	–15.61***	–16.78***
	(4.63)	(4.61)	(4.91)	(5.00)
ΔFindev	1.00***	0.98***	0.18	0.18
	(0.32)	(0.31)	(0.33)	(0.33)
ΔOpenness	–8.84***	–9.91***	0.41	–1.51
	(2.26)	(2.42)	(2.69)	(2.50)
ΔGDPpc×Anglo-Saxon	0.42		1.95	
	(1.59)		(2.27)	
ΔOpenness×Anglo-Saxon		3.08		5.96
		(2.56)		(3.98)
Obs	126	126	99	99
N countries	14	14	12	12

Notes: Interacting a dummy for Anglo-Saxon countries (Australia, Canada, New Zealand, U.K. and U.S.) and ΔGDPpc and ΔOpenness. See also the notes of Table 5.1.

The results do not indicate any systematic distributional effects from either economic growth or trade openness that differ between the two country-groups. In a few cases the estimated coefficients are statistically significant, but they fail to provide a consistent pattern.[239] Another possibil-

[237] See, e.g., Atkinson and Piketty (2007).

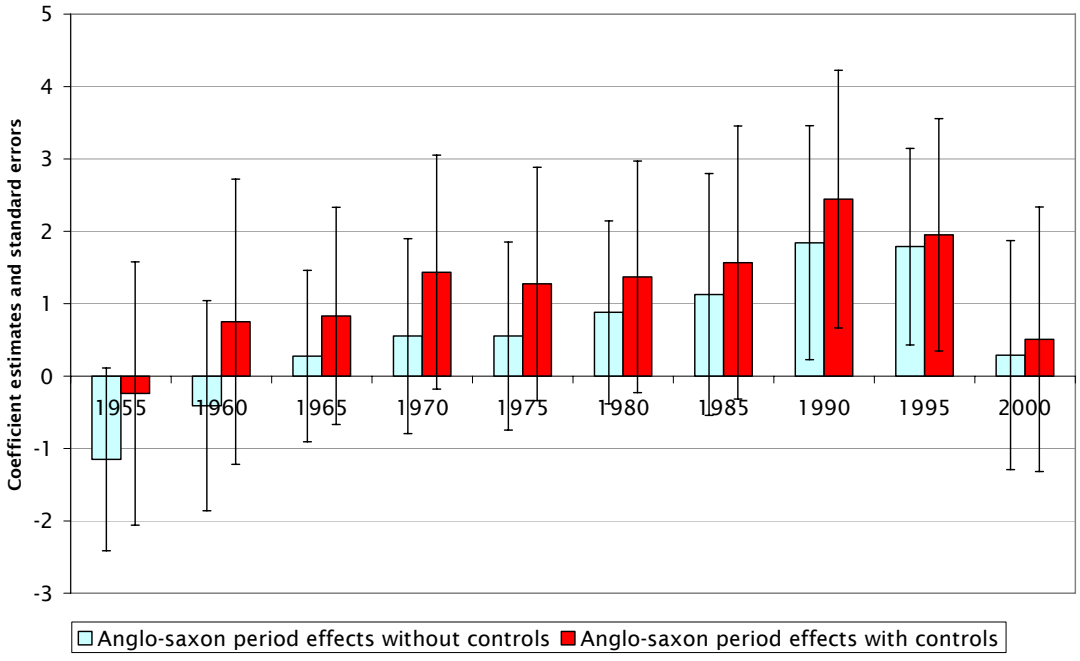
[238] Anglo-Saxon countries are Australia, Canada, New Zealand, the UK and the US.

[239] See, e.g., the negative effects of openness and growth in Anglo-Saxon countries on both *Bot90* and *Top01/1* while at the same time *Top1/10* in these countries is positively affected by openness.

ity that has been discussed in the literature is that the different groups of countries differ in their acceptance of inequality.[240] One, admittedly quite weak, way to test this hypothesis is to analyze if government spending is relatively pro-rich in Anglo-Saxon countries. When we interact government expenditures with the Anglo-Saxon indicator the interaction term is, however, not statistically significant (suppressed in the table). We can therefore not see any indication that the distributional impact of government spending is different in the two country groups.

An alternative approach to the question of why Anglo-Saxon countries differ from continental Europe is to analyze the diverging time trends between the two groups of countries. Specifically, we ask if these differences are reduced when we include our set of control variables. In Figure 5.3, we graph the interaction terms between time fixed effects and an Anglo-Saxon dummy, with and without our base set of control variables.[241] As should be clear, this exercise indicates that the difference between the two groups of countries is—if anything—more pronounced after we control observable characteristics. Thus, the difference between the two groups of countries must be due to other factors. Unfortunately, our data does not allow us to pursue the question further.

Figure 5.3: Anglo-Saxon deviations from common time trend.



Note: The graph displays the interaction terms between time fixed effects and an Anglo-Saxon dummy, with and without our base set of control variables. 95 percent confidence intervals indicated.

[240] See, for example the discussion in Piketty and Saez (2006).

[241] As the diverging patterns are main apparent from 1980 an onwards, we only display these results for the post WWII-period.

5.6.5 Sample restrictions, extensions and robustness

In Table 5.10, we conduct a set of robustness tests, based on sample restrictions and alternative measures used. First, we replace our *de facto* openness variable, *Openness*, by a *de jure* measure of openness, *Tariffs*. This change does not alter the findings and openness remains basically unimportant to explain long-run trends in income inequality. Second, we restrict the sample to the post World War II-period, dropping all observations prior to 1950. The main reason for doing this is that the pre-war period includes the great depression era, during which the volatility of growth rates and changes in the income distribution were quite extreme. Further, top income shares declined rapidly during the Second World War, possibly for reasons unrelated to the economic forces we are analyzing. The main results are unchanged by this sample restriction.[242]

Third, we replace the preferred marginal tax measure, *Margtax1*, by the alternative *Margtax2*, containing solely statutory top rates. The correlation between the two series 0.80 (in first differences), which is high. Table 5.10 also reports roughly the same negative relationship between marginal taxes and income inequality as we saw in our main results in Table 5.5. The coefficient sizes are somewhat lower and the standard errors larger. Overall, however, switching tax measure does not alter the conclusions drawn from our main analysis.

Fourth, other factors that may contribute to changes in income inequality are technological and democratic developments. We analyze the role of technology in two ways: as the share of agricultural production in GDP (*Agrishare*) and as the stock of domestic patents (*Patents*). As shown in Table 5.10, neither of these variables suggest technology to have a crucial long-run impact on inequality. Furthermore, we have also incorporated variables on democratic standards in countries and evaluated their impact on the long-run inequality trends. However, neither their main effects nor their interaction the other explanatory variables appear to have any significant effects.[243]

[242] We also try dropping Japan from the sample as we lacked data on the top income decile for Japan, which affects our computed income shares for both the upper middle class and the rest of the population. This exclusion has no effect on our results..

[243] We use data on democracy from the Polity IV dataset. The lack of significant results (which are available upon request) is most likely due to the low within-country variation of this variable during the major part of our study period.

Table 5.10: Sample restrictions and alternative measures.

	(1) Δtop1	(2) Δtop1	(3) Δtop1	(4) Δtop1	(5) Δtop1	(6) Δtop10–1	(7) Δtop10–1	(8) Δtop10–1	(9) Δtop10–1	(10) Δtop10–1
ΔGDPpc	5.16***	5.81***	6.27***	5.39***	–7.49***	–7.03***	–8.48***	–10.00***	–6.33***	–8.71***
	(1.02)	(1.30)	(1.31)	(1.19)	(2.22)	(1.84)	(1.47)	(1.97)	(2.06)	(1.74)
ΔPop	–7.64	4.12	–4.36	–2.18	4.62***	–5.37	10.68**	–12.35*	8.10	–1.72
	(5.09)	(5.59)	(5.25)	(4.66)	(1.13)	(6.52)	(5.31)	(7.16)	(9.31)	(6.31)
ΔGovspend	–1.49	4.44	13.01***	3.85	2.68	–17.04***	–11.25**	–17.88***	–24.21***	–16.31***
	(4.23)	(5.06)	(4.97)	(5.57)	(4.92)	(4.98)	(5.60)	(6.52)	(6.12)	(4.97)
ΔFindev	0.63**	0.61*	1.28***	1.90**	4.86	0.36	1.35[a]	0.08	–0.32	0.24
	(0.28)	(0.35)	(0.32)	(0.91)	(4.48)	(0.31)	(0.94)	(0.42)	(0.50)	(0.32)
ΔOpenness	–0.78		–8.40***	–3.35**	1.10***	–0.01		0.52	–2.95	–0.32
	(2.34)		(2.52)	(1.67)	(0.31)	(2.57)		(3.31)	(3.10)	(2.45)
ΔTariffs		2.40					3.96			
		(2.60)					(4.30)			
ΔMargtax2			–2.10**					–2.89***		
			(0.93)					(1.08)		
ΔAgrishare				–0.04					–0.03	
				(0.04)					(0.09)	
ΔPatents					–0.00					0.00
					(0.00)					(0.00)
Restriction	Postwar	Tariffs	Margtax2	Agrishare	Patents	Postwar	Tariffs	Margtax2	Agrishare	Patents
Obs	112	110	103	142	115	93	114	82	91	99
N countries	14	14	12	15	13	12	13	10	11	12

Note: Postwar = sample is 1945 onwards, Tariffs = we switch openness measure to the *de jure* measure Tariffs, Margtax2 = Margtax2 replaces Margtax1, Agrishare = technological development as GDP-share of agriculture and Patents = technological development as patents. See also the notes of Table 5.1. [a] denotes that ΔBankdeposits was used instead of ΔFindev because otherwise we had too few degrees of freedom when also using the Tariff variable.

5.7 Conclusions

This paper set out to empirically analyze the long-run relationships between top income shares and financial development, trade openness, the size of government, and economic growth. While these relationships, of course, have been extensively studied before, the unique contribution of this paper lies in the long time period for which we have data. Combining findings from a number of recent studies on top incomes with other historical data, our results are based on developments over the whole of the twentieth century. Using a panel data approach allows us to take all unobservable time-invariant factors, as well as country specific trends into account.

Two findings stand out as being significant and robust across all specifications. First, economic growth seems to have been pro-rich over the twentieth century. More precisely, in periods when a country has grown faster than average, top income earners have benefited more than proportionally. A likely reason for this result is simply that, top incomes are (and have been) more closely related to actual performance than incomes on average. This result is similar at different levels of development and is not different between Anglo-Saxon and other countries. Second, we also find financial development to have been pro-rich over the twentieth century. This effect is also similar in Anglo-Saxon countries and elsewhere, it does not depend on whether financial development is approximated using bank deposits or stock market capitalization (often said to be a difference between Continental Europe and Anglo-Saxon countries), *but* it seems to depend on the degree of economic development. In line with the model in Greenwood and Jovanovic (1990) we find that the effect is strongest at relatively low levels of economic development. Furthermore, to explore in more detail how financial development might be pro-rich we have also studied the effects of banking and currency crises and find that only banking crises have had a significant negative impact on top income shares.

Regarding the much debated distributional effects of trade openness we do not find any evidence of this being disproportionately beneficial for top income earners on average. If anything the relationship is negative in some specifications.

Finally, when it comes to government spending and top marginal tax rates these seem to have been equalizing as increases in both these variables are associated with disproportionate gains for the nine lowest deciles. Higher marginal tax rates have been negative for both the rich and the upper middle class, but interestingly government spending seems

to have been neutral for the top but negative for the next nine percentiles. It is also worth emphasizing that as our inequality measures are pre-tax, the results capture effects over and above the direct impact of taxation and transfers. Quantitatively the short term effects of high marginal taxes are small but when placed in a dynamic context, especially when combined with shocks to capital, the effects quickly add up to potentially explaining much of the observed equalization after the Second World War.

Needless to say, a paper with a scope such as this leaves many stones unturned. For example, it is likely that the distributional impact of income shocks differ substantially, depending both on the nature of the shock and the institutional set-up of a particular country. We hope that our work will stimulate detailed research on such particularities. Such research would greatly improve our understanding of the drivers of income inequality

Appendix: Simulations of dynamic effects of taxation and shocks to capital

The tables below show the cumulative effects on top incomes from increases in taxation and shocks to the capital stock under very stylized assumptions.[244] In all cases we assume that there are two groups of income earners; a top group that derives half their income from capital (the rate of return is assumed to be 5 percent) and the other half from wages, while the rest only have a wage income. Initially the income share of the top group is 15 percent of all income and their consumption is such that their capital stock remains unchanged. These assumptions are of course not calibrated to fit a particular economy but they are at the same time approximate representations of the relationship between the top percentile and the rest of the population, both in terms of the importance of capital (with a broad interpretation) and the income share around World War II.

Gross wage income is assumed to be unchanged when taxes change implying that the (gross) income remains the same over time forcing wage earners to alter consumption as taxes increases (alternatively one could think of this as a case where their effective consumption can be maintained through taxes being redistributed back to them). The rich group, however, can consume part of their capital stock so as to maintain their consumption level. This, of course, erodes their capital stock, giving rise to a decreasing capital income share, and also a decreasing top income share.

Table 5.A1 shows the effects of a tax increase from 0.3 to 0.6 in period 0 (columns 1–3), the effects of a shock to the capital stock causing 30 percent of it to disappear in period 0 (columns 4–6) and finally the combined effect of these changes given that the rich group does not alter consumption. With respect to the effects of taxation it illustrates that a one time change can have a small effect in the short run but through its cumulative effect can be important over time. Looking first at the effect from a tax increase, the instantaneous decrease in the top income share is only 0.2 percentage points. However, after five years the effect has grown to 0.8 percentage points, and after 25 periods the effect is over 6 percentage points. The effect of a 30 percent loss of capital is approximately of the same order of magnitude (given these assumptions) and combined the effect is substantial already after a decade.

244 The assumptions we make are very similar to those in a similar exercise in Piketty (2001b).

Table 5.A1: Cumulative effect of one time changes affecting the capital stock and capital income (%).

	Tax increase only (no change in capital stock)			Shock to the capital stock only (no tax increase)			Combined tax increase and shock to the capital stock		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Capital stock left	Capital inc. share	Top inc. share	Capital stock left	Capital inc. share	Top inc. share	Capital stock left	Capital inc. share	Top inc. share
0	100.0	50.0	15.0	100.0	50.0	15.0	100.0	50.0	15.0
5	87.6	46.7	14.2	65.6	39.6	12.8	55.2	36.9	12.3
10	70.7	41.4	13.1	59.1	37.2	12.3	34.9	29.9	11.2
15	52.1	34.2	11.8	51.4	34.0	11.8	0	0	8.1
20	31.5	23.9	10.4	42.3	29.7	11.2	0	0	8.1
25	8.7	8.0	8.8	31.5	24.0	10.4	0	0	8.1

Note: In year 0 there is a one time change which has cumulative effects. Columns (1)–(3) show the effects of a tax increase from 30 to 60 percent, columns (4)–(6) the effects of a shock to the capital stock such that it decreases to 70 percent of it's initial value, and columns (7)–(9) show the effects of these two changes in combination. All calculations are made based on the assumption that consumption is not adjusted (see Table 5.2 for the effect of adjusting this).

