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

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Abstract

We study wealth concentration in Sweden over 130 years, from the beginning of industrialization until the present day. Our series are based on new evidence from estate and wealth tax data, foreign and domestic family firm-wealth, and pension wealth estimates. We find that Swedish wealth concentration was high in the agrarian state, and changed little during early industrialization. From World War I until about 1950, the richest percentile lost ground to high-income earners in the rest of the top-wealth decile. This equalization continued post-war; the entire top decile lost-out relative to the rest of the population. Around 1980, wealth compression stopped and inequality increased. We approximate the effects of international flows and find that the recent increase in wealth inequality is probably larger than what official estimates suggest.

Keywords: Wealth distribution; inequality; income distribution; welfare state; augmented wealth

JEL classification: *D*14; *D*31; *N*33; *N*34

I. Introduction

Theories about the dynamics of wealth distribution are typically concerned with long-run developments, 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.[1] The main contribution of this paper is to provide new series

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[1] Recent studies on long-run wealth concentration are Piketty, Postel-Vinay and Rosenthal (2006) (France); Dell, Piketty and Saez (2007) (Switzerland); and Kopczuk and Saez (2004)

of wealth concentration in Sweden for the years 1873–2006, thus covering a period from the early stages of industrialization to the present day. By constructing alternative series using both estate and wealth tax data, we believe our series give a robust representation of the developments over time.[2]

Besides allowing us to study changes in inequality over the transition from an agrarian to an industrial economy, there are other reasons why the case of Sweden is particularly interesting. First, over the course of the twentieth century, Sweden developed the world's most extensive welfare state with a strong egalitarian emphasis. Putting wealth equalization in an historical perspective is crucial to understanding the achievements of the Swedish welfare state but also to gaining further insights into the society in which it gained popular support. Second, comparing wealth concentration over time in Sweden with the patterns for France (Piketty *et al.*, 2006), Switzerland (Dell *et al.*, 2007), and the United States (Kopczuk and Saez, 2004) is interesting since 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.[3]

Several important findings come out of our analysis. Our main series suggest that the period from 1873–2006 can be divided into three broad phases based on how wealth concentration has evolved. First, although data are scarce for the period before World War I, our estimates suggest that wealth was concentrated in the agrarian economy and that it did not change much during the initial phase of industrialization. The slight increase that we find is limited to the top 1 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. At the beginning of this period, a number of major institutional changes in

(U.S.). Out of these it is only the data for France that cover the whole industrialization period. Lindert (2000) provides an overview of previous work on historical wealth statistics.

[2] Spanning 130 years, our series are the longest available estimates of the evolution of wealth distribution in Sweden to date. Spånt (1979, 1981, 1987) cover the years 1920–1983. Our main series are, due to restricted availability of data, limited to shares of total wealth held by the top decile of the distribution (and fractiles within this group). This is not particularly restrictive, however, 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 the data do not allow us to say anything specific about the lower parts of the distribution.

[3] Sweden did not participate in either of the world wars and was not affected 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 their governments.

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 seems directly related to the initial phase of wealth compression, which was characterized by wealth being more evenly spread out 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 whereby 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 behavior and real income growth, we can study distributional changes and changes in wealth composition to see which explanations seem most likely.[4] Our conclusion is that this process was most likely mainly driven 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).[5] Furthermore, our results for the period 1910–1980 also suggest 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

[4] 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 from 1954–1986.

[5] As we will discuss further below, the major changes in wealth shares for various groups in the distribution do not seem to correspond with 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.

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 achieve 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 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 whose measurement becomes more difficult as capital is more internationalized.[6]

II. Measurement Issues and Data

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 by far the most common measure in historical tax-based sources of wealth inequality for most countries.[7] In the case of Sweden, net worth is what has been specified in the taxation of estates and wealth.[8] One item not included in net worth

[6] Here we can also note that our analysis points to a number of more conceptual problems in measuring wealth (or income) inequality in a country where residency and even citizenship may be "internationalized".

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

[8] 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.

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 which 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 "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.[9] Top shares estimated at the individual level may be different from top shares estimated at the household level. The size and direction of 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

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

period we study are large enough not to be sensitive to the issues discussed by Atkinson.[10]

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 5 percent or the wealthiest 1 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.[11]

The Data

Our main series on 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).[12] 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 the wealth of super-rich Swedes 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.

