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# On the wealth dynamics of Swedish families 1984-1998

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Abstract

This paper focuses on three issues. First, it analyses the increasing inequality of wealth in Sweden in terms of percentile age and birth cohort differences. Second, it discusses mobility of wealth as a function of age, length of the transition period, the magnitude of quantile differences, and a time trend. The third theme is the relative importance of bequests. Estimates are given of their share of total net worth, and of their contribution to the inequality and mobility of wealth.

Keywords: Wealth distribution, age-cohort effects, wealth mobility, bequests

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## 1. Introduction

Measurement and decomposition characterize much of previous empirical research on the distribution of wealth. Using comparisons across nations and time and decomposition by type of asset and type of wealth holder we have attempted to better understand changes and cross-sectional differences in the distribution of wealth. Usually there is a focus on the inequality of wealth and in particular on the wealth share of the top 1 or 5 percent. This could be motivated by the finding that much of the activity goes on in the extreme right tail of the wealth distribution and by the influence of the very rich at the national level. However, the almost obsessed interest in the very rich does not justify only a modest interest for the remaining 95 percent of the population, in particular as the notorious difficulties in measuring wealth are particularly severe for the very rich.

In Sweden two data sources have been used. One is register data from self-assessments for taxation purposes and from employers, banks and brokers, and another is survey data. Estate data have (to my knowledge) only been used by economic historians in geographically very limited studies. Measures of inequality depends very much on what is included in the wealth concept as demonstrated in Bager-Sjögren & Klevmarken (1993). In particular, they found that the inequality of tax assessed wealth was much higher than the inequality of a wealth concept based on market values and with a broader coverage. Older Swedish studies that had to rely on self-assessment data thus probably exaggerated inequality as compared to later studies based on better data. In the last decade the quality of register data from Statistics Sweden has increased considerably and today much speak in their favor, but to get a longer perspective the HUS surveys are used in this study. Comparisons with register data can be found in Bager-Sjögren & Klevmarken (1993, 1998).

Previous Swedish estimates of the inequality of wealth (Spånt 1987) show a decline from the beginning of the previous century to the middle of the 1970s. The decline then came to a halt, Jansson &Johansson(1988). The inequality of wealth started to increase in the 1980s. Depending on inequality measure used the increase can be dated to the beginning, the middle or the end of this decade, SCB(2000). It continued to increase through the 1990s. Diagram 1 shows the 1984, 1993 and 1998 net worth distributions as estimated from the HUS surveys. It demonstrates the increase in mean wealth as well as the increase in inequality that is even more clearly seen from Table 1 and Diagram 2. Although the estimates of the $10^{th}$ and the $90^{th}$ percentiles are rather uncertain the picture of a very small increase in the $10^{th}$ percentile, and a strong increase of the $90^{th}$ percentile, in particular during the second half of the period 1984-98, is quite clear. Median net worth also increased more than the $10^{th}$ percentile did, but much less than the $90^{th}$ percentile.

The Swedish changes in wealth more or less parallel those of other European countries and of the United States as summarized in Davis & Shorrocks(1999). One difference between Sweden and the United States is that the Swedish increase in inequality originated primarily from the extreme tails of the distribution as measured by the ratio between the $90^{th}$ and the $10^{th}$ percentiles, while in the U.S. this ratio as well as the quartile ratio had increased, see Klevmarken et.al. (2000), Display 1. This finding for Sweden parallels that of Spånt(1987) who showed that the drop of the share of the top 10 percent in the period 1920-1975 was almost all accounted for by the decline of the top 1 percent. Inequality among those below the top did not change much.

The increase in inequality in the 1980s and 1990s probably has several explanations. One is the aging of the baby boom cohorts who in these decades approached the peak of the age-wealth profile as predicted by the life-cycle hypothesis. Another is the increasing distrust in the social security system and increased private pension savings to compensate for anticipated cuts in compensation. A third is the deregulation of the capital markets at the end of the 1980s and a fourth the major tax reform in the beginning of the 1990s. Related to these changes there were rather dramatic changes in asset prices.

The Swedish private savings rate peaked at about 12-13 percent around 1993-94 from a low of a few percent in the prior years. After 1993 the rate dropped back down under 5 percent in 1998 and 1999. One explanation to the peak in the time series is the reduction of debts after the tax reform in 1991. Debt ratios decreased in particular for high income and wealthy people. The savings rate then decreased as a result of the deep recession in the first half of the 1990s and falling real estate prices. It did not increase at the end of the recession, but continued to decrease reflecting a need to purchase durables, purchases that were postponed during the recession and which were boosted by favorable expectations about future income growth.

The importance of changes in asset prices to explain changes in the inequality of wealth has been documented in several studies: Spånt(1987), Pålsson(1993), Bager-Sjögren & Klevmarken(1998) and SCB(2000). Changes in the real price of homes and vacation homes primarily influence the center part of the wealth distribution. Real estate prices have been rather volatile. They peaked in the beginning of the 1980s, in the beginning of the 1990s and then again in the beginning of 2000. The troughs in the middle of the 1980s and in the middle of the 1990s were about 70 percent of the peaks. Over the entire period 1975-1990 there was no increase in the real price of homes and vacation homes.

Increases in the prices of stocks and shares will primarily influence the right tail of the distribution. The increase in stock prices has been exceptional. In the period 1980 to the end of the 1990s the general index of the Stockholm Stock Exchange increased by a multiple of 17. The difference in price change between the real estate market and the stock market at least partly explains why the increase in wealth inequality in Sweden only is a move outward of the extreme right tail.

This study starts from the perspective of the life-cycle hypothesis and first focuses on the stability of age-wealth profiles by percentiles. This opens for a discussion of cohort and period effects on wealth. It then continues with an analysis of how the percentile mobility of wealth depends on the time-span of mobility, the percentile width and age. The study ends with an attempt to separate the life-cycle and bequest components of wealth using survey estimates of bequests. We do not only obtain estimates of the relative share of bequests in total wealth but also estimate of the contribution of bequests to both the inequality and mobility of wealth.

## 2. Data

Data for this study come from the Swedish household panel surveys HUS. For a general description and details about survey design and variables included see the code-books Klevmarken & Olovsson (1993), Flood et.al. (1996) and the Internet address
http://www.handels.gu.se/econ/econometrics/hus/husin.htm

The sample frame of these surveys was limited to non-institutionalized respondents in the age bracket 18-74. In the panel people were, however, interviewed also after the age of 74.

The household concept used in these surveys define a household to include people sharing the same dwelling and having meals together. Interviews were normally only conducted with the head and the head's spouse. The definition of a household is tied to the head. A household will almost always have the same head while other members living with the head might change.

Only one household member, normally the head and if the head was not available the head's spouse, was asked questions about real estate, assets and debts. The response should be given to include all household members.

Wealth data are available from the following waves of data collection: 1984, 1986, 1993, 1996 and 1998. Total net worth includes the following assets: Owner occupied homes including condominiums, vacation homes, other real estate, savings and checking accounts, stocks and bonds, consumer durables, less mortgages and other debts. With the exception of 1984, life insurance and annuities are also included. When it was important to cover a long time period these two types of assets were, however, excluded, while in other cases when 1984 data were not used, they were included. Assets in the form of unincorporated business are always difficult to capture in wealth studies. No particular questions were asked about this form of wealth until the 1998 survey. It is thus not covered in this study. The share of self-employed and employed with an unincorporated business is, however, relatively small in Sweden. The responses to questions about financial wealth were given in bracketed form and then converted into Swedish crowns using bracket midpoints. All asset data were transformed to constant 1993 Swedish crowns using the December CPI the year prior to the survey year.