Table 5.A2 shows the results of the same exercise but changing the increases in taxation up and down and also changing the size of the capital shock, as well as when changing consumption. The results are intuitively clear: higher tax increases cause the capital to shrink faster as does larger shocks to capital under the assumption that consumption is to remain unchanged and decreasing consumption can lead to a recovery of the capital stock. Again what is important to note is the potential cumulative effect of taxation when interpreting our coefficients which are the estimated instantaneous effects. Even if these are relatively small the dynamic effect can be important over time.

Table 5.A2: Cumulative effects of different changes to taxes and the capital stock, as well as with consumption adjustment (%).

	Tax increase			Shock to the capital stock			Combined tax increase and shock to the capital stock		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Capital stock left	Capital inc. share	Top inc. share	Capital stock left	Capital inc. share	Top inc. share	Capital stock left	Capital inc. share	Top inc. share
0	100.0	50.0	15.0	100.0	50.0	15.0	100.0	50.0	15.0
	Tax increase from 0.3 to 0.4			Capital shock, 90% remaining			Combined effect		
5	95.8	48.9	14.7	88.5	47.0	14.3	84.6	45.8	14.0
10	89.8	47.3	14.4	86.4	46.3	14.1	76.8	43.4	13.5
15	82.9	45.3	13.9	83.8	45.6	14.0	67.8	40.4	12.9
20	74.9	42.8	13.4	80.8	44.7	13.8	57.3	36.4	12.2
25	67.5	40.3	12.9	77.9	43.8	13.6	47.8	32.3	11.5
	Tax increase from 0.3 to 0.6			Capital shock, 50% remaining			Combined effect		
5	87.6	46.7	14.2	42.6	29.9	11.2	33.5	25.1	10.5
10	70.7	41.4	13.1	31.9	24.2	10.4	11.0	9.9	8.9
15	52.1	34.2	11.8	19.1	16.0	9.5	0	0	8.1
20	31.5	23.9	10.4	3.9	3.7	8.4	0	0	8.1
25	8.7	8.0	8.8	0	0	8.1	0	0	8.1
	Changing consumption to 0.9 of previous level								
	Tax increase from 0.3 to 0.5			Capital shock, 70% remaining			Combined effect		
5	96.5	49.1	14. 8	70.5	41.3	13.1	63.4	38.8	12.6
10	92.6	48.1	14.5	72.1	41.9	13.2	55.1	35.5	12.0
15	88.1	46.8	14.2	74.0	42.5	13.3	45.7	31.4	11.4
20	83.0	45.3	13.9	76.2	43.2	13.5	35.0	25.9	10.6
25	77.2	43.6	13.5	78.9	44.1	13.6	23.0	18.7	9.8
	Changing consumption to 0.7 of previous level								
	Tax increase from 0.3 to 0.5			Capital shock, 70 % remaining			Combined effect		
5	Consumption decreases			79.0	44.1	13.6	71.8	41.8	13.2
10	more than the tax increase.			94.2	48.5	14.6	76.4	43.3	13.5
15	Capital stock grows			Capital stock recovered			81.5	44.9	13.8
20							87.3	46.6	14.2
25							93.9	48.4	14.6

Chapter 6

Intergenerational Top Income Mobility in Sweden: A Combination of Equal Opportunity and Capitalistic Dynasties*

6.1 Introduction

This paper studies intergenerational income mobility focusing on top income earners in Sweden. More precisely, we study the income association of matched father-son pairs, where the sons are a representative sample of all men born in 1960–1967. The fact that our sample consists of more than 100,000 pairs (35 percent of the whole population) means that we are able to get good precision estimates for fractions as small as the top 0.1 percent of the income distribution.

There are two main motivations for this study. The first is based on the growing literature on top income shares over the long run.[245] While initially driven by a lack of comparable long-run series of inequality, this literature has also shown the importance of studying the top in more detail in order to understand changes in overall inequality.[246] In particular, it has been shown that the recent surge in inequality in many countries has been driven mainly by large income increases in the top percent (or even

* We are grateful to Robert Erikson, Markus Jäntti, Thomas Piketty, Tim Smeeding and seminar participants at SOFI, Stockholm University and Université Libre de Bruxelles for constructive comments. Björklund acknowledges research funding from Swedish Council for Working Life and Social Research (FAS) and Waldenström acknowledges financial support from the Jan Wallander and Tom Hedelius Foundation and the Gustaf Douglas Research Program on entrepreneurship at IFN.

[245] Starting with Piketty (2001), Atkinson (2004), and Piketty and Saez (2003), a number of studies have followed using a common methodology to create homogenous series of top income shares over the long run for a number of mainly industrialized countries. Roine and Waldenström (2008) studies the Swedish case. Atkinson and Piketty (2007, 2010) and Leigh (2009) survey much of this work, its methodology and main findings.

[246] For example, the top income literature has shown that the top decile is typically a very heterogeneous group both in terms of income composition (though the composition has also changes over time for some groups) and in terms of the volatility of their income share. For most countries it also seems that most of the movement in the share of the top decile group is, in fact, driven by the top percent (something which runs the risk of not being captured if data is based on smaller, often top-coded samples.

smaller fractions). However, so far this literature has not been able to answer questions about mobility. Mobility is just as crucial for evaluating the increase in top income inequality as it is for inequality in general. Indeed, when asked about the fairness of high income concentration, most people respond that it crucially depends on *how* those in the top got there. If success depends on "hard work" or "willingness to take risk", people seem to tolerate inequality—even high degrees of it. If, on the other hand, the rich have reached their position because of inheritance, a certain family environment, or "connections and knowing the right people", this is generally viewed as unfair.[247] Atkinson and Piketty (2007) point out that the change in top income composition in Anglo-Saxon countries, where top wage earners have replaced capital income earners, indicate that today's income top is not primarily based on inherited wealth. This is supported by the findings in Kopczuk and Saez (2004), who show that the recent increase in income concentration in the U.S has not been accompanied by any major increase in wealth concentration, and by Edlund and Kopczuk (2009), who proxy wealth mobility in the U.S. by the share of women in the top of the distribution, and find that this share has decreased substantially over the past decades, also indicating a decreasing role for inheritance among the rich.[248] While these studies are indicative of changes in mobility, no previous study has been able to explicitly study intergenerational mobility of top incomes.[249]

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247 The quotes are formulations from a Gallup pole used in Fong (2001), but there are many other examples of similar formulations in, for example, the World Values Survey, the General Social Survey, the International Social Survey, the International Social Justice Project, etc. Some studies have focused on the differences in perceptions of *why* people are rich or poor, and, in particular on the differences between the US and Europe with respect to such beliefs (e.g., Alesina, Glaeser and Sacerdote, 2001, and Alesina and Glaeser, 2004). However, the opinion that *if* a person is rich as a consequence of working hard this is fair (and vice versa if the person has not made any effort) seems to be shared across countries. For example, Jencks and Tach (2006) report that a majority of people in Germany, Japan, U.K. and the U.S. agreed with the statement that "[inequality] is fair but only if there are equal opportunities" (based on data collected by the International Social Justice Project (ISJP) in 1991).

248 Kopczuk, Saez and Song (2010) study *within lifetime income mobility* in the U.S. and find that the probability of remaining in the top percent of the distribution from one period to the next has changed very little over the past decades.

249 It may at first seem odd that we know so little about intergenerational income mobility at the top. However, when one considers the progress made in intergenerational income mobility research over the past 15 years it becomes less of a puzzle. A central insight in the work following Solon (1992) and Zimmerman (1992) is that taking data requirements seriously is crucial for correctly estimating intergenerational mobility and when it comes to estimating life-time incomes for two generations focusing on fractions as small as 0.1 percent this requires very large datasets. The only study we

The second motivation for our study is an interest in the workings of the extensive welfare state. Broadly defined as having an exceptional commitment to economic security and egalitarianism, the "Nordic model" has received much attention and its achievements in equalizing income and mitigating poverty are well known.[250] What seems less well known is the fact that the financing of these welfare states has primarily rested on high average taxes rather than highly progressive taxes. Furthermore, this has been combined with relatively low capital taxes (at times even negative due to generous deductions) indicating a desire to combine high egalitarian ambitions with good investment incentives for large capital holders.[251] The extent to which this has been a strategy or a result of pragmatism in the face of increasing mobility of capital is debatable. It nevertheless gives rise to a number of interesting questions regarding mobility of Swedish top income earners. Is it the case that there are large differences in mobility when contrasting earnings and total income? If so, are these differences particularly important in the top of the distribution? Is there evidence that equality of opportunity in Sweden has been conditional on not aspiring for the very top of the distribution?[252]

Our study's answer to all of these questions is "yes". Using the same income concepts as in previous work on top incomes we find that: 1) intergenerational earnings mobility is generally higher than total income mobility, 2) mobility is generally smaller the higher up in the distribution and, perhaps most importantly, 3) for total income it becomes exceptionally low at the very top of the distribution. In this sense Sweden does indeed seem to fit the picture of a society where equality of opportunity for wage earners coexists with capitalistic dynasties. In line with previous studies of top incomes, our results also emphasize the need to study small fractions of the population in order to fully understand income mobility.

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know of which has previously studied intergenerational mobility for fractions as small as the top percent of the distribution is by Corak and Heisz (1999) on Canadian data.

250 See Gottschalk and Smeeding (1997) for Nordic income distribution in international perspective, Lindbeck (1997) for an examination of the Swedish welfare state, and Björklund and Freeman (2008) for a recent overview of income equalization in Sweden.

251 For example, Steinmo (1993) and Lindert (2004) contain discussions of this as well as numerous references.

252 Previous work on intergenerational mobility in Sweden suggests that mobility is in general comparatively high in Sweden (see Björklund and Jäntti, 2009, for a cross-national comparison). To the extent that previous work examines differences across the income distribution, the top group is defined as a rather broad group, such as the top-quintile group in Jäntti et al. (2006).

6.2 Econometric models

Our point of departure is the prototypical model in intergenerational income mobility research

$$y_{si} = \alpha + \beta y_{fi} + \varepsilon_i \tag{6.1}$$

where y_{si} is the income of a son in family i and y_{fi} the corresponding measure for his father. We strive for estimating the intergenerational relationship between long-run incomes following the standard approach in the literature, and therefore use multi-year average incomes throughout. We also control for father's and son's age (linearly and quadratically) in all our regressions.

The regression coefficient β is the intergenerational elasticity, i.e., it measures the percentage differential in sons' expected income with respect to a marginal percentage differential in the incomes of fathers. In case the variance of long-run incomes in both generations is the same, the elasticity is also the intergenerational correlation in log incomes. In our study, the distinction between the elasticity and the correlation is not relevant since we focus on the intergenerational transmission in the very top of the distributions.

We extend equation (6.1) in two ways to address two different questions.[253] First, we use non-linear regression by means of a spline function with knots (chosen by us), which are income levels in the distribution of fathers' incomes at which the slope is allowed to change (see Greene, 1997, pp. 388f). In this way, when estimated on knots in the top of the distribution, our parameters show the percentage differential in sons' expected income with respect to marginal differentials in the top of the fathers' distribution. The specified model now looks as follows for knot k, which in our case simply is a level of income corresponding to a certain percentile p in the fathers' distribution (in our estimations we include eight knots):

$$y_{si} = \alpha + \beta y_{fi} + \sum\nolimits_p \delta_p (y_{fi} - k_p) + \varepsilon_i \tag{6.2}$$

Our second approach is to use quantile regressions to analyze how sensitive the qth percentile in the sons' income distribution is to the fathers' incomes (see Koenker and Hallock, 2001). When q is a top income quantile, say the 99th percentile, our estimated parameter tells us how sensi-

[253] Grawe (2004) uses a model that combines our two approaches, namely spline and quantile regression. However, this combination is not feasible for us as our focus on the very top of the distribution gives small samples.

tive the top in sons' income distribution is to differentials in fathers incomes. Thus we specify the following equation for each quantile q:

$$y_{si} = \alpha^q + \beta^q y_{fi} + \varepsilon_i^q \tag{6.3}$$

6.3 Data

We use Swedish data compiled from administrative registers run by Statistics Sweden. First, we use the multi-generational register to connect biological fathers and their sons. We then use income registers to add income and earnings data, based on compulsory reports from employers to tax authorities or from personal tax returns.

The starting point for constructing our population is a random sample of 35 percent of all men born in Sweden between 1960 and 1967. These are the sons in our study and we observe their incomes during 1996–2005, i.e., when they are in their 30s and early 40s. This is a period in life when even annual incomes are shown to be unbiased proxies for lifetime income with only classical measurement errors (Böhlmark and Lindquist, 2006). Yet, we average their annual incomes over the entire ten-year period in order to eliminate a large part of the transitory fluctuations.

When measuring fathers' incomes, we also want a good proxy for long-run income. There are, however, also arguments for measuring income at the time when their children grew up since this captures important determinants of the intergenerational transmission of incomes. In fact, several previous studies in the intergenerational literature have chosen to measure fathers' incomes in this way.[254] When measuring fathers' incomes in Sweden, the choice of years is restricted by the fact that consistent income data are available only from 1974 onwards.[255] For this reason, we measure parental income as the average of income during the years 1974–1979, i.e., when their sons were between seven and nineteen years old and thus mostly living with their parents.

We use two concepts of income. The first is *total income*, which is income from all sources (labor, business, capital and realized capital

254 See Corak (2006) and Björklund and Jäntti (2009) for recent surveys.

255 Although we observe incomes since 1968, there was a legal change in 1973–1974 that made a set of social insurance benefits taxable and from then on also included in the income data. As a consequence, to get fully comparable measures of income and earnings we choose 1974 as our starting date.

gains) before taxes and transfers.[256] This is the same measure as the top income studies have used when studying the evolution of top income shares.[257] Our estimates of the intergenerational mobility in the top, hence, correspond directly to their estimates of the static inequality in the income top. Our second measure is *earnings*, which includes income from work for employees and self-employed.[258]

Several specific problems arise when measuring incomes and earnings in the absolute top of the distribution. We feel broadly confident with the Swedish register data used in this study—for example there is no such thing as top coding in the income and earnings registers. Yet there are two important sources of measurement error that potentially influence our results.[259]

First, our earnings measure never includes capital incomes even though items such as bonuses and realized stock options can be a relatively important form of compensation to top earners. To the extent that such capital-based reimbursements have become more prevalent since the 1970s, which is arguably the case in Sweden, we systematically underestimate top earnings among sons. Since this mismeasurement of the dependent variable ought to be positively correlated with father's earnings, we are at risk of biasing the estimated relationship downwards and *overestimating* earnings mobility across generations.

Second, after Sweden around 1990 liberalized its capital account there has been a drastic increase in cross-border capital movements among the wealthy. In a recent survey of the Swedish household wealth concentration, Roine and Waldenström (2009) show that significant shares of wealth owned by the richest Swedes may be placed in off-shore locations. As a result, capital income among high-income earning sons could be underestimated. Since measurement error is likely to be positively correlated with fathers' earnings, we risk *overestimating* intergen-

256 Total income (*sammanräknad nettoinkomst* for fathers and *summa förvärvs- och kapitalinkomst* for sons) also includes taxable social insurance benefits such as unemployment insurance, pensions, sickness pay and parental leave benefits.

257 See Roine and Waldenström (2008).

258 Earnings (*arbetsinkomst*) is an income concept created by Statistics Sweden by combing wages and salaries and business income. It also includes earnings-related short-term sickness benefits and parental-leave benefits but not unemployment and (early) retirement benefits.