[10] 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 U.S. over the century.
[11] 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.
[12] There are some other sources of wealth data, in particular household surveys, which we do not use, mainly because they contain too few observations to allow a comprehensive analysis of the top of the distribution.

Finally, we present estimates of the level and trend of augmented wealth concentration.

Estate Data. Estate data are 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.[13]

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 continue with observations for the periods 1906–1908, 1942–1943, 1954/1955, 1967 and 2002–2003, covering a total of 130 years.[14] 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.[15] 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.[16]

Another problem in 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.

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

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

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

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

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

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 impede 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.[17] Second, consumer durables are quite imperfectly covered in the wealth tax returns, which could imply a significant underestimation of "popular wealth".[18] Third, pension wealth is not included in our analysis, mainly because it is mostly not controlled directly by the households but rather is 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 quite 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 since 1980 they have increased dramatically.[19]

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 10,000–20,000 households for which wealth tax returns and interview material are available, with a full sampling of the richest households.[20] Before 1999, wealth records are entirely based on tax returns, with real and financial assets

[17] 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.

[18] The absence of consumer durables (furniture, household appliances, machinery, art, antiquities etc.) could notably reduce wealth concentration. Estimates in Jansson and Johansson (1988, Ch. 7) indicate that they would decrease the top-wealth percentile's share in 1985 by a third. However, this is 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 further discussion below).

[19] 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 (2009) 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.

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

only roughly adjusted to market values. From 1999 onwards, our wealth information is 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 (2004, 2006a,b).

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 owner-occupied housing are notoriously difficult to assess; see further, Jansson and Johansson (1988, pp. 68–73, 140–141). 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 oversampling of the richest households 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 and 1951, and finally some specific investigations from 1966 and 1970.[21] 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.

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 have led to a situation where the rich moved their capital overseas for tax avoidance reasons, and if so domestic wealth inequality could become 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 (BoP) and the Financial Accounts (FA).[22] A third source of foreign household wealth is the super-rich Swedes who have

[21] Sources are wealth tax tabulations in Statistics Sweden (1927, 1937, 1938, 1940, 1951, 1956), SOU (1969) and Spånt (1979).

[22] 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 also analyze the emigrated Swedes in the robustness section, and then make use of the journalistic estimates of the wealth of the 30–50 named super-rich Swedish households residing in foreign countries. In their study of wealth concentration in Switzerland, Dell *et al.* (2007) analyze data on foreigners' wealth in the 1990s as reported to Swiss authorities. However, wealth is not related to country of citizenship or systematically linked to inequality estimates in other countries.

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.[23]

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.[24] The basic approach rests on deriving residuals between observed balance sheet entries. In the case of the BoP, 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 outflows *per se* 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.[25] In the case of the FA, 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.).[26]

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 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 40,000 to 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

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

[24] These data are available from the authors' personal webpages or on request.

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

[26] Bergman and Rylander (1984), SOU (2002, p. 298) and Swedish National Tax Board (2008) all use the unexplained savings in the FA for analyzing the size of foreign household wealth. We use the newly revised figures for the financial savings in the National Accounts.

it may be slightly too small in the years thereafter.[27] Naturally, we also add the foreign wealth to the reference wealth total in the denominator.

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.[28] 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 UK. Because of their subjectivity in the valuation of the fortunes, one must treat these numbers with great caution.[29] 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; see 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.[30] 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

[27] There are clearly a number of objections that can be raised to these assumptions. Our main purpose, however, is 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.

[28] 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 according to the Wealth Tax Act of 1997 (1997:233). This rule is generally considered to have been specifically designed for the Persson family (main owners of H&M).

[29] For example, their methods comprise 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 interviews with the rich themselves are also used. See further the discussions in Davies and Shorrocks (2000) and Atkinson (2008).

[30] 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.

SEK. Swedes living abroad are between 10 and 50 in the listings with fortunes between 3 and 17 billion SEK.[31]

Retirement Wealth Data. Pension wealth and social security wealth are important sources of income for most people at 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*.[32] Conceptually, it is not unproblematic to include retirement wealth in personal wealth. On the 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, 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 about people's life expectancy, future rates of return on the capital markets, and so forth. Third, there are public and private funded and unfunded parts of the pension system, 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: for example, in mapping 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. In this paper, we use 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.[33]

[31] Detailed information about these data are available from the authors' webpages or on request.