Survey data on wealth is always burdened by nonresponse. To compensate for this problem Rubin's multiple imputation method was applied. Predictors used were assets with valid responses, average real estate prices by municipality, schooling of the head and a few demographic variables. Imputations were made at the sub-category level described in the previous paragraph and not at the total net worth level. The number of assets imputed thus varies from one household to another. For most assets 20-30 percent of the observations were imputed. In the 1980s the share of imputations was a little less than 20 percent while it increased to about 30 percent in 1998.

Imputations were done cross-sectionally that implied that imputed observations could not be used to study mobility. That would have inflated the mobility measures. For this purpose only observations without imputations were used. The disadvantage with this strategy is that we have to accept a relatively high nonresponse that might be selective. In future work it might be possible to increase the number of usable observations and then also the precision of estimates by a longitudinal imputation procedure.

## 3. Age – wealth profiles

The life-cycle hypothesis suggests a hump-shaped relation between age and total wealth, and several studies have tested this hypothesis with varying success. The problem is that the profile does not always decay as quickly after retirement as predicted by the life-cycle hypothesis. To explain this deviation from theory it has been suggested that uncertainty about

health and the need for care at the end of life and uncertainty about the length of life itself make people reduce their wealth less than suggested by the life-cycle hypothesis. Some people also want to leave bequest to their children.

Table 2 gives the estimates of simultaneously estimated quantile regressions of net worth on age in the form of piecewise linear splines. The corresponding age-wealth profiles are displayed in Figures 3-7. The first two of these figures show the $10^{th}$, $50^{th}$ and $90^{th}$ percentile profiles for 1984 and 1998 respectively. The $10^{th}$ percentile has almost no hump shape while the median profile has a clear hump that becomes even more pronounced for the $90^{th}$ percentile. The peak of the 1998 profiles is around the typical retirement age of 65 as predicted by the life-cycle hypothesis. For 1984 the peak is not as well estimated. Although the estimated profiles are cross-sectional and not cohort profiles the difference in shape between the $10^{th}$ and the $90^{th}$ percentile might suggest that the life-cycle hypothesis is a better explanation of behavior for the wealthy while there is very little life-cycle savings among the poor.

Figure 5 displays the median profiles for the three years 1984, 1993 and 1998. They do not show a stable relationship with age. While the first part of the profiles up until the age of 45 to 50 is about the same, the peak becomes higher and is pushed towards a higher age in the later profiles. Older people have thus become wealthier. The profiles for the $10^{th}$ percentile have become steeper (Figure 6) that implies that the age differences among the poor have increased. Young people are relatively less well of in the end of the 1990s compared to the middle of the 1980s. Similar to the median profiles the $90^{th}$ percentile profiles peak higher and later in age at the end of the period. The lack of stability in the age-wealth profiles suggests that there are other forces than stable life-cycle savings that determine the wealth distribution. One alternative is that there are birth cohort differences in wealth accumulation, and another possibility is that there are period effects that interact with age. Unfortunately data have only been collected at five different time points that makes it very difficult if not impossible to identify and estimate any period effects. But it is possible to estimate joint birth cohort and age effects assuming that the age effects are stable through the whole period and that the cohorts can explain the differences in age-wealth profiles we have observed. The resulting estimates are given in Table 3. Please note that the estimated age effects are annual increases within each age group, while the cohort effects are to be interpreted as deviations in level from the level of the birth-cohorts 1940-49. Although each cohort parameter is not very precisely estimated there is a clear birth cohort pattern. The older cohorts had less wealth than the younger cohort. There is an interesting difference between the wealthy and the poor. For the $90^{th}$ percentile the cohort effect continuously increases with each younger cohort. Do we see in these numbers the young affluent dot.com generation that was able to build up a fortune early in life? In the $10^{th}$ percentile, however, the birth cohorts of the 1940s had more compared to both older and younger cohorts. Those who did not belong to the affluent dot.coms were thus relatively less successful.

The corresponding age-wealth profiles are displayed in Figure 8. They show a rather different picture compared to the unadjusted age profiles presented above. There is now no hump shape in the profiles of the $10^{th}$ and $50^{th}$ percentile and only a weak hump can be detected in the profile of the $90^{th}$ percentile. With this parameterization of the model wealth increases more or less linearly with age and there are clear advantages to younger generations. These results

do not support the life-cycle hypothesis. There would seem to be very little of life-cycle saving in Sweden. [1]

Similar results have recently been reported from a Panel on Research Agenda and New Data for an Aging World (U.S. National Research Council, 2001). For the United States, The Netherlands, Italy and Japan this panel found strong trends across cohorts. Younger cohorts had considerably more household wealth than older cohorts at the same age. In the case of the Netherlands this was explained by the combined effect of less prevalent home ownership of the elderly than among the young and the rise in housing prices.

What explains the Swedish cohort differences in wealth? The cohorts of the 1940s could take advantage of the relatively prosperous 1960s and 70s, periods of relatively high growth not disturbed by periods of high unemployment. These cohort were able to get a job and to keep it, buy a house or a condominium and then surface on the price increases in the real estate market and in the stock market. Older generations had to carry on the heritage of the depression in the 1930s and the war-time economy in the 1940s. The results indicate a more divided picture for the post-war generations. Some have been lucky and inherited wealth that have grown in the stock market and real estate market, while others who did not get an equally fortunate start were hurt by periods of low income growth and high unemployment in the 1980s and 1990s. Probably there are also cohort differences in private pension savings. The growing awareness in the 1990s of the future problems with the social security system has increased savings in private pension policies. It is unknown how much of this is just a reallocation of already existing portfolios, but the young generations have probably generated new savings for this purpose.

Unfortunately it has not been possible to estimate models that also include period effects as for instance picked up by price changes in stocks and shares and in real estate, and changes in labor incomes. Even with richer data than have been available for this study the identification of all three effects is a delicate issue. Their separation will very much depend on the model specification. For this reason the interpretation suggested above is only tentative and more definite conclusions will have to await more data.

## 4. Wealth mobility

The concept of mobility is related to the relative position of a family in the wealth distribution. A move up (down) in rank will normally but not necessarily
imply an increase (decrease) in wealth. It will depend on how the whole distribution is shifted. Similarly, no change in rank does not exclude an increase (or decrease) in wealth. Usually mobility is measured relative to the quantiles of a distribution. As the quantiles change over time and differ across heterogeneous groups of wealth holders and across nations a move from one quantile to another might imply a very different move in terms of Swedish crowns or dollars depending on the context.

Quantile mobility in wealth is largely a result of initial heterogeneity, behavior and variable returns on investments. Unevenly distributed inherited tangible wealth and human capital give people different initial opportunities to accumulate further. There are also differences in the desires to postpone current for future consumption, and in the willingness to accept risks in exchange for higher returns. Simple differences in life-cycle stages is a fundamental cause of

[1] To an unknown extent the small number of observations above the age of 74 might have contributed to this result, in particular if the down turn of the age-wealth profile does not start until after this age.

variation and hence mobility. Much of the heterogeneity in initial wealth and in behavior is best seen as random phenomena. Also events at least partly beyond individual control such as sickness, accidents and lottery gains add to the randomness of mobility. Finally there is the behavior of the macro economy, financial markets and responses to public policy that will contribute to the mobility of wealth.