259 Statistics Sweden's income and earnings data rely on personal tax assessments through 1977 for wages, salaries, and transfers, and through 1987 for interests and dividends. Thereafter reports come from employers (and authorities for transfers) and banks respectively. Thus, our sons' data come from employers and banks and most of our fathers' data come from personal reports. Most likely, the latter source introduces some measurement error in fathers' income resulting in an underestimation of intergenerational transmission, and consequently, an overestimation of mobility.

erational income mobility. Altogether, we may not fully capture all incomes and earnings accruing to the top, which could bias our results. Fortunately, the biases all go in the same direction, namely that we tend to overestimate intergenerational mobility and especially so in the very top of the distribution.

When determining the population used in the estimations, we begin by requiring fathers to be residents all the years 1974–1979 and sons in all the years 1996–2005. We then use separate samples for income and earnings and use only the son-father pairs for whom both had positive income observations each observation year, and do correspondingly in the earnings sample.[260] For reasons that we will return to, we are somewhat concerned about the presence of observations with zero income and earnings, and therefore perform some sensitivity analyses to examine whether our basic conclusions are sensitive to the treatment of these observations.

Table 6.1 reports descriptive statistics for fathers in the two samples of our main analysis. Our income sample contains 130,047 pairs of fathers and sons and the earnings sample contains 101,635 pairs.[261] Thus we observe more than thousand father-son pairs in the top income percentile and over one hundred in the top 0.1 percentile group.[262] The mean and median are about the same for income and earnings. Top incomes are substantially higher than top earnings, with the highest income observation being 2–3 times larger than the highest earnings observation. This difference clearly underscores the importance of large capital incomes for top incomes. The age of fathers is somewhat higher in the income sample, which is plausible given than few fathers have positive earnings after their retirement at the age of 65.[263]

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[260] Our income and earnings data come in units of 1 SEK for all but two years when they come in 100 SEK. We adjust for this in our analysis by multiplying incomes and earnings in the two latter years by 100. Still, there may be a concern that when taking logs of incomes near the lowest income limit the initial difference in limits could influence the results. Rerunning the main analysis requiring incomes and earnings to be at least 100 SEK instead of just being positive, however, the results (available upon request) do not change.

[261] These numbers can be compared to 151,148 sons who were born in Sweden in 1960-67 and resided in Sweden all years 1996–2005, that is, the population we want to make inferences about. Table 6.A1 explains how the sample changes depending on the requirements we have.

[262] As a striking comparison, note that Solon (1992) in his seminal study for the United States had some 250 pairs of fathers and sons who lived together in the same PSID household in 1968.

[263] We checked whether the fact that fathers in the income sample are relatively older influence the results, but found that they did not by running the analysis using only fathers aged 65 or less in both populations (results are available upon request).

Table 6.1: Descriptive statistics for main income and earnings samples, fathers.

Variable	Concept	Mean	S.D.	Min	P25	P50	P75	P90	P95	P99	Max
Age in 1974	Income	40.6	7.3	22	35	40	45	51	54	60	81
	Earnings	40.2	6.9	22	35	39	45	50	53	58	76
1974	Income	247	144	.1	181	217	276	373	464	785	9,882
	Earnings	244	129	.0	183	219	277	373	460	761	3,747
1979	Income	252	140	.3	187	226	287	382	471	757	12,263
	Earnings	258	130	.3	194	231	292	386	474	747	4,573
Ave(74-79)	Income	254	137	3.1	189	225	283	380	468	764	13,950
	Earnings	256	124	1.4	194	228	287	383	468	748	4,467
Ave(ln74-ln79)	Income	12.34	0.43	7.74	12.14	12.32	12.55	12.84	13.05	13.53	16.39
	Earnings	12.32	0.56	5.70	12.16	12.33	12.56	12.85	13.05	13.51	15.24

Note: The income (earnings) sample consists of father-son pairs with positive income (earnings) all years. Incomes and earnings are in thousand 2005 SEK. Observations are 130,047 (incomes) and 101,635 (earnings).

In Table 6.2, we report similar characteristics for sons. The levels of inequality are quite different across both generations and income concepts. In the case of total incomes, the coefficient of variation increased from around 0.5 for fathers to over 1.0 for sons and the standard deviation of the average of log incomes increased from 0.43 to 0.49. By contrast, the coefficient of variation for earnings increased only modestly from 0.48 for fathers to 0.57 for sons and the standard deviation of average of log earnings even fell from 0.56 to 0.49. These numbers are in line with the previously documented trends for top income shares in Sweden, which indicate sharp increases for total income but only moderate changes for earnings (see Roine and Waldenström, 2008, for details).

Table 6.2: Descriptive statistics for main income and earnings samples, sons.

Variable	Concept	Mean	S.D.	Min	P25	P50	P75	P90	P95	P99	Max
Age in 1996	Income	32.3	2.3	29	30	32	34	36	36	36	36
	Earnings	32.3	2.3	29	30	32	34	36	36	36	36
1996	Income	236	201	.0	179	223	273	346	411	594	37,113
	Earnings	236	118	.0	187	231	281	352	412	569	7,158
2000	Income	329	1,328	.0	216	267	342	476	594	1,125	347,553
	Earnings	310	232	.0	228	276	352	474	572	901	27,566
2005	Income	354	423	.0	237	297	388	544	691	1,311	45,223
	Earnings	350	229	.0	250	308	400	546	676	1,099	10,802
Ave(96-05)	Income	303	316	.2	217	263	333	452	557	936	43,346
	Earnings	302	171	1.6	224	271	342	455	544	820	13,051
Ave(ln96-ln06)	Income	12.45	0.49	3.13	12.25	12.46	12.69	12.98	13.18	13.60	17.50
	Earnings	12.46	0.49	5.94	12.28	12.49	12.72	13.00	13.17	13.56	16.10

Note: See table 6.1.

6.4 Results

Our main results are reported in Table 6.3. The conventional least squares regression model (6.1) yields estimates of the intergenerational elasticity of 0.262 for income and 0.169 for earnings. While this difference between income and earnings might appear as striking, it should be noticed that they also differ in terms of trends in dispersion. Specifically, using information from data in the above section 6.3, the ratio of the standard deviation of fathers' and sons' long-run incomes fell by 12 percent (0.43/0.49) and the corresponding ratio increased by 14 percent (0.56/0.49) for earnings. In other words, the intergenerational correlations (defined as the estimated intergenerational elasticities multiplied by the ratio of the standard deviations) are 0.23 and 0.19 in the two cases. These numbers are by and large in line with previous results for Sweden.

Table 6.3: Main results for basic samples. N=130,047 (incomes); N=101,635 (earnings).

Income:	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.262							
	(0.003)							
Quantile		0.189	0.233	0.296	0.331	0.338	0.381	0.531
		(0.004)	(0.003)	(0.004)	(0.005)	(0.006)	(0.011)	(0.033)
	p<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.106	0.352	0.347	0.422	0.260	0.222	0.344	0.827
	(0.007)	(0.027)	(0.026)	(0.027)	(0.051)	(0.034)	(0.073)	(0.099)

Earnings	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.169							
	(0.003)							
Quantile		0.154	0.158	0.170	0.169	0.160	0.164	0.252
		(0.005)	(0.003)	(0.004)	(0.003)	(0.005)	(0.006)	(0.012)
	p<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.042	0.417	0.398	0.409	0.291	0.157	0.319	0.355
	(0.004)	(0.031)	(0.029)	(0.032)	(0.061)	(0.041)	(0.091)	(0.160)

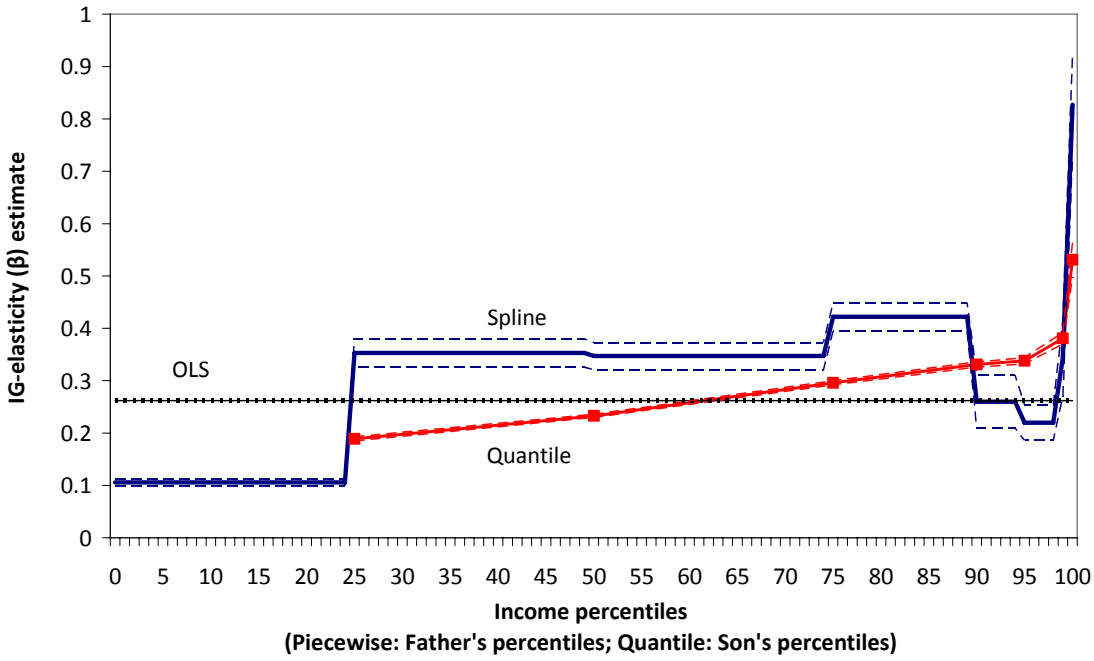
Note: All models reported in this and the following tables are estimated with linear and quadratic controls for father's and son's age. Corresponding to our models *q* and *p* are short for *quantile* and *percentile* respectively. Standard errors are in parenthesis and in the quantile regressions, these are bootstrapped using 30 replications.

Next, we turn to the pattern in the top of the distribution. The results using the spline specification (6.2) indicate a clear non-linear pattern in the persistence of sons' incomes in different levels of fathers' incomes or earnings. Specifically, in the lowest quartile, the generational dependency is almost absent, with regression coefficients of 0.106 for incomes and 0.042 for earnings. For fathers between the 25th and 99th percentiles,

generational persistence is higher. Coefficient estimates vary between 0.16 and 0.42, with the highest coefficient for incomes in the "upper middle class", i.e., between the median and 90th percentile. The most striking finding, however, is that the persistence increases drastically in the absolute income top. For fathers with incomes in the top 0.1 percentile, we estimate a coefficient of 0.827 with a standard error as low as 0.099. Taken at face value, this coefficient implies that a 10 percent income differential among high-income fathers is transmitted into an 8.3 percent differential among sons. This should be contrasted against the average transmission found in model (1), which is only 2.6 percent.

In the quantile regressions (6.3), we examine how sensitive sons' incomes and earnings at different levels are to their fathers' incomes and earnings. Here, the results reveal basically the same non-linear patterns as we saw in the spline regression analysis. In the case of incomes, there is a somewhat smoother increase in the degree of persistence across generation over the level of sons' incomes. The median regression, $q50$, has an intergenerational elasticity of 0.233. This is lower than in the OLS regression, but that is expected given the skewness of the income distribution. Already by the 75th quantile, we observe coefficients of 0.296 and for $q99$-coefficient it is 0.381, which implies that a 10 percent income differential among fathers is related to a 3.8 percent higher income for sons' at the 99th quantile of the distribution. Going even further up the income distribution, we find a coefficient of 0.531 at $q99.9$, which is markedly higher than elsewhere in the distribution. These coefficient estimates and their standard errors over the total income distribution are shown graphically in Figure 6.1.

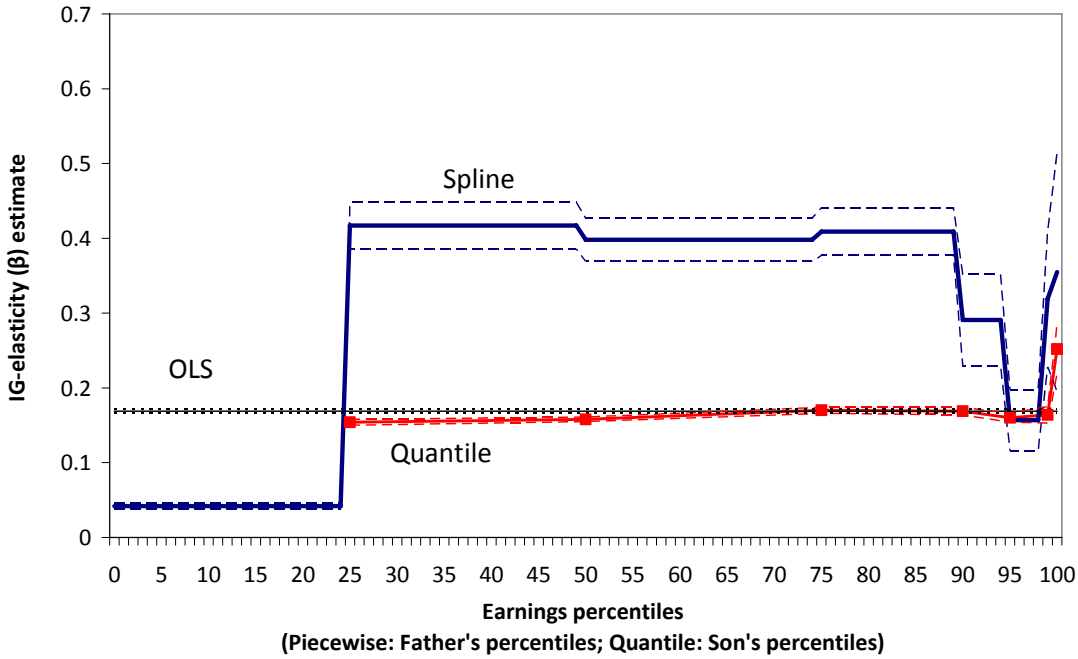
Figure 6.1: Intergenerational elasticities in the total income distribution.



Note: The figure is based on results for total income presented in Table 6.3.

Turning to earnings, we find qualitatively similar patterns but a much weaker increase in persistence toward the top. The coefficients at the top are only half as large as they are for income. This difference among income and earnings suggests that it is the capital income component that is strongly inherited at the very top of the distribution. The coefficient estimates and their standard errors for the earnings distribution are depicted in Figure 6.2.

Figure 6.2: Intergenerational elasticities in the earnings distribution.



Note: The figure is based on results for total income presented in Table 6.3.

Altogether, while our results corroborate previous findings on average Swedish income mobility they also highlight new evidence on notable non-linearities in this relationship across the distribution of income. Specifically, we find mobility to be high among low-income earners but that it diminishes notably in the middle-income classes. In the absolute top of the distribution we find remarkably low levels of income mobility. Among fathers in the top 0.1 percentile there is almost no intergenerational mobility at all.

These non-linear mobility patterns also prevail in the earnings distribution, but to a much lesser extent. There even seems to be a considerable equality of opportunity for wage earners in the Swedish economy, with low-wage earning fathers transmitting almost none of their earnings status to their sons. In the absolute top, earnings mobility is only slightly higher than mobility at the income median. Possibly this relatively high level of mobility in the earnings top could in part be due to the omission of capital incomes accruing to high-wage earning sons, which, as discussed above, leads to an overestimation of earnings mobility.