[32] This approach was first suggested by Feldstein (1976) and has since been applied by several others.

[33] The calculations are based on arriving at net present values of all individuals' current and future claims on different parts of the pension system. The estimate for 2004 was computed

III. 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 sub-periods, mainly based on the observed patterns but also on instances of important structural changes in 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, 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 make use of our estimates of foreign household wealth as well as journalistic sources.

Long-run Trends

Figure 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 until almost 1945, with only a small drop in the 1930s (visible in the wealth tax data). Given that the 1930s mark 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.

However, as has been pointed out several times in recent work on top incomes and wealth, when only looking at the evolution of the top decile, one typically fails to see a number of important aspects of the data. Figure 2

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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 public 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; as it turns out, 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 on request.

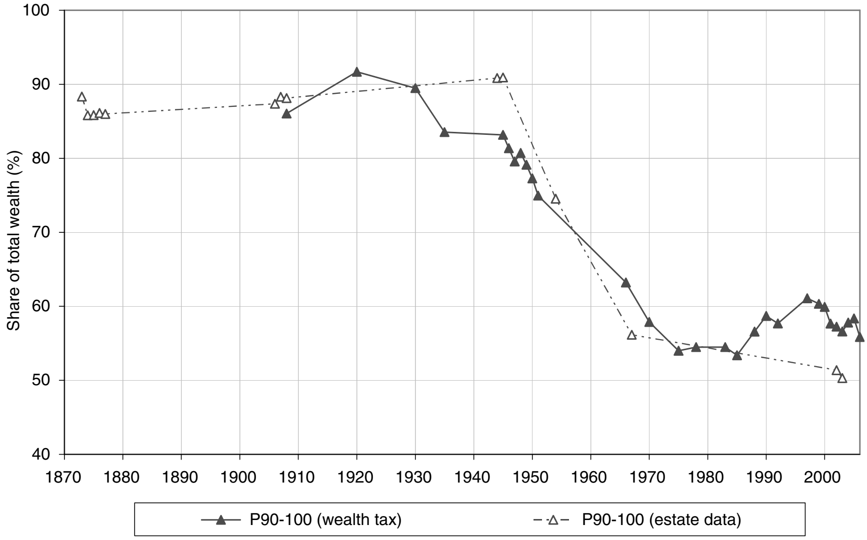

Fig. 1. Wealth share of top decile using wealth tax and estate tax data, 1873–2006
Source: Table A1.

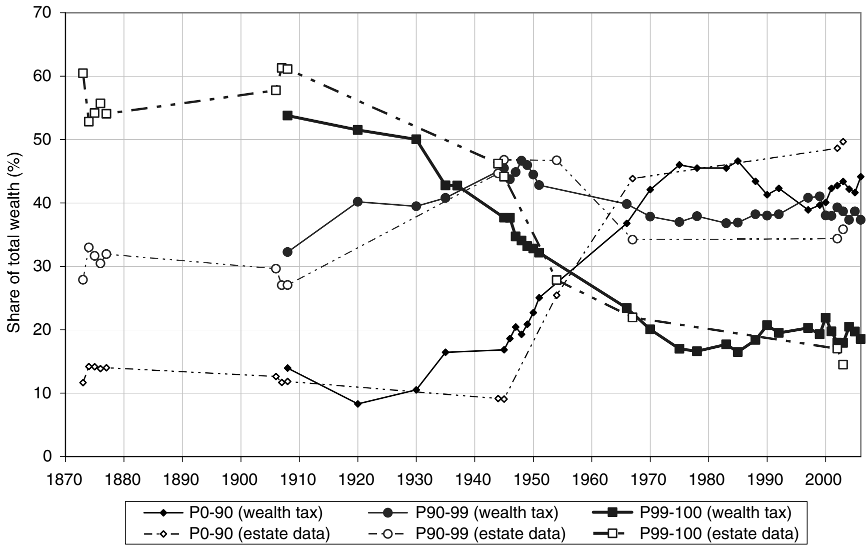

Fig. 2. Wealth shares of top percentile, rest of top decile and bottom nine deciles using wealth tax and estate data, 1870–2006
Source: Table A1.

shows the development of the top percentile (P99–100), the next 9 percent (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 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 1—that no big changes occur. During 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 the same amount. 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 World War II, 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.