The literature on mobility was reviewed in Bager-Sjögren & Klevmarken (1998). In summary they noted that the position in the life-cycle was important. Except possibly for the very young, young and middle aged increase their wealth relatively rapidly. Marital status and changes in marital status contributes to mobility. Singles have a disadvantage and becoming divorced or widowed decreases the ranking. Those who have a higher education and get managerial and similar white-collar jobs tend to increase their relative wealth position. Their review also found that the portfolio composition determines mobility when asset prices change differentially.

Klevmarken et.al.(2000) compared the mobility of wealth in Sweden and the United States using a matching technique. Contrary to what one might have expected quantile mobility is higher in Sweden than in the U.S. A quantile in the U.S is, however, wider than a Swedish quantile, and after standardization for this difference (and differences in demographic composition) they found that quantile mobility was about the same in the two countries.

Table 4 details two transition matrices, one for a short transition 1996-98 and one for a longer period 1984-98. While the former is based on more than 600 observations attrition reduced the sample size of the 14 year transition matrix to less than 300. A comparison of the 1998 quintiles for the two matrices - the last third of the table - shows that the 96-98 sample has a longer left tail than the 84-98 sample. This might be due to attrition, but another explanation is that the 84-98 sample on average was older in 1998 than the 96-98 sample. Any difference between the two transition matrices might thus not only depend on the difference in span covered, but also on the difference in age. We will return to this issue below, but first note a few stylized characteristics of the two transition matrices.

The diagonal elements are all smaller in the 84-98 matrix than in the 96-98 matrix, which implies that mobility increases with the span of the period covered. This is also picked up by Shorrocks' mobility index. Most of the mobility takes place in the middle of the distribution. The probabilities to stay poor and remain rich are both relatively high. For the short transition period they are of the same magnitude, but the probability to stay poor decreases by about 40 percent when the span of the period is extended from 2 years to 14 years while the probability to remain rich only decreases by 10 percent. Judging from these results, in the long-run it thus becomes easier to get out of poverty than to loose a fortune!

Previous studies have shown that mobility depends on age. People in the middle age brackets tend to move up the distribution, while people who have retired move down the distribution, at least if the life-cycle hypothesis is true. Age-standardized transition matrices will, however, not capture these moves. They will show mobility relative to the quantiles of each age group. Because the quantile differences tend to increase with age, c.f. above, one might expect that mobility should decrease when measured in transition matrices by increasing age. Table 5 gives Shorrocks' measures for three age groups and two transition periods. They show a weak negative association with age. The number of observations in the last age group is though very small. In an attempt to compensate for this the 84-86 and 96-98 matrices were weighted

together and the Shorrocks' measure computed for the joint matrices. The result is given in the last column of the table. It only shows a mild decline with increasing age.

We have found that wealth mobility depends on the length of the transition period, in Klevmarken et.al. (2000) most of the difference in mobility between the United States and Sweden was motivated with the larger quantile differences in the U.S., and finally Table 5 above indicates that mobility might change over time. The 96-98 mobility is lower than the 84-86 mobility. Because the HUS-panels have wealth observations from 1984, 1986, 1993, 1996 and 1998 transition matrices can be estimated for all pair-wise combinations of these years. That will give 10 different transition matrices. For each matrix there is a Shorrocks measure that can be used in an attempt to capture the relative importance of the effects of the three variables on mobility. The following function was estimated,

$$\ln(s)=\ln(a)+b/x_1+c\ln(x_2)+d\ln(x_3)+e$$

where s is Shorrocks' measure, $x_1$ is the spell length, $x_2$ the average of the quintal differences $Q_4$-$Q_3$, $Q_3$-$Q_2$, $Q_2$-$Q_1$ in 1000 Swedish crowns, and $x_3$ the calendar midpoint of the spell (last two digits of the year with one decimal point). The OLS estimates can be found in Table 6. The intercept should be close to zero as the Shorrocks measure has an upper limit of 1. The point estimate is not zero but the standard error is so high that it is not significantly different from zero. The estimate of b is significantly negative that implies that s will approach its upper limit from below for increasing spell lengths. There is a negative time trend – mobility decreases – but the corresponding P-value is only 0.15. The estimate of the elasticity of the quintal differences is not significantly different from zero. There is thus no indication that higher wealth dispersion will have a negative effect on the mobility measure. It is of course difficult to get much mileage out of only ten observations from one country. It should be an interesting exercise to combine data from different countries and studies given that the wealth concepts were approximately comparable.

Just by inspection of the transition matrices it is easy to see that every quintile can be reached from every other quintile and that there are no periodic or absorbing states. This implies that these matrices are ergodic and that there exist limiting matrices and a limiting distribution that is independent of the initial distribution. It turns out that all matrices have the same limiting matrix – a matrix with all entries equal to 0.2 – and that the limiting distribution is the same as the observed destination distribution – a distribution with the frequencies 0.2 for each of the destination quintiles. The time it takes to reach the limit depends on the mobility of the matrix. The higher mobility the less time to reach the limit. The transition matrices that only have a span of two years reach their limit in 12-14 years. The observed processes are thus inegalitatian in the sense that they tend to preserve the observed (destination) distribution of wealth, but they are also egalitarian in the sense that in the limit the probability to become rich or poor is the same for everyone and independent of initial wealth. This is a statement about the properties of the observed process and not a prediction about a future distribution of wealth. A simple Markov model is not likely to capture well the trajectory of a wealth distribution. One interpretation of these results is that there is a built in tendency in the wealth process to move in the direction of equal chances, but the limit is never reached because new chocks change the direction all the time.

Until now mobility have been estimated using different quintiles in the origin and the destination. An alternative is to use quintiles estimated from the joint distribution of origin and destination. Examples are given in Table 7 for the transitions 1984-86 and 1996-98. For

the latter transition there are two alternatives, one with life insurance and annuities included and one with these assets excluded. The 1984-86 matrix is only available without these assets. Mobility becomes a little higher when they are included. These matrices differ from the previously estimated in that they capture the general increase in wealth. Probabilities to the right of the main diagonal are in general higher than are those to the left of the diagonal. The whole distribution slides up the wealth axis. These matrices are ergodic too. The limiting matrices have all rows equal, but all elements are not equal. Although there is a concentration to the two highest quintiles, it is interesting to note that in the limit the whole distribution will not be concentrated to the highest quintile, more than 10 percent will end up in the first quintile. The limiting distributions are displayed in the last panel of Table 7.

Thus, in summary, the mobility processes move in the direction to give people equal chances independently of whether they start out poor or wealthy, but there is no strong tendency to decrease the cross-sectional inequality of wealth.

## 5. The relative importance of bequests

Blinder(1988) and Davies & Shorrocks (1999) summarize well the discussion about the relative importance of bequests. The latter authors conclude that a reasonable rough estimate is that inheritance contributes some 35-45 percent to aggregate wealth.

The 1998 wave of the HUS surveys includes questions about inheritance and gifts received that can be used to estimate the relative importance of these two sources of wealth in shaping the distribution of total net worth. Each household has been asked if they inherited and/or received any gifts at a value of more than 1000 Swedish crowns[2], if yes how many times, when and how much. For each household it is thus possible to compute the capitalized value of inherited wealth and of gifts using various interest rates and assumptions about consumption out of the amounts received. In this paper the aim is only to get a rough idea of the relative importance of this kind of wealth and we will only use two different alternatives: The sum of all amounts received without capitalization and with capitalization to the real interest rate of 3 percent. On average median net worth increased by 1.9 percent annually in the period 1984-98. In the last five years of this period real net worth increased at a higher annual rate, 4.1 percent. 3 percent might serve as a good compromise.