6.5 Sensitivity analyses

We now turn to sensitivity analyses. First, we ask whether the interesting difference in results for income and earnings is driven by the fact that the estimations in Table 6.3 were done on two different samples. In panel Table 6.4a, we report estimates for the same models as in Table 6.3, but on requiring that fathers had both positive incomes and positive earnings each year 1974–1979 (giving us the same sample when estimating earnings and incomes, respectively). The results are similar to those in our main specification. If anything, coefficients in the very top of are higher, suggesting that top mobility could be even lower than indicated by our main results.

Table 6.4a: Same sample for income and earnings. Positive income and earnings each year for both sons and fathers. N=101,519.

Income:	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.294							
	(0.003)							
Quantile		0.186	0.273	0.352	0.379	0.388	0.466	0.630
		(0.005)	(0.004)	(0.004)	(0.005)	(0.007)	(0.015)	(0.033)
	$p<25$	$25<p<50$	$50<p<75$	$75<p<90$	$90<p<95$	$95<p<99$	$99<p<99.9$	$99.9<p$
Spline	0.097	0.351	0.377	0.440	0.286	0.243	0.400	0.741
	(0.009)	(0.028)	(0.024)	(0.026)	(0.049)	(0.032)	(0.068)	(0.092)

Earnings	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.168							
	(0.003)							
Quantile		0.154	0.158	0.170	0.169	0.160	0.164	0.252
		(0.005)	(0.004)	(0.004)	(0.003)	(0.004)	(0.006)	(0.021)
	$p<25$	$25<p<50$	$50<p<75$	$75<p<90$	$90<p<95$	$95<p<99$	$99<p<99.9$	$99.9<p$
Spline	0.042	0.417	0.397	0.409	0.287	0.163	0.313	0.357
	(0.004)	(0.031)	(0.029)	(0.032)	(0.061)	(0.041)	(0.091)	(0.160)

Note: See Table 6.3.

The motivation for the other sensitivity analyses is that we are concerned about the interpretation of observations with zero annual income (or earnings). On one hand, both income and earnings might correctly be zero. In particular, our register information might correctly report zero earnings income for a person who has studied the whole year, been unemployed the whole year or left the labor force (for retirement or something else) for the whole year. In some of these cases, in particular unemployment, retirement and long-term sickness, we could expect the person to collect some taxable social transfers but not necessarily for those who study. On the other hand, there is also a possibility that income or earnings in our

data is recorded zero by mistake. One example is if the tax declaration process is not completed and subject to a judicial process.

Our strategy is to make two extreme assumptions about the possible nature of the zero income observations and investigate whether our main results would change substantially. Looking first at the case where we treat the zero income/earnings observations as being incorrect and use average of log income for the remaining years, the main results are not changed, see Table 6.4b.

Table 6.4b: Treat zero income/earnings observations as incorrect: Exclude zero income years and use average of log income for remaining years. N=142,046 (incomes); N=139,210 (earnings).

Income:	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.251							
	(0.004)							
Quantile		0.208	0.218	0.256	0.279	0.267	0.268	0.312
		(0.005)	(0.003)	(0.003)	(0.005)	(0.007)	(0.012)	(0.025)
	p<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.119	0.506	0.292	0.433	0.200	0.121	0.398	0.919
	(0.007)	(0.033)	(0.032)	(0.034)	(0.064)	(0.043)	(0.090)	(0.117)
Earnings	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.134							
	(0.003)							
Quantile		0.167	0.109	0.105	0.118	0.117	0.120	0.165
		(0.005)	(0.003)	(0.002)	(0.002)	(0.002)	(0.005)	(0.012)
	p<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.011	0.638	0.407	0.461	0.302	0.073	0.367	0.547
	(0.004)	(0.032)	(0.038)	(0.041)	(0.079)	(0.053)	(0.120)	(0.202)

Note: See Table 6.3.

Finally, treating the zero income/earnings observations as being correct we calculate the log of average income for all years treating zeros as just zeros. As can be seen in Table 6.4c, this does not seem to change the main results either. This approach, however, also involves the change of functional form since we now use the log of average income for all years instead of the average of the log of annual income observations. In order to investigate whether this change is important, we go back to the assumption in Table 6.4b and treat zero observations as incorrect but use the log of the average of income instead of the average of the log. The results in Table 6.4d show that our main results are robust with respect to this assumption as well.

Table 6.4c: Treat zero income/earnings observations as correct. Use the log of average income for all years treating zeros as just zeros. N=142,046 (incomes); N=139,158 (earnings).

Income:	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.269							
	(0.003)							
Quantile		0.208	0.227	0.271	0.289	0.278	0.275	0.324
		(0.004)	(0.004)	(0.004)	(0.005)	(0.008)	(0.011)	(0.026)
	p<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.099	0.512	0.373	0.471	0.303	0.169	0.605	0.690
	(0.007)	(0.031)	(0.031)	(0.032)	(0.061)	(0.041)	(0.084)	(0.102)
Earnings	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.145							
	(0.003)							
Quantile		0.165	0.112	0.121	0.125	0.120	0.129	0.175
		(0.004)	(0.002)	(0.002)	(0.003)	(0.004)	(0.007)	(0.016)
	p<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.026	0.452	0.515	0.441	0.354	0.081	0.291	0.607
	(0.004)	(0.032)	(0.039)	(0.043)	(0.082)	(0.055)	(0.126)	(0.204)

Note: See Table 6.3.

Table 6.4d: Treat zero income/earnings observations as incorrect. Use the log of average income for all years treating zeros as just zeros. N=142,046 (incomes); N=139,158 (earnings).

Income:	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.287							
	(0.003)							
Quantile		0.213	0.245	0.304	0.334	0.342	0.379	0.422
		(0.004)	(0.003)	(0.004)	(0.004)	(0.007)	(0.018)	(0.022)
	P<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.112	0.454	0.377	0.454	0.345	0.165	0.600	0.693
	(0.007)	(0.029)	(0.027)	(0.029)	(0.055)	(0.036)	(0.074)	(0.085)
Earnings	OLS	*q*25	*q*50	*q*75	*q*90	*q*95	*q*99	*q*99.9
OLS	0.185							
	(0.003)							
Quantile		0.194	0.158	0.171	0.174	0.162	0.176	0.218
		(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.006)	(0.023)
	P<25	25<*p*<50	50<*p*<75	75<*p*<90	90<*p*<95	95<*p*<99	99<*p*<99.9	99.9<*p*
Spline	0.041	0.513	0.420	0.446	0.350	0.098	0.314	0.535
	(0.005)	(0.029)	(0.032)	(0.034)	(0.065)	(0.044)	(0.099)	(0.159)

Note: See Table 6.3.

6.6 Conclusions and suggestions for future research

Analogously to the top income literature, a first general conclusion that can be drawn from our results is that it is crucial to study small fractions in the top of the distribution to get a clear picture of income mobility. Discussing "the top" as consisting of the top 20, or top 10, or even the top 5 percent, runs the risk of missing important aspects. Indeed, our most striking results do not show until within the top percentile. Furthermore, as is also suggested by the top income literature, it is important to separate different sources of income, in particular to separate between earnings and income including capital income.

While our results are clear in showing higher persistence in total income mobility compared to earnings mobility, as well as in showing sharp increases in persistence for the very top groups, some questions still remain in terms of interpretation. First, and most importantly, we can not distinguish the "qualitative source" of capital incomes. The concepts of capital income and realized capital gains may both contain income from stock options or the sale of a company built by the individual who reports the income, as well as income flowing from inherited capital. The former are connected to an individuals work efforts while the latter are based on inheritance of wealth. Typically we would like to distinguish these when making interpretations. Importantly though, the fact that top capital incomes may be related to work effort, does not alter the fact that those who receive such compensation also had fathers with similar positions in the income distribution. Second, the fact that we focus on persons residing in Sweden over the period means that our estimates do not include those who have chosen to move abroad. To the extent that such moves have, for example, been more common among individuals who have made their own fortunes, these "mobile" top income earners are not captured in our sample. Again, this does not take away the result that among those who reside in Sweden persistence in the top is very high.

Our results suggest several interesting avenues for further research. To begin with, we have followed much of the previous research and confined the analysis to men. Obviously, it would be interesting to incorporate mothers and daughters too. It would also be fascinating to consider the role of parents-in-law and thus assortative mating in a study of intergenerational inheritance of top incomes and earnings. Chadwick and Solon (2002) have shown that this can be done in a straightforward way by using family income of parents and offspring.

Finally, our results can at present be given two different comparative interpretations. Either the combination of high overall earnings mo-

bility and extremely high income persistence in the top is a unique feature of the extensive welfare state, perhaps even a consequence of the particular "Nordic model", or, alternatively, income persistence in the top is just as high, or even higher, in societies like the U.S. where overall mobility is lower than in Sweden. Determining which is right requires studies of top income mobility for other countries.

Appendix

Table 6.A1: Structure of attrition.

	Number of observations	
	Income	Earnings
1. All sons, born in Sweden in 1960–67 and part of the multigenerational register, registered as living in Sweden all years 1996–2005.	151,148	151,148
2. All sons in 1 and with at least one positive income (earnings) observation.	150,902	148,612
3. All sons in 1 and with 10 positive income (earnings) observations.	142,716	126,045
4. All sons in 3 with a known biological father.	140,710	124,379
5. All sons in 4 with a biological father who was registered in Sweden all years 1974–1979.	134,673	119,300
6. All sons in 5 with a biological father who has at least one positive income (earnings) observation.	134,599	118,638
7. All sons in 6 with a biological father who has positive income (earnings) observations all years 1974–1979.	130,047	101,635

Table 6.A2: Descriptive statistics for main samples, fathers.

Variable	Concept	Mean	S.D.	Min	P25	P50	P75	P90	P95	P99	Max
Age in 1974	Income	40.6	7.3	22	35	40	45	51	54	60	81
	Earnings	40.2	6.9	22	35	39	45	50	53	58	76
1974	Income	247	144	.1	181	217	276	373	464	785	9,882
	Earnings	244	129	.0	183	219	277	373	460	761	3,747
1975	Income	259	170	.8	190	228	290	389	484	805	24,512
	Earnings	257	136	.0	193	230	292	389	478	778	7,500
1976	Income	261	154	.1	193	232	293	393	486	798	16,098
	Earnings	263	134	.0	200	237	298	395	484	780	4,654
1977	Income	255	145	.1	189	228	289	387	477	776	13,240
	Earnings	257	132	.0	195	232	293	389	475	757	6,021
1978	Income	251	146	.3	186	224	284	381	470	765	16,715
	Earnings	257	127	.3	193	229	289	384	471	751	5,432
1979	Income	252	140	.3	187	226	287	382	471	757	12,263
	Earnings	258	130	.3	194	231	292	386	474	747	4,573
Ave(74–79)	Income	254	137	3.1	189	225	283	380	468	764	13,950
	Earnings	256	124	1.4	194	228	287	383	468	748	4,467
Ave(ln74–ln79)	Income	12.34	0.43	7.74	12.14	12.32	12.55	12.84	13.05	13.53	16.39
	Earnings	12.32	0.56	5.70	12.16	12.33	12.56	12.85	13.05	13.51	15.24

Note: The income (earnings) sample consists of father-son pairs with positive income (earnings) all years. Incomes and earnings are in thousand 2005 SEK. Observations are 130,047 (incomes) and 101,635 (earnings).

Table 6.A3: Descriptive statistics for main samples, sons.

Variable	Concept	Mean	S.D.	Min	P25	P50	P75	P90	P95	P99	Max
Age in 1996	Income	32.3	2.3	29	30	32	34	36	36	36	36
	Earnings	32.3	2.3	29	30	32	34	36	36	36	36
1996	Income	236	201	.0	179	223	273	346	411	594	37,113
	Earnings	236	118	.0	187	231	281	352	412	569	7,158
1997	Income	252	291	.0	187	233	287	371	443	672	56,278
	Earnings	251	134	.0	197	241	296	377	443	626	9,530
1998	Income	270	254	.0	197	244	304	402	486	759	23,801
	Earnings	271	177	.0	209	255	315	409	486	707	22,235
1999	Income	292	415	.0	206	255	322	437	539	919	65,061
	Earnings	288	182	.0	219	264	331	438	525	789	13,271
2000	Income	329	1,328	.0	216	267	342	476	594	1,125	347,553
	Earnings	310	232	.0	228	276	352	474	572	901	27,566
2001	Income	320	532	.0	220	272	350	485	600	1,037	85,931
	Earnings	323	284	.1	234	283	365	495	601	976	29,412
2002	Income	323	464	.0	224	277	357	492	606	1,029	47,842
	Earnings	327	243	.0	237	289	372	503	611	980	26,369
2003	Income	323	407	.0	226	280	360	494	611	1,035	69,290
	Earnings	328	201	.0	239	292	375	505	614	979	9,529
2004	Income	336	491	.0	231	288	372	513	641	1,115	69,843
	Earnings	337	212	.0	244	299	386	522	641	1,032	11,073
2005	Income	354	423	.0	237	297	388	544	691	1,311	45,223
	Earnings	350	229	.0	250	308	400	546	676	1,099	10,802
Ave(96-05)	Income	303	316	.2	217	263	333	452	557	936	43,346
	Earnings	302	171	1.6	224	271	342	455	544	820	13,051
Ave(ln96-ln06)	Income	12.45	0.49	3.13	12.25	12.46	12.69	12.98	13.18	13.60	17.50
	Earnings	12.46	0.49	5.94	12.28	12.49	12.72	13.00	13.17	13.56	16.10

Note: See Table 6.1.

Chapter 7

Why Are Securities Transactions Taxed? Evidence from Sweden, 1909–1991*

7.1 Introduction

What drives the taxation of securities transactions on the financial markets? During the twentieth century, most industrialized countries used a securities transaction tax (STT) as a fiscal tool applied to the financial sector. Its effects upon government revenues and financial market performance have been explored numerous times by public investigators and academic researchers.[264] Surprisingly few, however, have analyzed these taxes' political origins.[265] This study therefore attempts to describe and analyze the origins of the STTs in Sweden, in place between 1909 and 1991, i.e., almost during the entire twentieth century. The basic methodology is to match historical evidence, in the form of political arguments and economic outcomes, with various measures of tax efficiency as well as deduced economic incentives of actors. Using such extensive time period allows specific conclusions of structural character to be drawn, but it also imposes restrictions of historical accuracy affecting the methods.

The analysis employs a theoretical framework departing from the conflict between the two contrasting approaches to the economics of regulation: the *public-interest* and the *private-interest* theories. The first prevailed until the 1960s as the general economic approach to how governments should conduct their regulatory and fiscal policies. It mainly rested upon economically justified assumptions that, first, policymaking is a costless activity and, second, it is of great importance since private markets recurrently fail to internalize their own costs or undertake the redistribution among social groups necessary to each society. The other theory evolved during the 1960s and 1970s as a critique of the public-interest approach, focusing on how the government, constantly maximiz-

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* This chapter was originally published in the *Financial History Review* (2002), vol. 2, pp. 164–191.

264 See, for example, Jackson and O'Donnell (1985), Lindgren and Westlund (1990), Umlauf (1993), Saporta and Kan (1997), Sun (1999) and Green, Maggioni and Murinde (2000).

265 Banner (1998, pp. 166–171) contains a review of the political debate around an American stock transfer tax in the 1790s but there is no thorough politico-economic analysis pursued.

ing its own political support, primarily pursue a policy that is a function of the pressure from well-organized, special interest groups, which in turn maximize their private benefits at the expense of other groups in society.