Our data also allow us to analyze the long-run patterns of wealth shares in the very top of the wealth distribution. Figure 3 shows 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

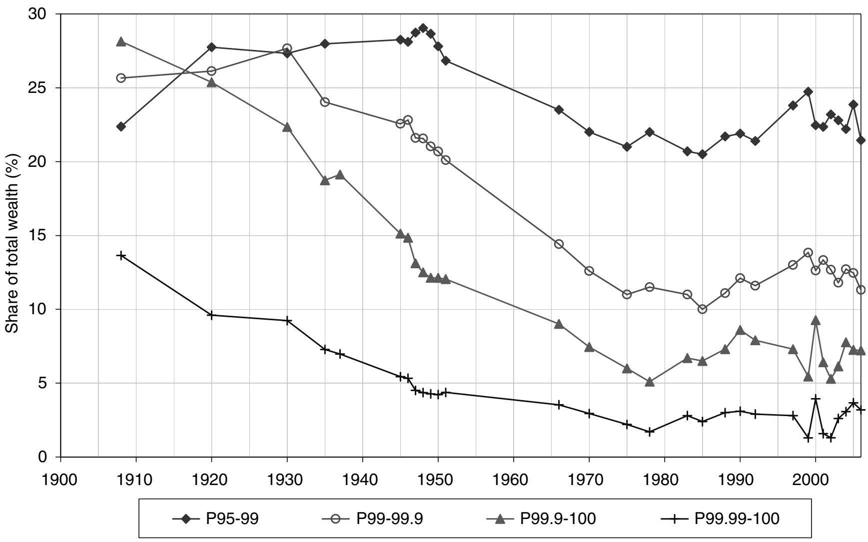

Fig. 3. Wealth shares groups within the top wealth vintile, 1908–2006
Note: Wealth tax-based data.
Source: Table A1.

(P99.9–100) and the top 0.01 percentile (P99.99–100).[34] 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 percent 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 more striking when contrasted against P95–99, which increased its share until 1950, then experienced a relative fall until around 1980 and then recovered, only to land at a wealth share in 2000 which is almost exactly the same as in 1908.

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 do not allow us to identify precisely what has been driving this process, we can get a number of clues and also a more precise picture by analyzing the data in more detail. We do so by looking separately at three sub-periods: 1870–1910, 1910–1980 and 1980–2006.

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.[35] 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.[36] This is particularly important, since Kuznets' influential hypothesis about industrialization is explicit about inequality increasing during the initial stages of economic development.

Our data suggest that between the 1870s and the first decade of the twentieth century, the top 1 percent increased their wealth share by approximately five percentage points, from about 55 percent to around 60 percent. The losses for the rest of the population were 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

[34] 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.

[35] For example, according to the growth-rate-based definition in Maddison's (1982) "Phases of capitalist development", Sweden achieved growth rates averaging above 1 percent for the first time in the 1850s and 1860s.

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

created wealth that was concentrated at the top of the distribution.[37] 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.

1910–1980: Wealth Equalization and the Rise of "Popular Wealth"

Between the 1910s and the years around 1980, Sweden experienced 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 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, with the next four percentiles (P95–99) actually increasing their wealth shares.

These heterogeneous patterns within the top percentile 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 two 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 principle equal to net wealth) to individual income to calculate what was called the "taxable amount".[38] 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 1 shows how the wealth share of the top percentile in the income distribution decreased before 1950, in particular during 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

[37] 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 much affected by increased salaries. Rather, a more likely interpretation is that the reason 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.

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

Table 1. *Shares of wealth owned by top income earners*

Income fractile:	P90–95 Mainly high-wage earners		P95–99 High-wage earners and rentiers		P99–100 Mainly rentiers	
	Wealth share	Pct. change	Wealth share	Pct. change	Wealth share	Pct. change
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

Notes: 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 to the data used in Roine and Waldenström (2008), it would generate an annual capital income (assumed as 5 percent nominal return of the observed wealth) of roughly 200 SEK, or about a third of the average income in the country as a whole (which was about 700 SEK). By contrast, the wealth of income earners in the top percentile, the rentiers as we call them, would on average generate about 6,500 SEK—or more than nine times the average income.

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.