For the households that received a gift or inherited Table 8 gives a few descriptive statistics of the distributions of inherited wealth, gifts and the sum of the two with and without capitalization. 30.5 percent of the respondent households had inherited, 17 percent received one or more gifts, 13.2 percent both inherited and got gifts, and 34.4 percent inherited or got a gift. Although one would have to look more closely at the timing of gifts and bequests and find out who the donator is before any firm conclusions can be drawn about gifts as an early substitute for bequests, the fact that almost all gifts go to households that also inherit suggests that the two should be treated as one and the same type of intergenerational transfer. The median capitalized sum of gifts and inherited wealth is a little more than 100 000 Swedish crowns and the $90^{th}$ percentile almost 800 000. Gifts are typically smaller than amounts inherited. The typical gift is 10 000 Swedish crowns. The reason is most certainly that amounts above 10 000 are due to gift tax. The median of the sum of all gifts received is about 17 000 Swedish crowns. The median of the sum of all inherited wealth is 75 000. These amounts are thus relatively small, but the distributions are heavily skewed. The corresponding means are 90 000 and 270 000 Swedish crowns respectively.

[2] Approximately 100 USD

Table 9 displays the net worth distribution with and without inheritance and gifts. The 1998 mean net worth in 1993 Swedish crowns was 928144. Net of inheritance and gifts without capitalization it was 830 740 and with capitalization 751 901 Swedish crowns. In neither case anything was subtracted for consumption purposes. The shares of inherited wealth and gifts out of total net worth with and without capitalization thus becomes 19 and 10.5 percent. These numbers are low compared to the best estimates of Davies & Shorrocks (1999), but they are in the same range as some of the previous estimates from survey data. For instance, in the U.S. Panel Study of Income dynamics (PSID), it was found that only one in five households had received any financial inheritances as of 1984. Smith(1999) estimated that inheritances would account for only 13 percent of PSID 1984 wealth values, as well as 13 percent of the increment in wealth between 1984 and 1994. It is generally believed that survey data underestimate the share of bequests out of total net worth because surveys have difficulties in capturing households with the largest fortunes most of which are believed to originate from bequests. It is impossible to know without additional information on the very rich if this is the explanation to the comparatively low figures in our case or if bequests are relatively less important in Sweden with its low wealth dispersion and high tax on bequests and gifts.[3]

If most of the very large fortunes are inherited, then one would expect that the wealth distribution net of bequests would be more equal than the distribution including these sources of wealth. It is then interesting to note from Table 9 that this is not the case. Inherited wealth and gifts make the distribution of net worth more equal! All inequality measures in this table give the same result. One also finds that bequests and gifts increase the $10^{th}$ percentile by 305 percent while they only increase the $90^{th}$ percentile by 9 percent! Again, this might be the result of an inability of the survey to capture the very large bequests, but among the 95 percent of the population who do not belong to the very rich bequests tend to make the wealth distribution more equal. The explanation is that in most cases estates are split on several heirs, that assets are transferred from wealthy to less wealthy and that although most amounts are rather small, even small amounts mean relatively much to people who are not so wealthy.

Finally we will investigate what bequests imply for mobility. To do so two transitions will be considered: 1993-98 and 1996-98. From the 1998 total net worth figures inherited wealth and gifts received in each of these periods were subtracted and the corresponding transition matrices and Shorrocks measures computed. They were then compared to the original matrices and measures. Table 10 summarizes the results. There is virtually no effect on mobility from bequests and gifts. The explanation is that in these short periods the number of households that receive a transfer is rather small and the amounts transferred are typically small too.

## 6. Conclusions

Cross-sectional age-wealth profiles are hump shaped but they are not stable and wealth has become more concentrated to the elderly. The birth-cohorts included in this study have experienced very different opportunities in accumulating wealth. Later generations have been more fortunate than older generations. Among the younger generations we also see an increasing inequality in wealth. Some have been very successful while others have not been able to accumulate at all. As a matter of interpretation almost the whole hump in the cross-sectional profiles can be attributed to differences in birth-cohorts that would imply that there

[3] Respondents were asked to give amounts inherited and received in the form of gifts with taxes deducted.

is very little life-cycle savings in Sweden. The almost constant increase with increasing age in wealth net of the cohort differences would then have other explanations.

Mobility primarily depends on the time-span of the transition period. The longer period, the higher mobility. Data also suggest that mobility was higher in the 1980s than in the 1990s. There is no strong relation between the width of the quantiles and quantile mobility, or between age and mobility.

The ergodic property of the transition matrices implies that the mobility processes move in the direction to give people equal chances independently of whether they start out poor or wealthy, but mobility does not decrease the cross-sectional inequality of wealth.

Our survey estimates of the relative importance of bequests suggest that this source of wealth contributes less than 20 percent of total net worth. Bequests do not increase the inequality of wealth, it rather decreases inequality. This might be a reason to reconsider the relatively high taxes on inherited wealth and on gifts for all but the very large bequests. Finally we found no significant effect of bequests on short-run mobility.

A more general conclusion from this study is that in future research about wealth accumulation we cannot be satisfied by just analyzing mean or median behavior. Poor and rich behave very differently and most likely we will find different explanations to changes in different parts of the wealth distribution. Mobility is poorly understood and we need both to learn more about the measures we already have and take additional steps in the direction of causal modeling. Last but not least, improved data are very high on the priority list. If we could learn more about the nature of measurement errors in wealth data and have them in better control much could be gained. For instance, this could help in assessing how much measurement errors inflate our current mobility measures. There is also much work to be done in capturing the wealth of self-employed and the very rich including the share that originates from bequests.

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**Table 1 Percentiles of networth 1984-1998**

| *Year* | *P10* | *P25* | *P50* | *P75* | *P90* |
|---|---|---|---|---|---|
| 1984 | 5684 | 167380 | 471908 | 819534 | 1281925 |
| | ( 8266) | (18871) | (30433) | (40804) | (95362) |
| 1986 | 32859 | 154065 | 470212 | 827896 | 1240956 |
| | (5815) | (15547) | (12079) | (20952) | ( 54268) |
| 1993 | 28009 | 201127 | 504048 | 946200 | 1541751 |
| | (10325) | (16227) | ( 25207) | (47791) | (67941) |
| 1996 | 50160 | 239832 | 568898 | 1039157 | 1642465 |
| | ( 9604) | (16003) | (14293) | (40657) | (65038) |
| 1998 | 49863 | 263886 | 616035 | 1122862 | 1796924 |
| | (10559) | (21964) | (16529) | (27954) | (54295) |

Note: Standard errors in parenthesis include uncertainty from random imputations.