The paper proceeds in the following way. Theory, method and data are described in section 2. The theory outlines the public-interest and private-interest models as applied to tax policy and, specifically, STTs. The paper's methodology is to analyze qualitatively political arguments together with a quantitative use of economic outcome variables and, thereby, evaluate the goodness of fit with the theoretical models. While this methodological approach yields considerable benefits in its combination of a narrow qualitative approach and a measurable quantitative treatment, it also entails a number of problems, discussed in the same section. Section 3 presents the actual case study, starting with the events during the first securities stamp duty regime between 1909 and 1979. In section 4, the various tax events during the second STT regime, in place between 1984 and 1991, are described and analyzed. In Table 7.1, an overview of the entire STT history is presented. Section 5 concludes.

Table 7.1: Securities transaction taxes in Sweden, 1909–1991: Main events.

Year	Event	Tax rate (%)
1909	Securities stamp duty introduced.	0.1
1913	Tax rise and tax base extended to additional set of stock-like securities.	0.15
1917	Tax rise.	0.3
1918	Tax rise.	0.6
1929	Tax cut.	0.3
1979	Securities stamp duty removed.	-
1984	New STT introduced.	1
1986	Tax rise.	2
1989	Tax base extended to bond and money market instruments.	2
1991	(January) Tax cut and money market tax removed.	1
1991	(December) STT abolition.	-

7.2 Theory, method and data

7.2.1 Public-interest theory

The economic view of policy-makers as compassionately executing what they think is optimal for society without any other (private) objectives, is sometimes called the *public-interest theory*. As discussed by Posner (1975) and Joskow and Noll (1981), this is not really an economic theory in the model term of the word but, rather, a generic term for a view of government stemming from the late nineteenth century. The public-

interest theory is based upon the assumptions that private markets are fragile, and government regulation is costless. This then suggests that governments in a benevolent manner maximize social welfare by correcting for all inequitable market failures that they observe.

In the context of single-based excise taxes, such as STT, there are three common economic and fiscal justifications for applying tax policy in the public interest.[266] First, the Ramsey rule, or inverse demand elasticity rule, formulated by Ramsey (1927) is an optimal taxation argument stating that single-based taxes should have low rates whenever the demand elasticity with respect to the tax is high, and vice versa. When pursued, the excess burden, that is, the welfare loss incurred when agents adjust their behavior away from what they prefer the most, for a given level of revenue raised, is minimized. In the context of STT, the Ramsey rule implies that STT efficiency at a given tax rate is inversely related to the size of the demand elasticity and hence also to the excess burden. The ways that investors might respond to the tax are many. They can change the location of trade, move to substitute securities or alter their trading frequency. Regarding the revenues generated by STTs, it is important to differentiate between *gross revenues*—the money flowing into the treasury—and the economically more interesting *net revenues*. The latter incorporates the various costs associated with the tax—the excess burden, administration costs and revenue reductions in other taxes (for example capital gains and corporate taxes).

Second, when the government observes market failures, i.e., when private market participants' actions imposes net costs on society and so create negative externalities, there is a role for taxation or regulatory measures to correct for this and make the private actor internalise these private costs. Such corrective taxes are sometimes also called "sin" taxes. In the context of an STT, the by far most noted market failure through all times is that financial market speculation has been 'destabilising' for the rest of society. For example, James Tobin (1984) and others have argued that stock-market speculation is wasteful and destabilising for long-term real investment, hence diverting society's resources away from productive uses.[267] An inherent problem in this view, however, is how to distinguish between "sound" and "harmful" speculation, especially since secondary markets need a certain element of speculation to be thick and liquid.

Third, there is the benefit principle of taxation, which states that groups should be taxed at a rate equivalent to the marginal benefit of the public goods produced within their respective sector. In the STT frame-

266 The following description is inspired by Shughart (1997).

267 See also Stiglitz (1989) and Summers and Summers (1989).

work, it should imply that the tax is used to finance the public goods appearing in, and producing value to, this sector, such as: public market supervision or public infrastructure investments in, for example, telecommunication. In practice, this means that politicians should earmark the proceeds generated by the STT to finance these specific activities. Historically, Swedish politicians during the early twentieth century often used earmarking and the benefit principle to defend their fiscal policies.[268]

7.2.2 Private-interest theory

The private-interest theory, also called the economic theory of regulation, treats politicians as economic agents in the ordinary sense, that is, they maximize their own utility and private benefits (see, e.g., Stigler, 1971 and Peltzman, 1976). According to this view, governments are self-interested entities that primarily care about winning the next election, and because of this they constantly strive for maximizing their political support through redistributing rents between rent-seeking special interest groups in society. As Becker (1983, 1985) has also pointed out, the government does have an incentive to reduce inefficiencies associated with rent seeking and redistribution. Unlike the public-interest view, however, the private-interest theory attributes this urge to the fact that the inefficiencies reduce the overall rents that the government can redistribute and use to maximize its political payoff function.

Interest groups, in turn, exert pressure upon government by offering votes or other benefits to gain beneficial treatment at the expense of others. In the STT context, groups that are (or expect to become) taxed will, ceteris paribus, decrease their support offered to the government, whereas those groups that are (or expect to become) subsidized respond in the opposite way. Accordingly, interest groups prefer other groups to be taxed because this increases the (expected) rents to be captured in the form of subsidies, and they dislike it when other groups receive benefits. The latter response is related to notions of relative deprivation or envy, which have been found to be consistent factors explaining the rise of social conflicts and political action towards redistribution (Podder, 1996).

Regarding ideological components in interest-group behavior, there is evidence of ideological shirking among politicians not captured by special interests (Kau and Rubin, 1979). In the present study, however, the ideology component will not be emphasized due to obvious and disputed problems over measuring and separating it from pure economic interests.

The special interest groups associated with the Swedish STT issue are: the suppliers (banks, brokers) and demanders (investors, firms) on

[268] For examples of this from the broader fiscal debate, see Rodriguez (1980, p. 197).

financial markets, all with an obvious incentive to pressure for decreased STTs. Support for STT comes from all groups that either receive subsidies based on the tax, or compare their utility with financial market actors' utilities. These are predominantly trade unions and other broad-based societal organisations. Public bureaucrats might also influence taxing if they can be described as having similar utility maximising incentives as other interest groups.

7.2.3 Methodological approach

The method of the empirical analysis is structured according to the chronological order of significant tax events. At each step, I start by describing the political arguments put forward by all participants (the government, political parties and interest groups), and the collected economic outcomes recorded from statistical sources. Second, these observations are matched with the contrasting predictions set out by the two theoretical models of government policy. Finally, I evaluate the goodness of fit of both models, and establish which offers the most plausible explanation of the event.[269] The study, hence, becomes an outright test of the suitability of the two theories, which can offer insight to other similar studies of government policymaking.

Of course, my method incurs a number of analytical problems, some serious, some less so. First, evaluating these two contrasting theories against each other is demanding as they are not always perfectly substitutable and, hence, may in some events apply either simultaneously or not at all. They are, moreover, highly stylized, and one may question whether the government is either completely benevolent or completely self-interested. There also exist alternative theories regarding the emergence, structure and effects of government taxation but these do not fit with this study.[270]

Second, analyzed arguments and justifications used by some actors might not always be fully congruent with their true intentions and motives. Policymaking after all is a complex agenda, including: logrolling, tacit agreements and other elements that are difficult for historians to trace. To isolate the STT issue from its political and fiscal context will hence be problematic.

Third, the extended period causes problems when one uses the same theoretical framework as numerous economic and political institutions change over time. By being aware of these constant risks but also

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269 A similar approach of evaluating the public- and private-interest theories against each other has previously been utilized by, e.g., Kroszner and Strahan (1999) in their studies of financial regulation in the US.

270 See for example the discussions in Rodriguez (1980).

recognising the behavior of politicians across historical eras, these problems can hopefully be minimized throughout the analysis.

All these methodological problems represent potential traps for the study, and all conclusions must be drawn with great caution. Nevertheless, I believe that interpreting arguments without using any specified theoretical frames might cause even worse problems. Only to read political statements and observe the thousands of economic events that would potentially influence the studied case will yield results of no value. By, instead, defining actors' incentives and matching their arguments and actual behavior, using evidence from measurable and theoretically relevant variables, one can actually relate predictions from theory to what has actually happened empirically. Moreover, using two complementary theories reduces the risk of achieving results driven by the choice of model framework rather than actual observations.

7.2.4 Data

The data used are the following. Evidence on government policy and parliament discussion was collected from the official parliamentary print, including: government bills, proposals from members of parliament, committee discussions and the debate in parliament.[271] This source also mostly reports the opinions in certain political issues of various public and private organisations that were consulted. Government archives, with their material underlying government policy, were also consulted.

Using official political print exclusively might cause selection biases, which is why I have also examined the archives of one of the involved special interests—the Swedish Security Dealers Association—public investigations and various media sources, primarily business magazines. Media reports not only contain journalists' reflections but also politicians aiming to reach the voters directly. Special interests have also often used media to express their opinions and supply information aimed to pressure the government. Another way to perceive interest-group activity and opinions is by reading their submitted considerations to the government on specific issues, sometimes after being asked to do so and sometimes on their own initiative. Finally, most quantitative data used were collected from *Statistics Sweden*.

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271 Some citation issues: I denote government bills as: Prop. (*proposition*) and Parliament members' proposals; Mot. (*motion*) followed by year and number. The 2 chambers of Parliament (after 1970 there was only one chamber) are denoted: FK (first chamber) and AK (second chamber). The parliamentary tax committee is called: BU (*Bevillningsutskottet*) or: SkU (*Skatteutskottet*) and RD (*Riksdag*) is the parliament.

7.3 First STT regime: The securities stamp duty of 1909–1979

7.3.1 1909–1918: Introducing and gradually raising the tax

The Swedish stock market grew rapidly at the beginning of the twentieth century with the Stockholm Stock Exchange as the dominating focus. Traditionally, Swedish stock exchanges were regulated and governed by local municipalities rather than the government but, after a severe national financial crisis in 1907–1908, politicians in parliament became interested in stock-market affairs. There were calls for immediate government intervention, mostly for taxing all securities transactions as had been the case in Germany for some time.

In March 1908, the government presented a securities stamp duty (*fondstämpel*) designed following the German STT—Kauf- und sonstige Anschaffungsgeschäfte. The suggested Swedish tax rate on stock transfers was 0.15 per cent of the value traded and half that rate on bond transfers (including government debt). Since the government's prime argument for the tax the raising of revenue for the national budget, approval from the tax and budget responsible authority, the National Economy Office (*Statskontoret*), was necessary, and eventually given. A secondary reason for the tax was to curb the stock-market speculation observed during the crisis, but some concerns regarding the risk that 'fully legitimate transactions' could also be negatively affected were mentioned.[272]

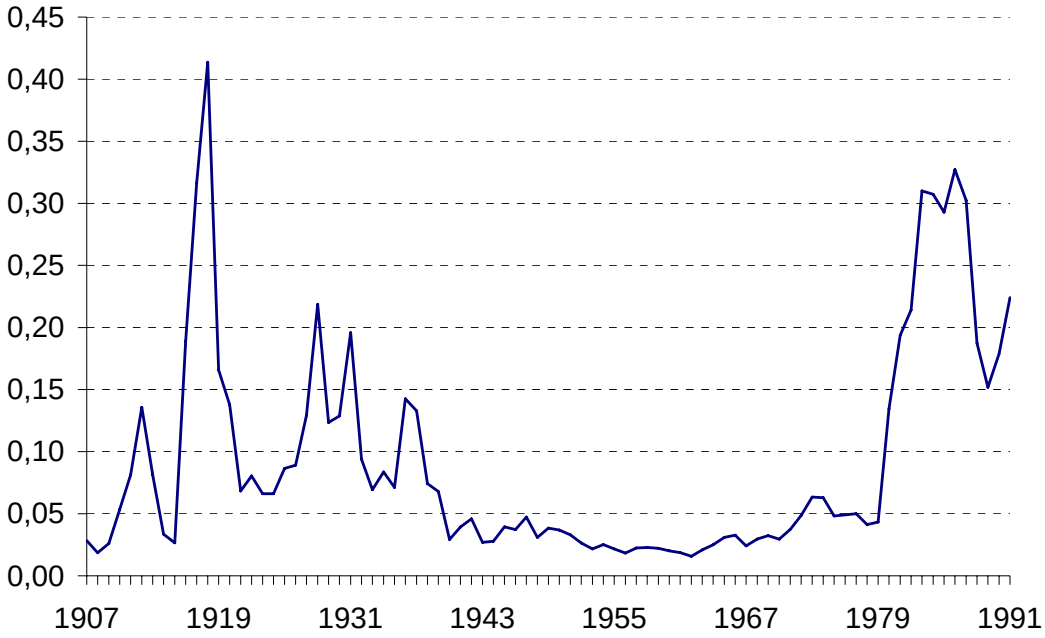
After the proposal was submitted, there were few reactions from the financial market. One exception was an editorial in the financial magazine, *Affärsvärlden,* which criticized both the design and the size of the tax, five times higher than the German STT rate.[273] Eventually, parliament granted the tax but lowered its rate to 0.1 per cent.

During the 1910s, socialist-leaning parties entered parliament and added the issues of national stock market regulation and increased taxation to the political agenda. In January 1913, one Social Democratic member proposed both a sharp increase of the STT rate to 0.5 per cent, and that tax exemptions for trades on stock exchanges should be removed, taken together implying a tenfold tax rise on stock-exchange trading.[274] The primary reason for the rise was the "insane form" that stock speculation was taking, but the fiscal needs of financing a new and extensive national pension reform were also put forward. The important parliamentary tax committee consulted two private organizations: the Stockholm Chamber of Commerce (*Stockholms Handelskammare*), represent-

272 Prop. 1908:152, p. 15.
273 "Köp och byte af fondpapper. En betänklig proposition", *Affärsvärlden* (16 Apr. 1908).
274 Mot. AK 1913:133.

ing private business, and the Stockholm Stock Exchange Board, composed of bankers and brokers.[275] Both parties opposed any STT increases since they had already observed significant harm to sound stock trade caused by the tax. Because of their close ties to the market, this reply might have been expected, but this closeness to the market also gave them insight and information about how the market really functioned. The tax committee eventually agreed that the proposed tax rate was too high, but it still granted a rise to 0.15 per cent, based on the additional revenues it would generate.

Figure 7.1: Turnover on the Stockholm Stock Exchange, 1907–1991.



Note: Turnover is defined as the value of traded shares divided by market capitalization.
Source: Official statistics and own calculations, available upon request

During World War I, the Swedish economy experienced an industrial boom, marked by rising production and many new equity issues. As shown in Figure 7.1, stock-market turnover (that is, volume traded divided by market value of listed shares) increased sharply from 3 per cent to 42 per cent between 1915 and 1918 as a consequence. In other parts of society, however, poverty and unemployment pressured politicians to increase both public expenditures and the level of political democracy, the latter resulting in a radical increase in suffrage during these years.

The Social Democrats benefited from a wider electorate and, working for increased redistribution by parliament, proposed an STT rise in

[275] Attachments 1 and 2, BU 1913:36.