An additional clue as to how this came about can be 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 and 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.[39]

After 1950, the trend of increased accumulation continues down the distribution. The equalization of incomes certainly contributed to this development. Even as early as 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.[40] 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 17 percent of all wealth to 45 percent in 1975.[41] This was

[39] Another possibility would be changes in policies that disproportionately benefited this group, but at this time such an explanation seems unlikely.
[40] See Roine and Waldenström (2008).
[41] This share has remained relatively constant since adding owner-occupied apartments, houses and vacation homes (consumer durables also increased considerably but remained a relatively small share of the total); see Spånt (1979, pp. 78–80) and Jansson and Johansson (2000, pp. 19–21).

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.[42] 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 percent, 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).

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 during this period, finding the lowest inequality in the early 1980s and a moderate increase thereafter.[43] 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 2000, with an average annual real rate of return of more than 20 percent.[44]

We believe that there are two main reasons for why some of the potentially most important changes in 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

[42] See Englund (1993).

[43] According to the official estimates at Statistics Sweden (Jansson and Johansson, 2000; Statistics Sweden, 2006a), the wealth share of the top percentile increased about 10 percent over the 25-year period since the late 1970s. 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).

[44] 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 (Waldenström, 2009) at year-end were 75.4 in 1980, 689.0 in 1990, 4,826.3 in 2000, and 5,817.5 in 2005, which results in average increases of between 20 and 25 percent per year.

Table 2. *Sums of foreign and super-rich wealth after 1978 (billion SEK, 2006 prices)*

	Domestic wealth		Foreign and family-firm wealth			
Year	Total wealth	P99–100	Foreign wealth (BoP)	Foreign wealth (FA)	Wealth of super-rich Swedes living *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

Notes: All sums are in current billion SEK. For sources and details, see the text. We add a 5 percent annual rate of return on the accumulated foreign wealth as estimated from the balance of payments (BoP) and the Financial Accounts (FA). 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 those from 1990 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) relate to IKEA founder, Ingvar Kamprad.

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 2 shows these sums for the 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.[45] The unexplained financial savings in the FA also exhibit substantial outflows, but they start in the early 1980s, which might reflect increased domestic unobserved wealth.[46]

Figure 4 displays the distributional effect of 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 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

[45] 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).

[46] 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 in the calculation of the aggregates.

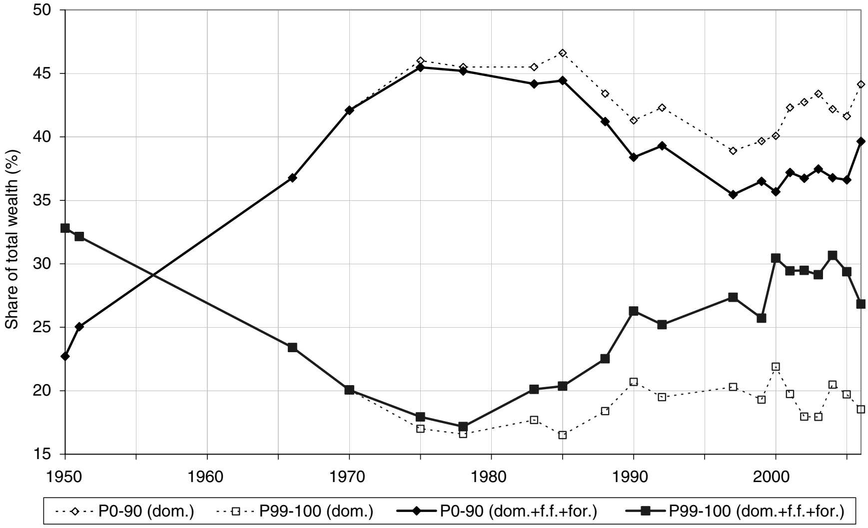

Fig. 4. Adding foreign and super-rich wealth to the top percentile, 1950–2006
Notes: The notation "dom." means wealth shares when using the market-valued wealth tax-based domestic wealth, "f.f." is the mainly closely-held family-firm wealth owned by super-rich residents, and "for." means the addition of foreign household wealth estimated from the BoP (see text for further details).
Sources: Tables A1 and A2.

presented in Table 2. Note that these data do not contain any assumed accumulated interests on the foreign capital, which means that 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.

The sizable impact of foreign wealth on the wealth concentration is probably a phenomenon that, if not unique, is 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.[47]

[47] Adding these wealth items increases the 2004 share of the U.S. top wealth percentile and increases its share from 33.4 to 34.6, an increase of about 3 percent which is to be compared to the 50 percent increase in the Swedish case. The calculation is based on top-wealth share in the Survey of Consumer Finances; see Kennickell (2006). Then we add 80 percent

IV. Robustness of our Estimates and Alternative Measures of Concentration

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.[48] 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.[49] 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 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 that 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.[50] This is hardly surprising given that the totals according to Berg (1988) are about twice our reference total and

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

[48] See 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.