**Table 2. Cross-sectional age-net worth piecewise linear splines by the 10th, 50th and 90th percentile in 1984, 1993 and 1998.**

| | Const. | -29 | 30-39 | 40-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75- |
|---|---|---|---|---|---|---|---|---|---|---|
| **1984** | | | | | | | | | | |
| P10 | 18823 | 23 | 4849 | 2779 | 8199 | -4880 | 1363 | -9291 | -3556 | 5267 |
| | *20880* | *3482* | *3119* | *8223* | *35128* | *36769* | *20815* | *11802* | *13949* | *39255* |
| P50 | 35414 | 14960 | 32237 | 15896 | -5635 | -18475 | 14680 | -20860 | -47980 | 15939 |
| | *323728* | *36482* | *13206* | *10483* | *31843* | *36249* | *30034* | *33196* | *43197* | *42953* |
| P90 | 391503 | 36311 | 47501 | 46734 | -32283 | -35438 | 49512 | -59309 | -63160 | -47371 |
| | *169676* | *18552* | *21054* | *43127* | *164742* | *160000* | *114978* | *93284* | *137731* | *267282* |
| **1993** | | | | | | | | | | |
| P10 | -31965 | –11675 | 21274 | 131 | 28779 | -25311 | 33716 | -26204 | -2668 | -951 |
| | *129267* | *16254* | *7881* | *6511* | *20201* | *23736* | *31483* | *31465* | *19424* | *8864* |
| P50 | 2753 | 18889 | 23147 | 21029 | 62526 | -46933 | 41696 | -56699 | -20059 | -10278 |
| | *428018* | *55497* | *27591* | *12041* | *17032* | *26578* | *38716* | *36496* | *34423* | *20082* |
| P90 | 207932 | 50251 | 55479 | 54034 | 13146 | 1530 | 23354 | -15066 | -114254 | -21944 |
| | *239436* | *29027* | *23949* | *30753* | *100249* | *118406* | *138672* | *178633* | *113578* | *52230* |
| **1998** | | | | | | | | | | |
| P10 | -181709 | 12101 | 6878 | 3117 | 21123 | 10028 | -1317 | 7921 | -21636 | -3444 |
| | *150066* | *16392* | *8325* | *5491* | *14986* | *21700* | *24124* | *26745* | *22818* | *11515* |
| P50 | 135203 | 11902 | 25444 | 11452 | 43776 | 12240 | 12844 | -19410 | -32731 | -7217 |
| | *114934* | *12942* | *8917* | *8492* | *20537* | *27638* | *29206* | *34146* | *34132* | *14142* |
| P90 | 594747 | 32106 | 54191 | 43878 | 70198 | -31132 | 4473 | 556 | -37613 | -36719 |
| | *432666* | *45519* | *21487* | *29639* | *57818* | *58736* | *88938* | *110634* | *83306* | *33526* |

Note: Standard errors in italic include the uncertainty originating from imputations. Net worth does not include private pension policies and annuities

**Table 3 Percentile networth by age and birth cohort**

| | *Est.* | *Std.* |
|---|---|---|
| **P10** | | |
| -29 | -5741.8 | 12103.7 |
| 30-39 | 3020.2 | 9040.9 |
| 40-49 | 3813.9 | 8592.1 |
| 50-54 | 12365.6 | 32557.6 |
| 55-59 | 7709.2 | 33867.4 |
| 60-64 | 594.6 | 50586.6 |
| 65-69 | 3112.8 | 44158.8 |
| 70-74 | -1696.4 | 23851.6 |
| 75- | 4851.5 | 28465.8 |
| -1919 | -123003.1 | 129691.9 |
| 1920-29 | -75319.8 | 135499.1 |
| 1930-39 | -9337.5 | 60141.5 |
| 1940-49 | 0.0 | |
| 1950-59 | -17159.2 | 61073.7 |
| 1960-69 | -74178.7 | 65015.4 |
| 1970-79 | -95661.9 | 116275.5 |
| Const. | 80575.7 | 123450.4 |
| **P50** | | |
| -29 | 20647.0 | 99131.2 |
| 30-39 | 23083.6 | 122024.6 |
| 40-49 | 16063.6 | 41182.5 |
| 50-54 | 35953.6 | 88498.6 |
| 55-59 | 20453.8 | 101833.2 |
| 60-64 | -875.1 | 115498.9 |
| 65-69 | 33199.9 | 135646.6 |
| 70-74 | -34068.6 | 128101.5 |
| 75- | 21876.5 | 49618.5 |
| -1919 | -505019.5 | 485077.3 |
| 1920-29 | -280764.2 | 361939.2 |
| 1930-39 | -30111.9 | 282559.7 |
| 1940-49 | 0.0 | |
| 1950-59 | -317.5 | 550636.0 |
| 1960-69 | -4086.7 | 554887.4 |
| 1970-79 | 86415.6 | 1064894.4 |
| Const. | 31407.6 | 619677.3 |
| **P90** | | |
| -29 | 71103.2 | 165861.4 |
| 30-39 | 44926.9 | 133902.9 |
| 40-49 | 106319.7 | 481144.5 |
| 50-54 | -32973.7 | 1014889.2 |
| 55-59 | 46343.9 | 289084.8 |
| 60-64 | 57751.0 | 464327.5 |
| 65-69 | 21021.0 | 601248.7 |
| 70-74 | -80490.9 | 361801.0 |
| 75- | 36852.5 | 125219.8 |
| -1919 | -1206605.3 | 1440486.0 |
| 1920-29 | -596185.7 | 389230.0 |
| 1930-39 | -352652.3 | 1291123.5 |
| 1940-49 | 0.0 | |
| 1950-59 | 95356.3 | 1012422.8 |
| 1960-69 | 240303.7 | 1354621.7 |
| 1970-79 | 366784.5 | 1320605.9 |
| Const. | -66934.7 | 2077017.1 |

**Table 4. Transition matrices 1996-98 and 1984-98**

1996-98

1998

Shorrocks' mobility measure = 0.600

| Quintiles | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1996 | 1 | 0.669 | 0.244 | 0.055 | 0.024 | 0.008 |
| | 2 | 0.213 | 0.449 | 0.252 | 0.047 | 0.039 |
| | 3 | 0.070 | 0.240 | 0.426 | 0.194 | 0.070 |
| | 4 | 0.040 | 0.040 | 0.230 | 0.429 | 0.262 |
| | 5 | 0.008 | 0.031 | 0.031 | 0.304 | 0.625 |

Note: This matrix is based on 637 observations

1984-98

1998

Shorrocks' mobility measure = 0.827

| Quintiles | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1984 | 1 | **0.407** | 0.389 | 0.093 | 0.056 | 0.056 |
| | 2 | 0.241 | **0.204** | 0.259 | 0.204 | 0.093 |
| | 3 | 0.204 | 0.185 | **0.222** | 0.222 | 0.167 |
| | 4 | 0.111 | 0.167 | 0.296 | **0.296** | 0.130 |
| | 5 | 0.036 | 0.055 | 0.127 | 0.218 | **0.564** |

Note: This matrix is based on 271 observations

Quintiles (SEK 1993 price level)

| | 1984 | 1996 | 1998 (84) | 1998 (96) |
|---|---|---|---|---|
| Q1 | 149442 | 155529 | 208517 | 156161 |
| Q2 | 386643 | 384235 | 502029 | 390291 |
| Q3 | 641092 | 672125 | 911586 | 713947 |
| Q4 | 974663 | 1105681 | 1459625 | 1171326 |

Note: The third colum gives the 1998 quintiles used for the 1984-98 transition matrix and the fourth column the quintiles for the 1996-98 matrix