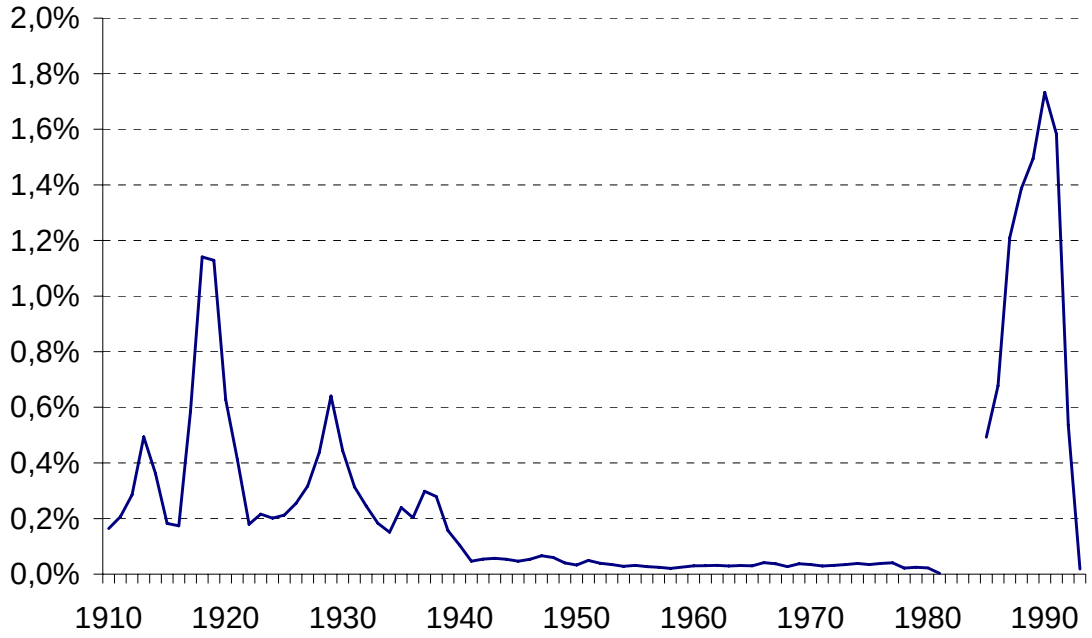
January 1917.[276] The Liberal Minister of Finance, Ivar Vennersten, asked a commission of bankers, brokers and public servants, who were currently investigating the basis for new national stock market legislation, for their opinion about a tax increase. Their reply was that 'the current economic boom and the excessive stock market speculation' justified a tax rise, but only a temporary, and definitely not a permanent, similar to what was recently accomplished in Denmark.[277] Using this affirmative answer in addition to the fact that the public war economy needed greater funding, the government carried a temporary (one-year) tax increase to 0.3 per cent through parliament.

Between 1917 and 1920, a new coalition government with Social Democrats and Liberals seized power and, in an extraordinary wartime session during late October 1918, the Minister of Finance, Fredrik Thorsson, proposed a doubling of STT to 0.6 per cent.[278] He argued that persistent high market activity supported STT's extended fiscal use and that harmful speculation could be beneficially curbed by the tax. Parliament approved the rise without any noticeable resistance.

How well can the public-interest and private-interest theories explain the introduction and subsequent increases of the Swedish STT? Recall that the public-interest theory requires excise taxation to be an efficient revenue source, a correction of perceived market failures or benefit taxation. Regarding efficiency, information that politicians received did not indicate any considerable tax-driven drag on the stock market, with the exception of intensive market protests prior to the 1913 STT increase. Turnover on the Stockholm Stock Exchange had increased steadily since the introduction of the tax in 1909, when it was only 2 per cent (see Figure 7.1). As the tax committee stated in 1913, it had increased to 12 per cent in 1912 and during World War I it was, remarkably, 42 per cent. This growth implied that the 1917 Stock Market Investigation supported temporary tax rises, although they were themselves in part taxpayers. By contrast, recently conducted estimates of the demand elasticities with respect to STT are significantly negative, suggesting that investors nevertheless adjusted their behavior when the tax was increased.[279]

276 Mot.'s FK 1917:76, AK 1917:150.
277 Report of 27 Dec. 1916 (Ministry of Finance, konseljakt 20 Mar. 1917, No. 14).
278 Prop. 1918B:25.
279 The estimated elasticities lie in the interval [–1.34, –1.13] based on data for the whole period 1907-1939 in Waldenström (2002).

Figure 7.2: STT revenues as share of total public taxes, 1909–1991.



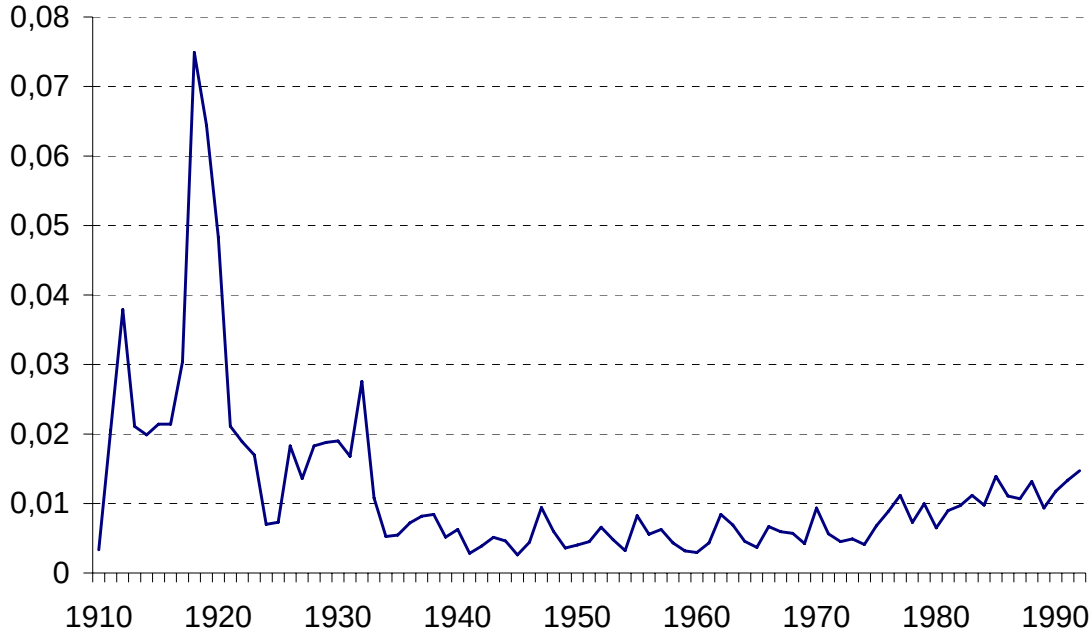
Source: Swedish Official Statistics, *Postverket*, and Statistics Sweden, *Statistical yearbook.*

Regarding government references to a need for wartime fiscal expansion, these seem to have been relatively well founded. Annual real public expenditures increased by on average 36 per cent each year during the period.[280] Due to the active stock market, moreover, gross STT revenue reached a level that was to be the highest over the entire stamp-duty regime, as depicted by Figure 7.2. As to net revenues, however, there were significantly lower levels. There is evidence that the tax was capitalized in asset prices, which caused a decreased rate of return on new securities issues and, hence, increased capital costs for the entire industrial sector.[281] Figure 7.3 shows new equity issues as a share of GDP between 1909 and 1991, and clearly suggests that the most active period was between 1910 and 1939. Besides confirming that this was of course related to Sweden's industrialisation, it also indicates that market distortions caused by STT might also have created substantial economic and social costs to the long run economic development in Sweden.[282] Administration and collection costs were relatively small, about two per cent of collected revenues. Summing up, even if gross revenues were relatively

280 *Statistics Sweden*, Statistical Yearbook.
281 Waldenström (2002) shows that stock prices decreased significantly when the tax rises were announced by the government but were not yet in effect on the market.
282 There was in fact another stamp duty directly taxing new securities issues by 1% of their value.

large during the war years, net revenues might have been considerably lower, leaving the final tax incidence with a question mark.

Figure 7.3: New equity issues in Sweden as share of GDP, 1909–1991.



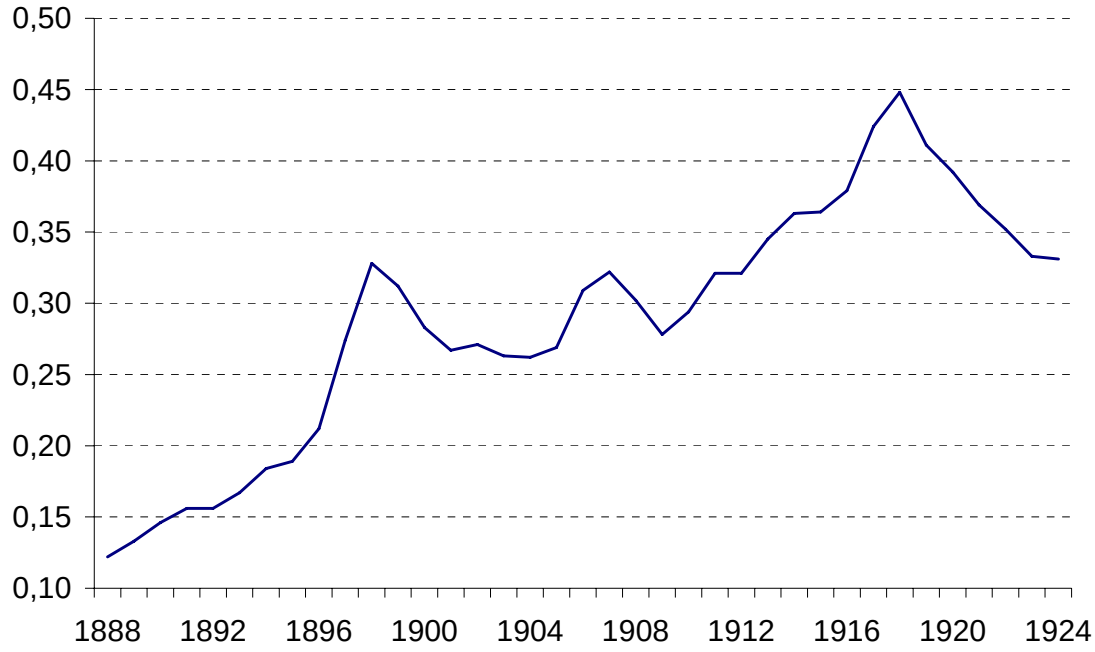
Source: Statistics Sweden, Statistical yearbook.

The corrective taxation argument was used in all the above STT events, and it was always aimed at harmful speculation. To assess this argument justness, one should try to find any elements that were really detrimental to social welfare and might have been observed by the government. A first candidate would be futures trading, practiced up to 1909 and regarded as destabilising by many market actors, including the Stockholm Stock Exchange Board. But since it was not referred to by the politicians and, moreover, abolished before the tax was applied, it can be removed as a speculation candidate.[283] Another is stock-exchange trading volume that, by contrast, seems to have been regarded as speculative by politicians whenever it increased relatively rapidly. One such increase was in 1907 before the tax was introduced. This was, however, because commercial banks from that year carried out their commissioned trading on the exchange and was, therefore, merely a transfer of trade to the organized market, and this is hence not a justified speculation. Although the remarkable turnover increase during the 1910s (see Figure 7.1) could indicate that purely price-speculative elements were prevailing on the exchange, the government never tried to differentiate between what was sound and unsound trading, which is troubling since this distinction had

[283] Algott (1963, p. 60).

actually been made in the government bill of 1908. Hence, trading volume as such cannot be regarded as an indicator of speculation justifying the corrective tax argument. A final speculation candidate could be the share of outstanding bank credits against stock collateral, indicating the degree of risk exposure of the banking sector and this was also something that was discussed by the contemporaries.[284] However, as is evident in Figure 7.4, during the first two STT events this share was not significantly higher than it was in the preceding decade. Over the war years credit volumes against stocks increased to almost 45 per cent. This could support the corrective taxation view, but it could just as well reflect the fact that stock prices increased markedly during the war, or that debt finance dominated other sources of funding to the firms.[285]

Figure 7.4: Bank credits against stock collateral as share of total bank credits in commercial banks, 1888–1924.



Source: Sveriges Riksbank (1931, pp. 206ff).

One fundamental problem to the public-interest view is the obvious policy inconsistency when the government both wants to curb stock trading volume since it contains socially harmful speculation, but, concurrently, wants to raise as much tax revenue as possible, as from increasing trading volume. Since these two aims often motivate the same tax events, it seems that the government lacked the awareness of this policy paradox.

[284] Trustkommittén (1914, pp. 49 ff.).
[285] Algott (1963, p. 92).

The third public-interest justification is the benefit principle, which requires that tax revenues be channelled back to the financial market in some way. Although this was not mentioned in 1909, the revenues from the 1913 increase were on the contrary earmarked for pensioners, which counters the benefit principle and, instead, indicates that politicians tried to pursue a policy to the taste of large voter groups, such as pensioners. During the war, the revenues were earmarked to the general war budget and do hence not render any support for this justification.

Table 7.2: Estimated income differences between stock market actors and industry workers, 1914–1929 (%).

	Real stock return (R)	Real wage increase (W)	R–W
1914	–9.9	1.2	–11.1
1915	3.4	–10.4	13.8
1916	23.7	–4.2	27.9
1917	–22.2	–9.5	–12.7
1918	–64.2	–10.3	–53.9
1919	–35.6	4.2	–39.8
1920	–21.6	13.6	–35.2
1921	–12.2	15.0	–27.2
1922	3.6	9.0	–5.6
1923	4.9	–0.9	5.8
1924	10.7	–0.6	11.3
1925	3.0	–2.5	5.5
1926	12.8	0.7	12.1
1927	19.0	0.7	18.3
1928	20.5	–0.8	21.3
1929	–5.6	0.3	–5.9

Source: R is the real stock return taken from Waldenström 'Taxing emerging stock markets' and W is the real wage increase of workers in industry and communication calculated from Statistics Sweden, *Statistical yearbook*, various years.

By contrast, the private-interest theory predicts evident interest-group activities associated with STT events and government policy. Regarding this period, however, there are few signs of either support or resistance from outside groups. The potentially supporting groups were workers, who became increasingly represented in parliament by the Social Democrats. A rough indicator of relative income between workers and financial market actors is presented in Table 7.2, where I compare the real annual wage increases for industrial workers with the real annual return on Swedish stocks, used as proxy for brokers' income. Despite a clear gap ex post between workers' and brokers' incomes in 1915 and 1916, the labor movement did not acknowledge this in their political rhetoric and was in-

stead primarily engaged in other labor-market issues.[286] An even stronger group supporting the tax was the defense industry, which benefited greatly from high public expenditures, especially during wartime. According to historians, this industry was strongly supported by the powerful Federation of Swedish Industries (*Industriförbundet*).[287] This could also explain the over-explicit earmarking of STT revenues for the war budget, that is, for military defense, as a government strategy to overcome bothersome taxpayer resistance.