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

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

Table 3. *Alternative reference wealth totals, 1930–1985*

(a) Levels

	Alternative wealth totals (million SEK)			Alternative shares for P99–100			
Year	Tax values	Market values (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

(b) Changes

	Percentage change of P99–100			
Years	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

that 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.

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 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 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) for 1983–1985. The main trends and levels are basically the same in all three cases, which perhaps is not so surprising given the fact that they all derive from the same wealth data source. Yet it is worth noting that the

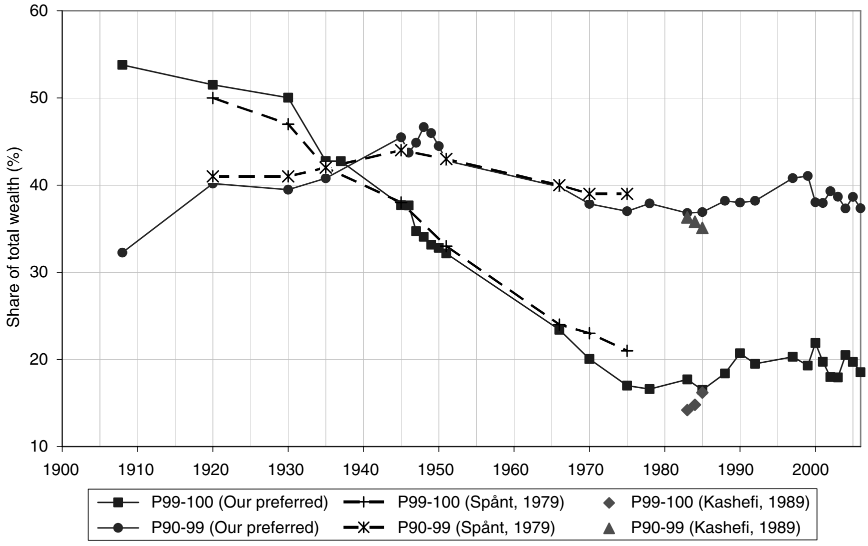

Fig. 5. Comparison between our series and previous studies
Notes: All series are based on wealth tax statistics. "Our preferred" is the main series presented in Figure 2.

differences in interpolation techniques, reference wealth and population totals do not seem to have an important impact on the estimates.

Shares Within Shares

Our top wealth shares may contain measurement errors 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.[51]

Figure 6 depicts the evolution of wealth concentration using shares-within-shares estimates and hence without any potential 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

[51] To see that this removes the influence of reference totals, note that P99–100 = W_{Top1}/W_{All} (with W = Wealth) and P90–100 = W_{Top10}/W_{All}. Hence, P99–100/P90–100 = $(W_{Top1}/W_{All})/(W_{Top10}/W_{All}) = W_{Top1}/W_{Top10}$.

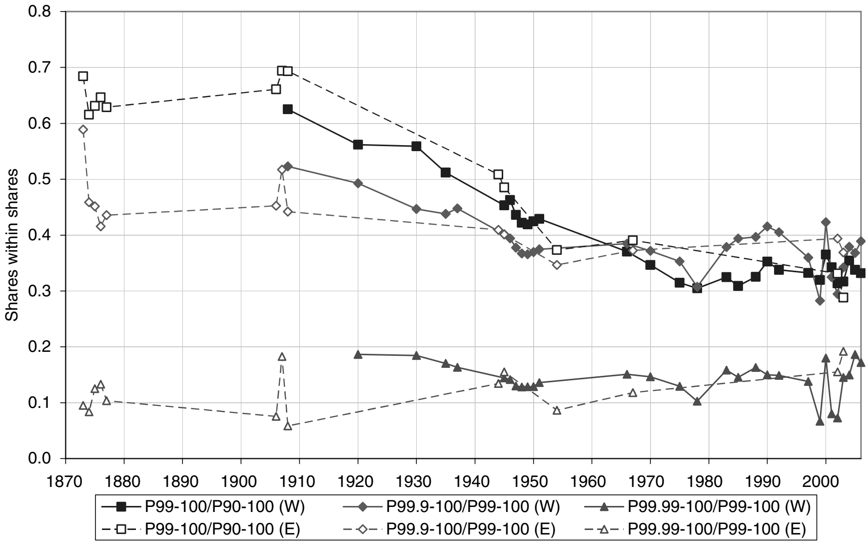

Fig. 6. Shares within shares—estimates of the wealth concentration
Note: The notation "W" and "E" refer to wealth tax and estate tax data sources, respectively.
Sources: Calculations based on shares in Table A1.