**Table 5. Shorrocks' mobility measure by age**

| Age group | 1984-86 | 1996-98 | Combined 84-86 and 96-98 |
|---|---|---|---|
| -44 | 0.734 | 0.605 | 0.666 |
| 45-64 | 0.736 | 0.601 | 0.647 |
| 65- | 0.705 | 0.557 | 0.609 |

**Table 6. OLS estimates of the log of Shorrocks mobility measure as a function of spell length, quintal range and period.**

| Parameter | Estimate | std | t-value | estimate | std | t-value |
|---|---|---|---|---|---|---|
| ln(a) | 3.707 | 2.492 | 1.49 | 3.382 | 2.364 | 1.43 |
| B | -0.438 | 0.156 | -2.81 | -0.506 | 0.119 | -4.22 |
| C | 0.038 | 0.053 | 0.72 | | | |
| D | -0.953 | 0.584 | -1.63 | -0.800 | 0.524 | -1.52 |
| R-square | 0.777 | | | 0.757 | | |

**Table 7 Transition matrices with common origin and destination quintiles**

| | 1996-98 without life insurance and annuities | | | | | | 1996-98 with life insurance and annuities | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Quintile | 1 | 2 | 3 | 4 | 5 | | 1 | 2 | 3 | 4 | 5 |
| 1 | **0.65** | 0,25 | 0.08 | 0.01 | 0.01 | | **0.63** | 0.26 | 0.08 | 0.01 | 0.01 |
| 2 | 0.22 | **0.43** | 0.27 | 0.05 | 0.03 | | 0.20 | **0.42** | 0.30 | 0.05 | 0.03 |
| 3 | 0.06 | 0.23 | **0.40** | 0.24 | 0.07 | | 0.05 | 0.20 | **0.35** | 0.28 | 0.11 |
| 4 | 0.03 | 0.05 | 0.15 | **0.47** | 0.30 | | 0.04 | 0.04 | 0.18 | **0.41** | 0.34 |
| 5 | 0.02 | 0.02 | 0.05 | 0.22 | **0.68** | | 0.02 | 0.02 | 0.03 | 0.26 | **0.67** |
| | Shorrocks=0.592 | | | | | | Shorrocks=0.627 | | | | |

| | 1984-86 without life insurance and annuities | | | | |
|---|---|---|---|---|---|
| Quintile | 1 | 2 | 3 | 4 | 5 |
| 1 | **0.67** | 0.15 | 0.13 | 0.02 | 0.02 |
| 2 | 0.18 | **0.35** | 0.26 | 0.16 | 0.06 |
| 3 | 0.11 | 0.20 | **0.36** | 0.21 | 0.12 |
| 4 | 0.02 | 0.10 | 0.29 | **0.37** | 0.21 |
| 5 | 0.00 | 0.03 | 0.11 | 0.19 | **0.67** |
| | Shorrocks=0.645 | | | | |

| | Quintiles | | | | Limit distribution frequencies | | |
|---|---|---|---|---|---|---|---|
| | 1984-86 without | 1996-98 without | 1996-98 with | Quintiles | 1984-86 without | 1996-98 without | 1996-98 with |
| Q1 | 134482 | 155502 | 178990 | 1 | 0.174 | 0.172 | 0.134 |
| Q2 | 434648 | 387906 | 434261 | 2 | 0.154 | 0.176 | 0.142 |
| Q3 | 653844 | 693918 | 773556 | 3 | 0.229 | 0.178 | 0.165 |
| Q4 | 977428 | 1141176 | 1241533 | 4 | 0.196 | 0.211 | 0.235 |
| | | | | 5 | 0.246 | 0.262 | 0.323 |
| No of obs. | 472 | 689 | 689 | | | | |

**Table 8. The distributions of inheritance and gifts among those who received an inheritance or a gift. (1993 Swedish crowns)**

| Statistic | Inheritance | Capitalized inheritance | Gifts | Capitalized gifts | Inheritance and gifts | Capitalized inheritance and gifts |
|---|---|---|---|---|---|---|
| Mean | 269763 | 479695 | 87669 | 173338 | 282753 | 511432 |
| CV | 524 | 650 | 570 | 851 | 489 | 614 |
| P10 | 18903 | 22026 | 3784 | 3894 | 14396 | 17202 |
| P25 | 35161 | 44518 | 8506 | 9423 | 38566 | 47469 |
| P50 | 75615 | 95792 | 17436 | 19471 | 86784 | 107495 |
| P75 | 204267 | 295309 | 43918 | 52178 | 210128 | 299066 |
| P90 | 499078 | 753842 | 119570 | 144318 | 507578 | 760717 |
| No of observations | 724 | 724 | 404 | 404 | 816 | 816 |

**Table 9. The 1993 distribution of net worth compared to distributions with inheritance and gifts subtracted (1993 Swedish crowns)**

| Statistica | Net worth in 1993 Swedish crowns | Net worth less inheritance and gifts in 1993 Swedish crowns | Net worth less inheritance and gifts capitalized by 3%, 1993 Swedish crowns |
|---|---|---|---|
| Mean | 928144 | 830740 | 751901 |
| CV | 117 | 154 | 273 |
| P90-P10 | 1960886 | 1846204 | 1831623 |
| (P90-P10)/P50 | 2.81 | 2.92 | 3.01 |
| P10 | 55700 | 30497 | 13754 |
| P25 | 283703 | 242686 | 227429 |
| P50 | 698715 | 632282 | 609367 |
| P75 | 1257816 | 1172406 | 1152623 |
| P90 | 2016587 | 1876701 | 1845377 |

Note: Net worth includes life insurances and annuities

**Table 10 Shorrocks mobility measure for transition matrices with and without bequests**

| | 1993-98 | 1996-98 |
|---|---|---|
| With inherited wealth and gifts | 0.698 | 0.600 |
| Net of bequests | 0.704 | 0.608 |
| Net of capitalized bequests | 0.704 | 0.608 |