Taxed groups did not object to these STT events, except for the protests preceding the increase in 1913. A plausible explanation would be that most interest groups were relatively unorganized. Brokers on the underdeveloped Swedish stock market did not have their own organization until December 1908, when the Swedish Security Dealers Association (*Svenska Fondhandlareföreningen*) was founded. Although the Association was established as a response to STT's introduction, it mainly focused during its first years on internal issues, such as: membership policy and brokerage fees.[288]

Altogether, the theoretical explanations of these early STT events have suggested the following. Introduction in 1909 is badly explained by both theoretical frameworks since the public-interest justifications barely hold and no evident interest-group pressure can be traced. The STT increase in 1913 carries aspects that can be explained by both views, but the evident role of interest-group activity and indications regarding politicians involved suggests that the private-interest theory offers higher explanatory value. STT events during primarily World War I are poorly explained by private-interest theory, but they give some support to public-interest notions of policy-making. Politicians received signals from market actors that STT could be justified (temporarily), while a strong increase in trading activity until 1918 can also be observed, suggesting a relatively inelastic investor demand. There were also significant increases in public expenditures that had to be balanced by corresponding increases in revenues. Hence, similar to the observations of Peacock and Wiseman (1961) regarding United Kingdom economic history, expansions in public income and expenditure levels associated with wartime often corresponded to the public interest.

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286 This is argued by Lewin (1992), and further supported by a remarkable lack of any tax discussions in congress material of the Swedish Trade Union Confederation, LO, before the 1930s that I have examined.

287 Norborg (1982, pp. 143f).

288 Govert Indebetou, President of the Association, 1919–1935 (14 Dec. 14, 1933, Swedish Security Dealers Association [henceforth SSDA] archives, A3: vol.1).

7.3.2 1920–1979: Tax cuts and long period of persistence ending with abolition

After World War I, the Swedish economy entered a period of recession and structural crisis. Many wartime investments proved to be unviable and industrial production fell rapidly. When Sweden returned to the gold standard at the former exchange rate, prices started to fall, augmented by an international deflationary tendency. Massive unemployment and deflation pressured the economy, the average real stock market return in 1917–1921 was –31 per cent and a severe banking crisis broke out in 1921.[289]

Against this context, the 1920 government proposal to prolong the temporary 0.6 per cent STT caused sharp reactions. In submissions to the government bill, the Security Dealers Association and the Bank Inspection Board (the authority supervising the banks and the stock market) opposed a prolonged increase, based on its observed devastating effects upon sound trading and several indications of tax-driven investor flight to other markets.[290] The National Economy Office, on the other hand, questioned these statements' validity, and countered them by emphasising the importance of STT revenues for the national budget. This argument was used later by the government when it successfully carried the prolongation through parliament.

During the period 1921–1925, the Bank Inspection Board repeatedly pointed out the tax's adverse effects but was always overruled by both government and the left-wing dominated parliament constantly referring to the state's fiscal needs. In 1926, however, two liberal members of parliament suggested an STT cut to 0.15 per cent, based on its inherent inefficiencies evident in the considerable crowding out of investors to substitute securities. The Chamber of Commerce followed up with an unsolicited official letter in support, emphasising the importance of a well-functioning secondary stock market for Swedish industry. As a response, the Social Democratic government conducted a minor inquiry over how a tax cut would affect revenues. It concluded that revenues would decrease significantly since the turnover boost of a decreased tax rate would not dominate the direct revenue effect of a lower tax. Thus, the proposal was rejected by parliament.[291]

Later in 1926, a temporary government crisis occurred, replacing the sequence of socialist-dominated governments with a new Liberal minority coalition, which directly proposed an STT cut. This time, the Stockholm Stock Exchange Board and the Bank Inspection Board reported new evidence on STTs in other countries. They showed that Swe-

289 Lindgren (1994, pp. 31ff.).
290 Prop. 1920:215, pp. 7 f.
291 BU 1926:35, attachment.

den, together with Finland and Norway, had the highest STTs in the Western world (see Table 7.3) and, moreover, that several countries (Austria, Denmark and Germany) had recently reduced their STT rates.[292] Additional support for a tax cut came from Sweden's largest industrial corporation, Kreuger & Toll, which heavily criticized STT in its 1926 annual report. Nonetheless, Social Democratic dominance in parliament's second chamber sufficed to reject the bill by a tiny majority.[293]

Table 7.3: Securities transaction taxes in some countries during the twentieth century (%).

	1912	1927	1968	1986	1991	2000
Sweden	*0.1*	*0.6*	*0.3*	*2*	*1*	*0*
Denmark	0.04	0.3	1	0.5	0	0
Norway	0	1	2	0	0	0
France	0.02	0.02	0.6	0.45	0.3	>0
Germany	0.06	0.3	0.25	0.5	0.25	0
UK	0.05	0.02	2	0.5	1	0.5
US		0.04	0.04	0	0.0066	0

Source: *1912*: The Riksdag, BU 1913:36, *1927*: The Riksdag, Prop. 1927:56, *1968*: SOU 1969:13, p. 230, *1986, 2000*: Fédération Internationales des Bourses Valeurs (FIBV): Commissions and stamp duties, *1991*: Campbell and Froot (1994).

The tax cut finally came in 1928 after the right-wing parties gained in the year's elections and a new conservative government was installed. STT was reduced to 0.3 per cent, commencing 1 July 1929, despite the Labour party's strong opposition.[294]

During the 1930s, severe world economic events seriously affected Swedish financial markets. The STT issue became dormant for a very long time, mainly because stock-market activity decreased substantially making STT fiscally insignificant. A new era of Social Democratic governments began, implying a more active economic policy aimed to smooth out business cycles as well as income differences. During World War II and subsequent decades, investors did not alter their portfolios, few corporations issued new equity and capital and credit markets became highly regulated.

According to some scholars (e.g., Lewin, 1994), the Social Democratic Party established something like a corporatist equilibrium, in which close connections with not only trade unions but also large industrial conglomerates were established. The blue-collar union, LO (Swedish Trade Union Confederation), was increasingly influential in government policy-

[292] Report of 16 Oct. 1926 (Ministry of Finance, konseljakt 4 Jan. 1927, No. 11).
[293] 'Kreuger and Toll', *Affärsvärlden* (19 May 1927).
[294] Prop. 1929:85.

making, especially during the post-war period. It was the major source of Social Democrats' support (both ideologically and financially), and LO even obtained seats in the party leadership. The Social Democrats controlled government between 1932 and 1976, practically always with this intimate LO association, which indicates the significant impact LO had on Swedish politics.

STT was not an issue in politics until the late 1960s, when a new public investigation concluded that it should be completely removed. This was based upon statements from the Bank Inspection Board and several market interests, which had pointed out that STT, apart from its fiscal insignificance (see Figure 7.2), had become redundant following the introduction of the new transaction tax-like "flat rate" capital-gains-tax regime in 1965.[295] The proposal for its removal was sent out to 59 public and private organisations for consideration, and all except LO, gave their support. LO countered by arguing that "abolishing the tax is neither necessary nor desirable".[296] When, some years later, the issue ended up in a government bill, the Social Democratic Minister of Finance, Gunnar Sträng, followed the single opposing party, LO, by merely stating that 'not enough strong reasons were presented in order to justify an abolishment of the securities stamp duty'.[297]

However, STT had now returned to the political agenda, and financial market participants continued to pressure for its abolition. Two Conservative members of parliament proposed this in 1976, supported by similar requests submitted by two large commercial banks directly to the tax committee.[298] The committee, still dominated by Social Democrats, admitted that the tax had become an obsolete artefact without any practical importance but, nevertheless, wanted to await the conclusion of the Bank Inspection Board's ongoing inquiry into STT. This came in 1979, and contained a suggestion for STT's complete removal solely for "technical and administrative reasons".[299] The new incumbent right-wing government accordingly carried through its removal, which thereby finally ended the 70-year history of the securities stamp duty.[300]

Justifying the public-interest theory, based on events from the 1920s to the late 1970s, must focus on the efficiency aspect according to the Ramsey rule simply because the politicians during this period only used the revenue-raising as argument for the tax. And, for a number of reasons, this justification does not square with the empirical evidence.

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295 SOU 1969:16, pp. 186f.
296 Ministry of Finance, konseljakt 10 Oct. 1974, No. 38.
297 Prop. 1974:181, p. 48.
298 Mot. 1975/76:2480, SkU 1976:63(21), p. 69.
299 SOU 1978:11.
300 Prop. 1978/79:165, p. 165.

First, the government received repeated indications from media, market actors and even public authorities about high investor mobility to other securities and markets. This picture was further backed up by the completely insignificant gross STT revenues, which dropped after World War I down to about 0.3 per cent during the 1920s and 1930s, and less than 0.05 per cent of total taxes thereafter (see Figure 7.2). Hence, the Ramsey rule, stating that the tax should be inversely proportional to the elasticity of demand, with respect to STT was apparently violated - for which the government received considerable information. Second, there were significant economic costs that made net revenues even lower. Both parliamentary debates during the 1920s and the public investigation of the 1960s pointed out that the effects on corporate finance were clearly negative, and that many business opportunities were thereby potentially overlooked.[301] Such effects are not in the public interest.

Does the private-interest theory offer any explanatory power of these events? The labour movement became a more active player in the political arena during the 1920s, clearly promoted by the Social Democratic Party's increasing parliamentary dominance and the membership boost during the economic depression after the war. The roughly estimated income gap between workers and financial market actors, reported in Table 7.2, increased during the 1920s, implying that labour interests had clear incentives to obstruct any tax cuts that would have increased this differential even further. The full emergence of democracy in Sweden during this period, moreover, moved the median voter towards the low-income part of the population. Traditional Social Democratic voters most likely supported increased taxation of capital earnings, and the Social Democratic Party should have recognized and internalized this in its policy.[302]

In the STT struggles of the 1960s and 1970s, LO's remarkable influence, with its efficient lobby organisation and evident capture of the Social Democratic Party in parliament, became decisive. One might argue that the small STT revenue was insufficient to make LO interested in its subsidies. However, when regarded as part of a larger system of subsidies in which trade unions sustained redistribution in the government policy, STT could well have been an important part.

The opposing interest groups also improved their rent-seeking effectiveness from the 1920s, as shown by their collection and presentation of facts about STT in Sweden and abroad. They obviously captured the right-wing opposition at an early stage during the 1920s, but could not

301 Parliamentary debate, FK 1927:36:102d, SOU 1969:16, pp. 189f.

302 Regarding the trade unions' scepticism about shareholding and stock market rents, see Brundell (1947).

reap the rewards until the parliamentary majority switched in 1928. The silence among taxed groups between 1930 and the early 1960s is hard to explain consistently, but their activity thereafter can be clearly linked to the new capital gains taxation and "double" transaction taxation it created. Through official letters and submissions, financial market interest groups brought the STT issue back onto the political agenda during the late 1960s and 1970s. The timing of the abolition, moreover, underlines the solid corporatist structure. Swedish politicians were hard to capture by groups outside their traditional sphere, and it was not until a right-wing government entered office that final removal was executed. These sticky relations could also be interpreted in terms that there were ideological barriers in place, obstructing successful rent seeking by the traditionally "wrong" interest groups.

Altogether, experiences from the 1920s until the STT's removal in 1979 yield strong support for the explanatory power of private-interest theory and completely reject the public-interest theory. Constitutional changes, such as universal suffrage at the beginning of the period, made politicians increasingly inclined to vote-maximising strategies. The 50-year long retention of the indisputably inefficient and fiscally insignificant STT was due to the dominance of one party, the Social Democrats, in parliament, which securely rested upon support from well-organized trade unions and their close ties with the largest Swedish banks and corporations. Tax resistance did not become significant until the tax load was substantially increased during the mid-1960s. This spurred financial market interests to induce their captured right-wing politicians to remove STT, when they eventually formed a government. The arguments defending the tax during this era must hence be seen as largely political platitudes hiding the true underlying determinant, namely securing political support from vested interest groups.

7.4 Second STT regime: The "puppy tax" of 1984–1991

7.4.1 1984–1988: Reintroducing the STT

With the 1980s, the Swedish economy left the recession period of the 1970s, partly as a result of significant devaluations. In particular, the new Social Democratic government's large currency devaluation of 1982 boosted export-industry production that, in turn, also augmented corporate profits and stock prices. Meanwhile, workers saw their real wages decrease and the labour movement complained that the gap between financial market profits and the real sector growth was increasing. For example, LO called repeatedly for redistribution from stock market actors to

families with children and criticized the 'sick' and wasteful transaction economy that had evolved.[303]

In late August 1983, the Minister of Finance, Kjell-Olof Feldt, said to the media that the stock market was 'over-liquid' and that an imminent return of the old securities stamp duty was likely.[304] One month later, a section of the Metalworkers Union (the largest union within LO) wrote to the government, calling for an increased capital gains tax and a reintroduction of STT. Their prime motivation, besides purely redistributive arguments, was politically strategic with general elections at hand. They considered it necessary for the incumbent Social Democratic government to send a signal to the working population by taking political action against the excessive financial markets in time before the election campaign.[305] Three weeks later, on October 24, the government presented a new STT and extended capital gains taxation.[306] The suggested STT rate was one per cent of the value traded, that is, more than three times higher than the previous securities stamp duty. The government supported the new tax by arguing that the substantial stock market growth to a large extent rested on the 1982 devaluation and the favourable economic development that had ensued which, in turn, had boosted corporate profits. Accordingly, society could rightfully internalise some of the private profits made on the stock market.

Reactions in parliament were loud and critical. In the tax committee, all right-wing parties pointed out that the government had not adequately investigated beforehand the tax incidence. In particular, the Bankers' Association, the Security Dealers Association and the Federation of Swedish Industries visited the committee suggesting major tax revisions, but without results. The tax was granted by parliament without any substantial adjustments.[307]

Before the next elections in September 1985, the government tried to alleviate the intensive critique of STT by promising no more STT increases during the coming electoral period.[308] Meanwhile, Sweden removed some of the highly restrictive regulations of capital and credit markets, which caused investment and market activity to grow rapidly

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303 'Ta från aktieklipparna. Ge till barnfamiljerna', *LO-Tidningen*, No. 38, (Sep. 1983).
304 'Feldt: stämpelskatt åter', *Veckans Affärer* (25 Aug. 1983).
305 29 Sep. 1983, Metall Avd. 173 (Government Central archives [henceforth GCA], Ministry of Finance, Decision of 12 Dec. 1983, I:5).
306 Prop. 1983/84:48.
307 SkU 1983/84:11,20 and GCA, Ministry of Finance, Decision of 2 May 1985, I:10).
308 This promise was made by the Prime Minister, Olof Palme ('aktieskatt', *TT Nyhetsbanken* (31 Jul. 1985)).

and strongly. Stockholm Stock Exchange turnover as well as stock prices reacted positively to this changed environment and increased rapidly, as shown by Figure 7.1. This caused an almost immediate reaction from the trade unions and, on 14 January 1986, one LO leader went out in the media demanding STT's immediate doubling. At the same time, two Social Democrats in parliament proposed increased state intervention in the financial markets. On a question regarding the probability of the government responding positively to their proposal, one stated that 'the success of our proposal is completely dependent on which pressure the unions will put upon the government'.[309]

Only a few weeks later, government policy turned around completely with the presentation of a bill extending the STT base to derivatives instruments and increasing STT on stocks to two per cent from 1 July 1986 – then the highest STT rate in the world (see Table 7.3).[310] The prime argument was the need for new state revenues to finance extensions of family policy. When talking to the media, however, the government predominantly employed the 'sin' tax argument, complaining about (unspecified) speculative elements that needed to be curbed.[311] The government did not invite outside organisations to comment on the bill, and only referred to an older report from the National Tax Board (*Riksskatteverket*) that a tax base extension was fiscally motivated. The tax committee granted the increase, based upon redistributive and fiscal reasons despite new direct approaches from and even protest meetings among market actors.[312]

Looking for public-interest theory justifications, in 1984 corrective taxation was the prime motive and raising revenues clearly secondary, while in 1986 revenue raising was the only justification used in parliament. Regarding efficiency, empirical estimates conducted some years later by Lindgren and Westlund (1990) suggest that tax efficiency was low, and that the elasticity of demand was significantly negative in the interval (–1.3, –0.9). The collected gross STT revenues comprized about 1.5 per cent of total taxes, similar to then levels in other Western countries. Regarding net revenues, however, estimates by a public financial tax investigation suggested that approximately 60 per cent of gross revenues vanished due to reductions in deductible capital gains taxes.[313] Moreover, stock prices decreased significantly when the tax increases where announced, further cutting other tax revenues. For example, the LO

309 See Mot. 1985/86:804 and 'aktieskatt', *TT Nyhetsbanken* (17 Jan. 1986).
310 Prop. 1985/86:140.
311 'VA frågar Kjell-Olof Feldt', *Veckans Affärer* (6 Mar. 1986).
312 SkU 1985/86:38, Dagens Industri, 'Dubbelt manifest i börssalen: För börsetik. Mot aktieskatt', 18 Mar. 1986.
313 Summers and Summers (1989) and estimates of 1991 in SOU 1990:46, pp. 269f.

demand of 1986 caused a radical stock price decrease of 3.5 per cent in one day, to be compared with a 0.3 per cent increase on the New York Stock Exchange the day before.[314] Similarly, the unofficial government STT announcement to the media on 28 February caused the Swedish stock price index to change –5.3 per cent, while the NYSE index on the contrary increased 1.1 per cent. Finally, Umlauf (1993) has shown that STT did not affect the variance of securities prices but primarily caused cuts in their level, seriously questioning any stabilising effects of STT. In neither of these STT events was the benefit principle of taxation met, especially not by the earmarking in 1986 of the new revenues to "the families".