magnitudes are similar to those observed in our main series, i.e. when the top is related to the wealth of the whole population, 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 during this period, most of the change is driven not by the changes at 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.

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 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 BoP and FA foreign household wealth series as well as journalistic estimates of the foreign and domestic wealth of super-rich Swedes) and different assumptions about the yield of foreign capital (0 and 5 percent nominal rate of return).

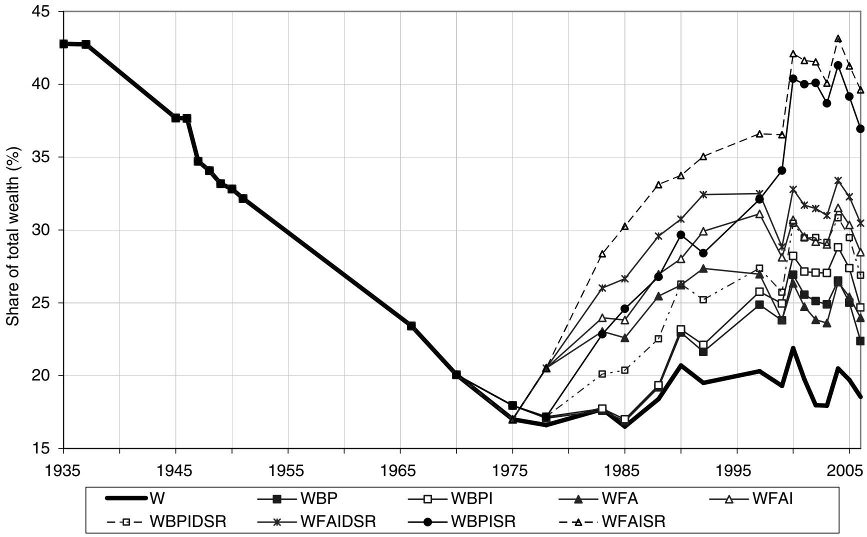

Fig. 7. Varying the definition of foreign and journalistic wealth
Notes: The acronyms in the figure are defined as follows: W (Marketable net worth) = Domestic net worth (wealth tax-based), WBP = W + Foreign wealth in BoP; WFA = W + Foreign wealth in FA; WBPI = WBP + 5% annual interest on foreign wealth; 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: See Table A2.

Figure 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.[52] The results confirm the sizable 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 percent after adding the (mainly)

[52] 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 (BoP-based estimates of foreign household wealth), FA (FA-based estimates of foreign household wealth), BPI and FAI (like the two previous but with an added 5 percent rate of return), DSR (closely-held wealth of the 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 FA-based foreign wealth (for which we have data from 1978) and in 1983 for those containing domestic super-rich wealth for the same reason.

Fig. 8. Top percentile share of marketable, augmented and foreign wealth, 1978–2004
Sources: Table A2.

family-firm wealth of the 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.[53]

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 II, 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 retirement wealth to marketable wealth has typically resulted in a considerable equalization of wealth; see e.g. Feldstein (1976), Feinstein (1996), and Wolff (2007). For example, the top percentile in the UK in 1991 owned 17 percent of marketable wealth but only 10 percent of augmented wealth.

Figure 8 depicts the top 1 percent wealth share in Sweden between 1978 and 2006, using three different concepts of wealth: net marketable wealth,

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

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 dashed line in the figure) shows that the increasing trend remains unaffected.[54]

V. International Comparison

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

Figure 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 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.

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

[54] 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 (2007). However, due to the great uncertainty in the Swedish estimates we refrain from making such a conclusion and confine ourselves to the observation that the trend is basically flat in both the marketable wealth and augmented wealth cases.