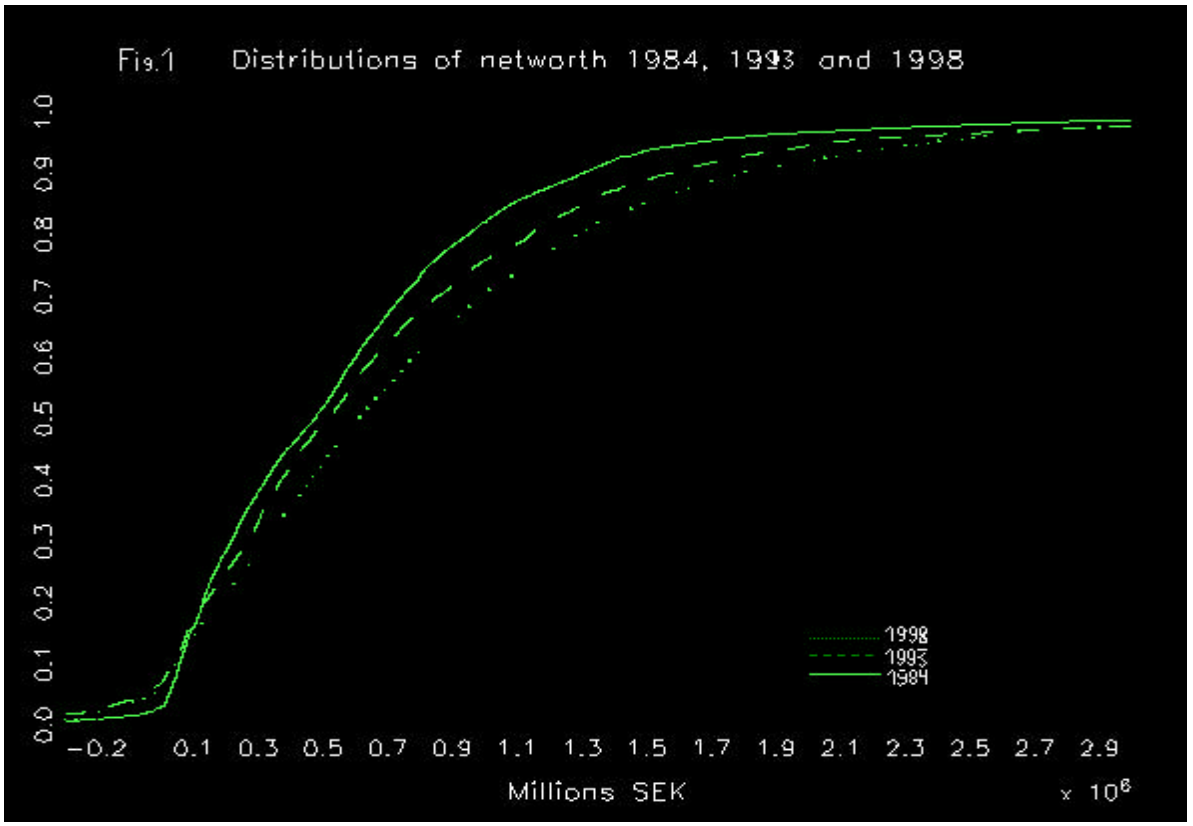
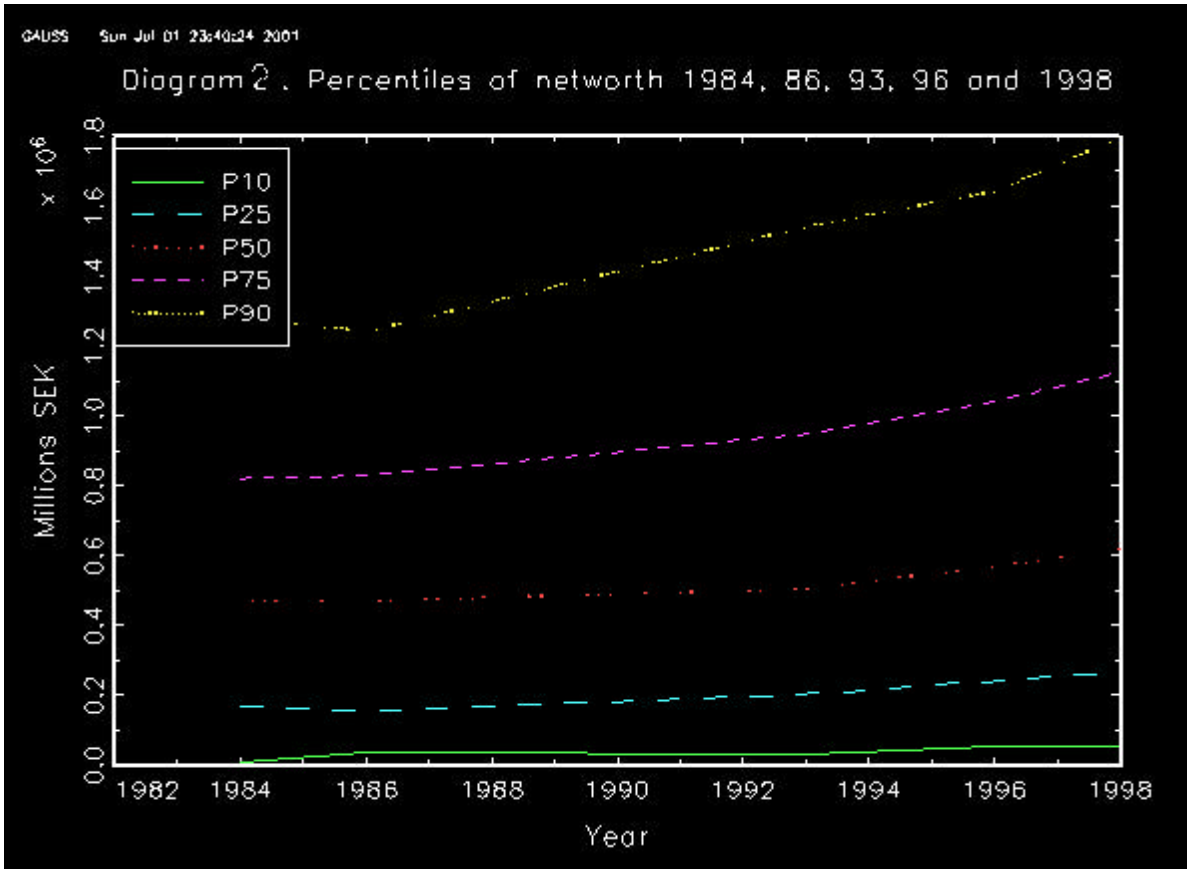
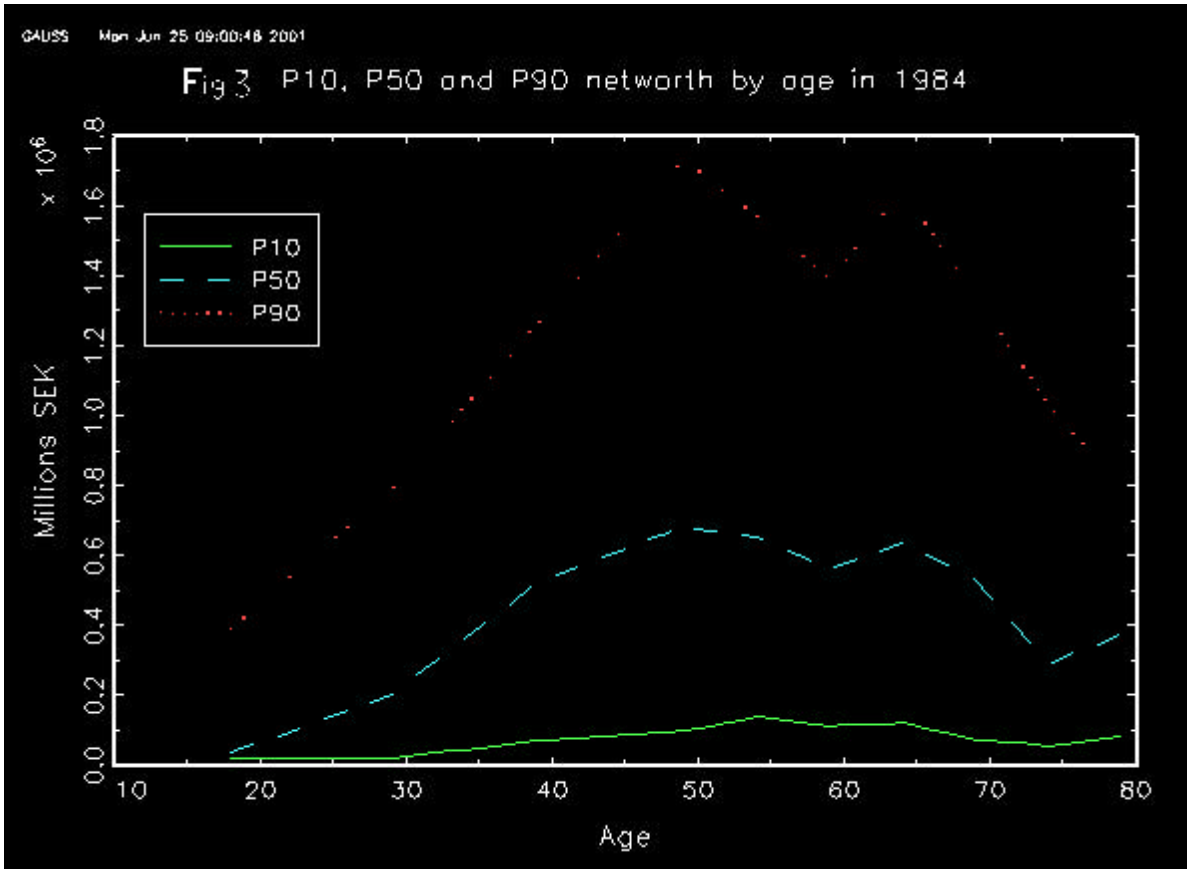