Table 7.4: Estimated income differences between stock market actors and industry workers, 1977–1991 (%).

	Real stock return (R)	Real wage increase (W)	R–W
1977	–27.7	3.7	–31.4
1978	6.2	2.8	3.4
1979	–7.7	–0.8	–6.9
1980	8.9	3.2	5.7
1981	44.8	3.8	41.0
1982	26.4	1.6	24.8
1983	56.8	2.0	54.8
1984	–19.2	–1.1	–18.1
1985	18.1	–0.3	18.4
1986	46.8	–2.4	49.2
1987	–12.0	–2.6	–9.4
1988	46.1	–2.0	48.1
1989	18.0	–3.4	21.5
1990	–41.4	0.2	–41.6
1991	–4.0	5.4	–9.6

Source: Real stock returns R are calculated from the *Affärsvärldens Generalindex* and W is real wage increases of workers in mining- and construction industry, taken from Swedish Official Statistics.

As to the private-interest theory, there is ample evidence of successful rent seeking by LO from the government for increased financial market taxation right before the actual STT events. Again using the rough estimator on earnings differences between industrial workers and financial market actors presented in Table 7.4, there is a large gap during 1981–1983. Responding to this, LO used its large-scale influence with government to induce some action against large stock-market profits. Equally strong evidence for rent-seeking behavior was the government's drastic

314 NYSE composite index (http://www.nyse.com/marketinfo/nysestatistics.html, 2002-06-23).

turnaround in early 1986 following directly upon LO demands. Financial support and the votes from about 2 million highly probable Social Democratic electors represented by LO explain this great impact on government policy and also why the resisting initiatives taken by market participants did not make any difference.

Altogether, the reintroduction of STT in 1984 was not determined by a welfare-optimizing government acting in the public interest. The government did not deploy any acceptable arguments justifying a public-interest view of the new STT, even if they may have prevailed in the background. By contrast, the remarkable match, both in time and content, of LO demands and both the reintroduction and doubling of the STT yields strong support for the private-interest theory. The trade unions were disturbed by the large profits within the corporate and financial sectors, and also knew that the Social Democratic government largely depended upon their support. Hence, despite recurrent resistance from taxed groups, the government clearly maximized its votes in the coming election by adjusting its policy to LO demands.

7.4.2 1989: Extending the STT to include bond and money market transactions

In 1987, the municipality of Stockholm and the labour movement's insurance company Folksam made multi-million losses in fixed-exchange derivatives trading. LO chairman, Stig Malm, reacted strongly and, at the annual LO conference in October that year, demanded that STT's tax base should be extended to bond and money market instruments to "reduce the overly large and socially worthless activities on the money market".[315] Within only two weeks, the Ministry of Finance presented a short report (Ministry of Finance, 1987) that contained a broadening of the STT base to include a wide range of fixed-income securities: bonds (including government debt), interest-rate futures and options. Tax rates were to depend on remaining maturity but a maximum rate was 0.15 per cent, or 15 base points of the underlying cash amount. In the report, international experiences of money-market taxes had been collected from a number of countries, but prime model was Swiss STT. Another tax extension contained in the report was brokerage firms' own trade, the so-called market-maker trade, which had previously been mainly considered as something that gave liquidity to the market.

The report was sent out for consideration to 37 public and private organizations, of which all but two (LO and the board of the First Government National Pension Insurance Fund) were critical.[316] Among the

315 Lybeck (1991, p. 156).
316 GCA, Ministry of Finance, Decision of 24 Mar. 1988, I:39.

most important opponents were the Swedish Riksbank and the National Debt Office, which warned that the new tax would have undesired effects on interbank trading and secondary trade in government debt. Nevertheless, the government presented the new bond and money market STT in March 1988 (to be effective from 1 January 1989), with only some minor adjustments. In the bill, the basic argument was compensating pensioners for their gradually increased costs of living, but dampening the 'exaggerated fluctuations on the financial markets that caused instability in the real sectors' and to create 'uniformity in the tax structure' were also mentioned.[317]

Because of the first report's drastic critique, the tax committee arranged a large meeting about the new tax with considered interest groups and the Minister of Finance. Although this did not result in anything qualitatively new, the government's political rhetoric and the tactics of tax earmarking became clarified. For example, clearly responding to the promises made in the bill, the leader of the largest pensioner association, PRO, stated: "I can confidently say that a veritable storm will break out among the pensioners in this country if the parliament would decide not to accept this new law".[318] When the matter came to parliament, it was approved without any obstacles. The new tax got the name "the puppy tax" (*valpskatten*), which came from the LO leader's nickname for people working on the financial markets: "financial puppies".

The public-interest theory finds some support in the fact that broader tax bases are mostly preferable from a tax efficiency point of view, especially when substitute securities are the ones to be taxed. Moreover, the inquiries made by the Ministry of Finance before launching the new tax were also desirable from a public-interest view. Ironically, though, the explicit reference to STT in Switzerland was counterbalanced by almost the exact same behavior from the Swiss government, which in 1988 defended its heavily criticized money-market STT by referring to other countries also using money-market STTs.[319] The efficiency of the new tax, measured ex post, was moreover devastating. Over the period from early 1987 (before the tax) to six months after its introduction, mid-1989, turnover on the Stockholm bond and money market fell by approximately 98 per cent, and trades in interest-rate futures and options on the derivatives markets vanished completely.[320] One factor enabling such a development was that the mobility of Swedish investors was drastically facilitated in 1989, when currency regulations prohibiting direct trade between Swedish and foreign investors were removed. The

317 Prop. 1987/88:156, pp. 10 f.
318 SkU 1987/88:37, Attachment, p. 56.
319 Levich and Walter (1990, p. 94).
320 Lybeck (1991).

Swedish markets partially escaped to foreign markets with lower or no taxes.

Regarding the corrective tax argument that was also employed heavily, the government was somewhat more precise in its description of market failure. It was real sector instability caused by the excessively fluctuating financial markets. There is, however, little evidence that the markets became more stable following the new tax's imposition. On the contrary, bond market volatility increased as a result of the new tax.[321] The benefit principle did again apply since the additional revenues were earmarked to the Swedish pensioners.

The private-interest theory would predict interest-group activities before and after the STT change. The temporal match between the LO initiative in September 1987 and the subsequent government report strongly suggests, and confirms, the previous results that trade unions' rent-seeking activities had a crucial impact on the Social Democratic government's policy. As mentioned, the trade unions, especially LO, offered highly probable votes in the coming general election in autumn 1988. The earmarking of revenues to pensioners suggests another important constituency that was subsidized in exchange for votes. Finally, Minister of Finance Feldt wrote in his autobiography about the determinants of the new STT. He felt that the coming Party Congress in 1988 "needed an active achievement, showing that the government would not let the financial market ravage freely and earn money merely by transacting money", which indicates another important pressure group that was crucial for the government to treat well, namely its own party members.[322] In other words, once again, it was the run for votes in the coming election and benefits from specific interest groups that appear to have been crucial for the "puppy tax".

Summing up, STT's extension to bonds and money-market instruments lends some support to the explanatory value of both theories although with emphasis on the private-interest theory. Most evident is the temporal correlation between proposals and opinions from LO and responses and decisions by government, confirming the previously suggested notions of a captured government, heavily dependent on support from special interest groups. However, government STT policy also became more developed over the years and the thorough preparatory work for the tax, including international comparisons and broad tax bases, indicates that the public-interest theory's efficiency requirements were actually met. But when judged against the actual outcome, this picture of efficiency changes completely.

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321 Lybeck (1991, pp. 169f).
322 Feldt (1991, p. 308).

7.4.3 1990–1991: The end of the STT

During the years 1990–1991, high inflation, labour shortages and almost negative real interest rates drove the Swedish economy into a superheated state with the government loosing control over economic policy. This resulted in a period of political turbulence and also a government crisis. The complex tax system, with numerous loopholes and specific subsidy rules, was blamed for many of these problems. Moreover, the financial markets continued to suffer under fiscal pressure. Stock exchange turnover decreased by about 15 per cent and the majority of trades in the shares of the largest companies occurred on foreign stock exchanges.[323] A Socialist-Liberal collaboration started working on tax reform in which the overall tax load and the system of special exemption rules were to be reduced.

It was during the logrolling rounds of the tax reform that support for STT from LO was suddenly withdrawn. LO had a representative on the Stockholm Stock Exchange Board, and he stated in late October 1989 that the proposed increases in capital taxation within the tax reform justified an STT reduction.[324] In January 1990, the government followed up with a 180-degree turnaround, carrying through an immediate abolition of the bond and money-market STT from 15 April and a cut of STT on stocks to one per cent from 1 January 1991.[325] Its arguments focused upon the importance of well-functioning financial markets and that Sweden could not diverge in tax policy relative to other European countries.

Similar developments occurred at the same time in other European countries such as Germany, Norway and Switzerland, where the financial markets had pressured successfully for the removal of their respective national STTs.[326] The Swedish election campaign in 1991 contained a focus on STT, set by the right-wing opposition which claimed that STT-removal was "of highest priority".[327] When the right-wing coalition eventually won the elections in September 1991, one of the first things undertaken was the abolition of the entire STT regime from 1 December 1991.[328] This was motivated by its negative effects on market liquidity and on equity financing; that it obstructed more dispersed shareholding in society; and that the tax contained many well-documented inefficiencies (offshore trading and low net revenues). Although Social Democrats and Leftists opposed its abolition, the new parliamentary majority carried through the bill without problems.

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323 Umlauf (1993).
324 "LO svänger om aktieoms", *Dagens Industri* (23 Oct. 1989).
325 Prop.1989/90:83 and Prop. 1989/90:111.
326 See Levich and Walter (1990).
327 Stated by the leader of the Conservative Party, Carl Bildt, in *Dagens Industri*, (28 Nov. 1990).
328 Prop. 1991/92:34.

The public-interest theory yields substantial support for the abolition of the various STTs in 1990 and 1991. The demand for fixed-income securities and related instruments had proved to be highly elastic and, hence, the money-market STT was clearly inefficient. The stock-market slump, during which shares in the largest companies were mainly traded abroad and "small" shares hardly traded at all, also indicated that the stock STT was highly questionable. One could also justify the corrective tax argument by stating that the "sins", that is, the 'excessive' brokerage profits and the high turnover, had been reduced, or corrected, as a consequence of the tax. These observed reductions in market activity, however, were already apparent during 1987 and 1988.[329]

The private-interest theory, on the other hand, explains the tax cuts and abolitions by LO's sudden withdrawal of its support for STT and government proposals in the same direction following short thereafter. The bargaining rounds during the tax reform gave LO the possibility to increase the overall tax load on the capital market and, hence, increase its own subsidies. Bad market performance in 1990 and 1991, evident in Table 7.4, also implied reduced profits for financial market actors and, accordingly, decreased envy among workers. The pressure from trade unions, comprising votes and benefits in combination with obvious vote-maximizing revenue earmarking to large voter segments, was a more important driving force.

To sum up, the second Swedish STT regime was abolished by a right-wing government, which argued that it had well-recognized negative effects on the stock market and was inefficient as an excise tax. These circumstances actually gives support to both the public-interest and private-interest theories but, when checking these particular events against the previous course of events during the 1980s, it becomes clear that the switching support for STT was the crucial factor driving the government policy. In a somewhat broader perspective, changes in technological and financial institutions created a possibility for investors to move from the costly Swedish market place to other European financial centers with smaller net regulatory burdens. Hence, these institutional changes undermined the traditional positions of the tax defenders making the support too expensive.

7.5 Conclusions

This paper's purpose has been to explore the political economy of STT, specifically focusing on the two Swedish STT regimes practiced during

[329] See SOU 1990:46, p. 265 and Figure 7.1.

practically the entire twentieth century. By combining theoretical predictions, the political arguments used and a number of recorded economic facts, I find that interest-group pressure stands out as the prime source of influence upon government STT policy, as opposed to public-interest theory. STT was an inefficient and fiscally insignificant revenue source, clear to everyone, driving investors either to stop trading in shares or to leave for foreign markets and substitute securities. Also influential was the development of technological and financial institutions that over time undermined the STT regime by giving investors new possibilities to switch to other financial markets where taxes were lower.

A parallel finding of the paper is that the influence of interest groups on government policy grew considerably during the century, an observation which fits well with the general pattern for Sweden. Trade unions were a highly influential special interest in the STT issue, mainly because they had captured the Social Democratic Party that controlled governments from the mid-1930s. Their influence peaked during the 1980s, when the tax-supportive trade unions several times practically forced the government to retreat completely and change opinion on the STT matter. The public-interest theory only offered plausible explanations for STT policy during extreme increases in public expenditures and the thereupon, following true need for additional tax revenues in World War I. In about all other cases, economic justifications for this theory based upon taxing efficiency, correction for market failures and the benefit principle were contradicted by real world evidence.

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Daniel Waldenström

Lifting All Boats?

The Evolution of Income and Wealth Inequality over the Path of Development

Does a rising tide lift all boats? This question – that is, to what extent does improvements of the general economy benefit all – is central to the study of economics and history. From fundamental issues about whether market forces have an innate tendency to increase or decrease differences in economic outcomes, to much debated questions about the effects of government policies, distributional concerns are always present.

In this dissertation, a novel dataset of international long-term income and wealth inequality data is presented and used to shed new light on long-standing issues in economic history. What were the distributional impacts of the industrial revolution? Who gains and who loses the most from the outbreak of a financial crisis? Has progressive taxation been a successful way to redistribute resources from the rich to the rest of the population?

Several important findings come out of the analyses presented. A general result is that whereas nineteenth century industrialization had a mixed impact on inequality across the Western world the twentieth century experience, including a rapid growth of government, educational reforms and the introduction of progressive taxation, uniformly equalized societies.

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