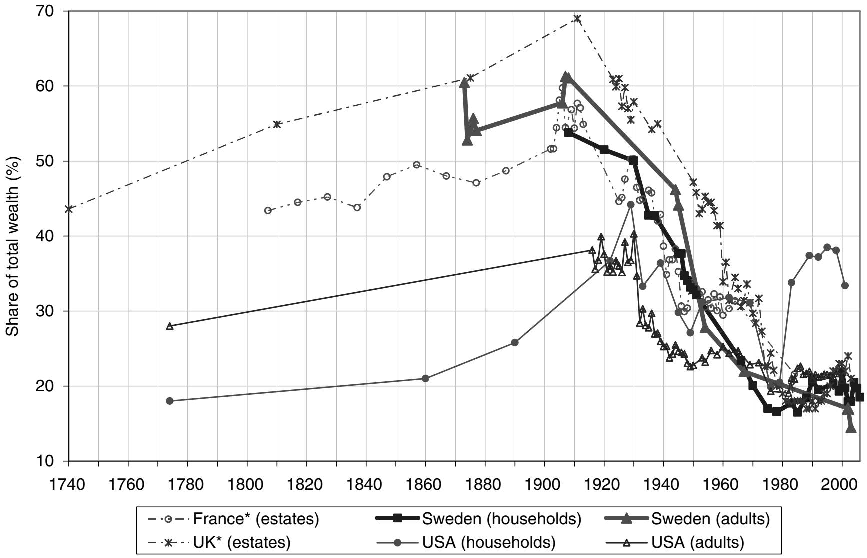

Fig. 9. Top wealth percentile in four countries, 1740–2006
Notes and sources: The estate series for the U.S. (adults and households before 1960) and the UK (UK* denoting England/Wales up to 1939 and UK thereafter) are mortality-adjusted, while the Swedish and French series are not. For U.S. (households) after 1960, survey data were used. For details, see Ohlsson *et al.* (2008) and Table A1 (this paper).

stages of industrialization (in the late nineteenth century). The UK 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 an average factor of about two (from around 40–50 percent at the beginning of the century to around 20–25 percent 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 until the 1980s, when it stabilizes on an internationally high level.

VI. Concluding Remarks

This paper has presented new evidence on trends in wealth concentration in Sweden over the period 1873–2006. 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 that which has been found in previous studies for other countries, but also one with some important differences. Overall, our findings suggest 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 did play 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 cannot 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 10 percent. On the other hand, the gradual leveling of Swedish wealth started long before that. Even as far back as 1910, we see evidence of the groups just below the very top increasing their wealth share and that the increases move down the distribution over time. These changes cannot be attributed primarily to exogenous shocks to top wealth holders—making the Swedish case different from France, the UK and the U.S.—but it is also hard to see what kind of policies enacted in the first half of the century would cause this pattern. When looking at the wealth holdings of the P90–95 group in the income distribution, their share more than doubles between 1911 and 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 about these aspects.[55] What we can say, however, is that our results once again show

[55] 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.

the importance of studying developments for smaller sub-groups within the top.[56] Looking only at the shares of the top decile and the rest indicates that wealth leveling started around 1950, but a finer decomposition of the shifts within the top decile show that the process of gradual wealth leveling started well before the expansion of the welfare state.

After 1980, wealth concentration increased, but only slightly according to standard official estimates. The commonly held view is that wealth concentration is still at an historically low level. At the same time, there has been an ongoing debate about much 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 treat foreign wealth (and income) when thinking in terms of 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 good deal to the picture of wealth distribution.

A similar argument has been put forward by Kopczuk and Saez (2004) to explain why the very high income inequality in the U.S. over the past decades does not seem to have led to increased wealth inequality.

[56] This is something that is pointed out in many of the recent papers on top incomes, including Roine and Waldenström (2008) on Swedish top incomes during the twentieth century.

Appendix. Wealth Concentration in Sweden, 1873–2006, Main Series

Table A1. *Top marketable 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					

Notes and sources: The shares based on estate tax data are for the disease population. In 1908, however, there are mortality-adjusted shares (marked with an asterisk (*)) and placed in the wealth tax data columns since they show the distribution for the living population.

Table 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	WBPI-DSR	WFAI-DSR	WFA-ISR	AW	AWBP-IDSR
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		

Notes: W (Marketable net worth) = Domestic market valued wealth tax-based wealth; WBP = W + Foreign wealth in the balance of payments; WFA = W + Foreign wealth in the Financial Accounts; 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; AWBPIDSR = AW + WBPIDSR − W.
Sources: See the text.

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