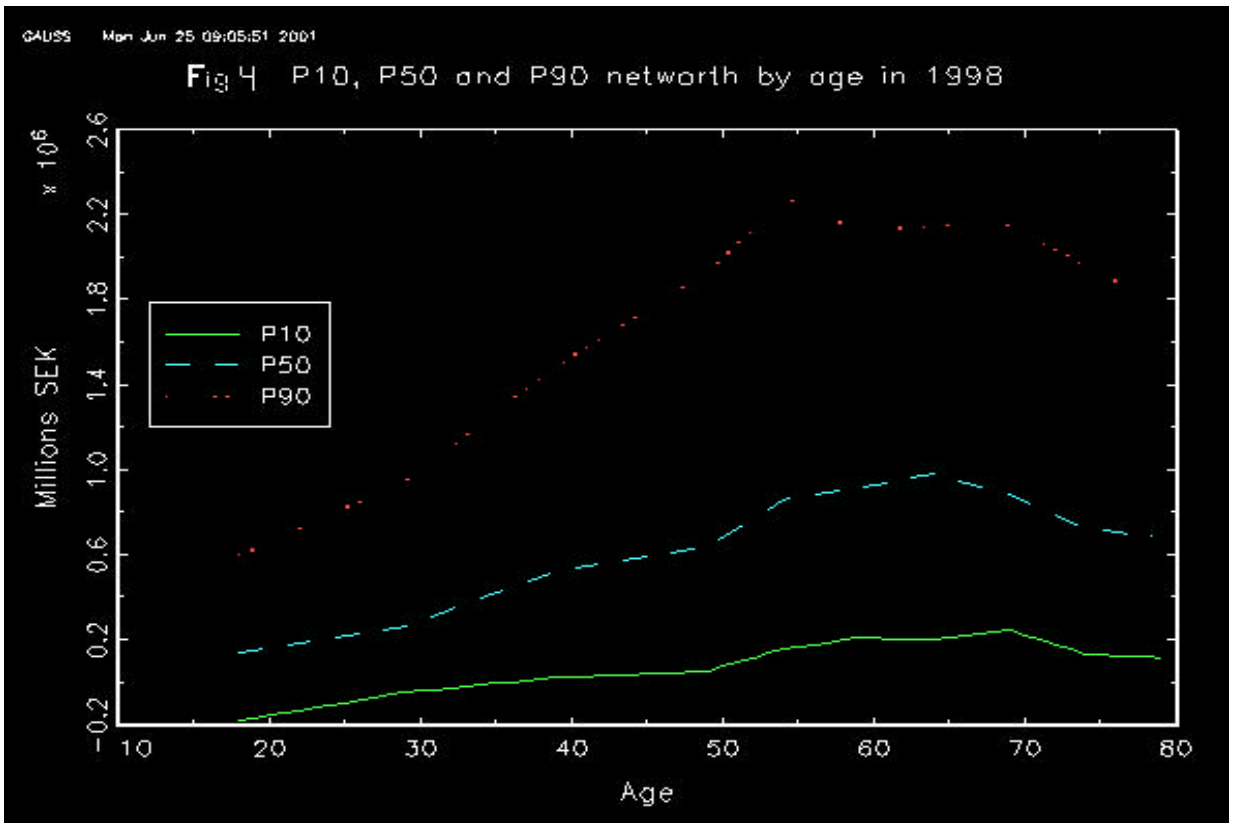
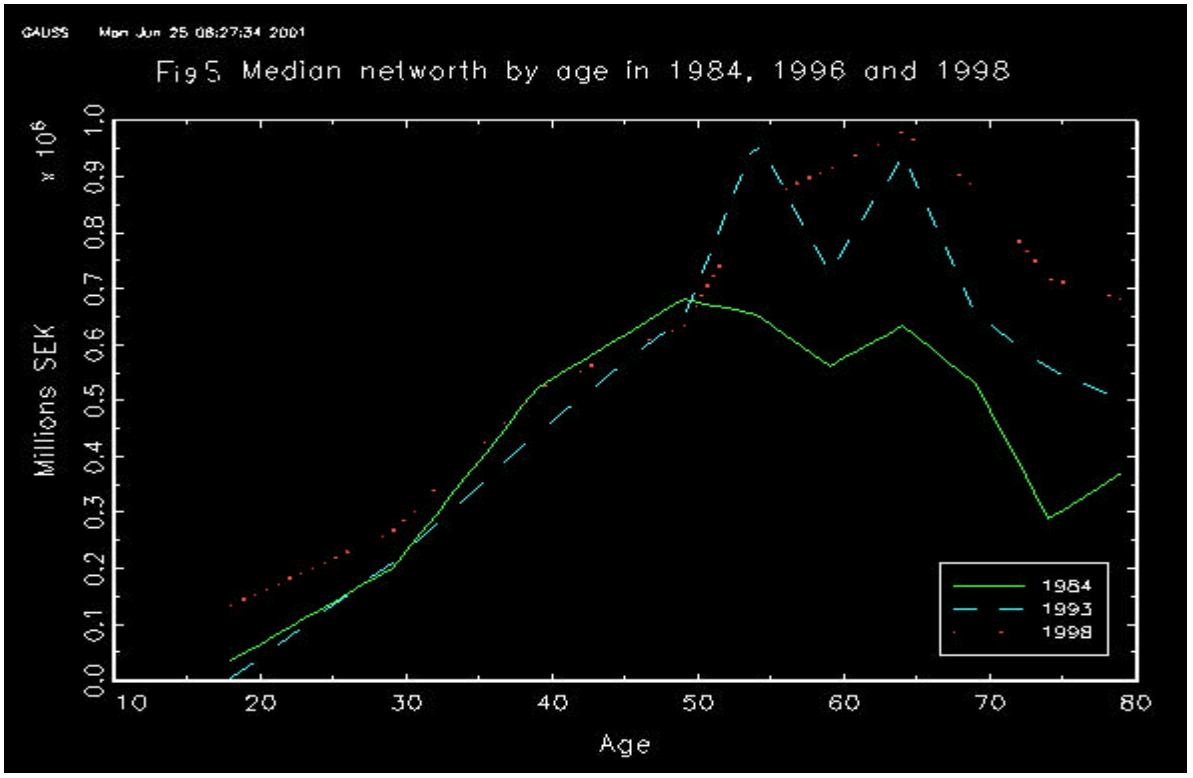


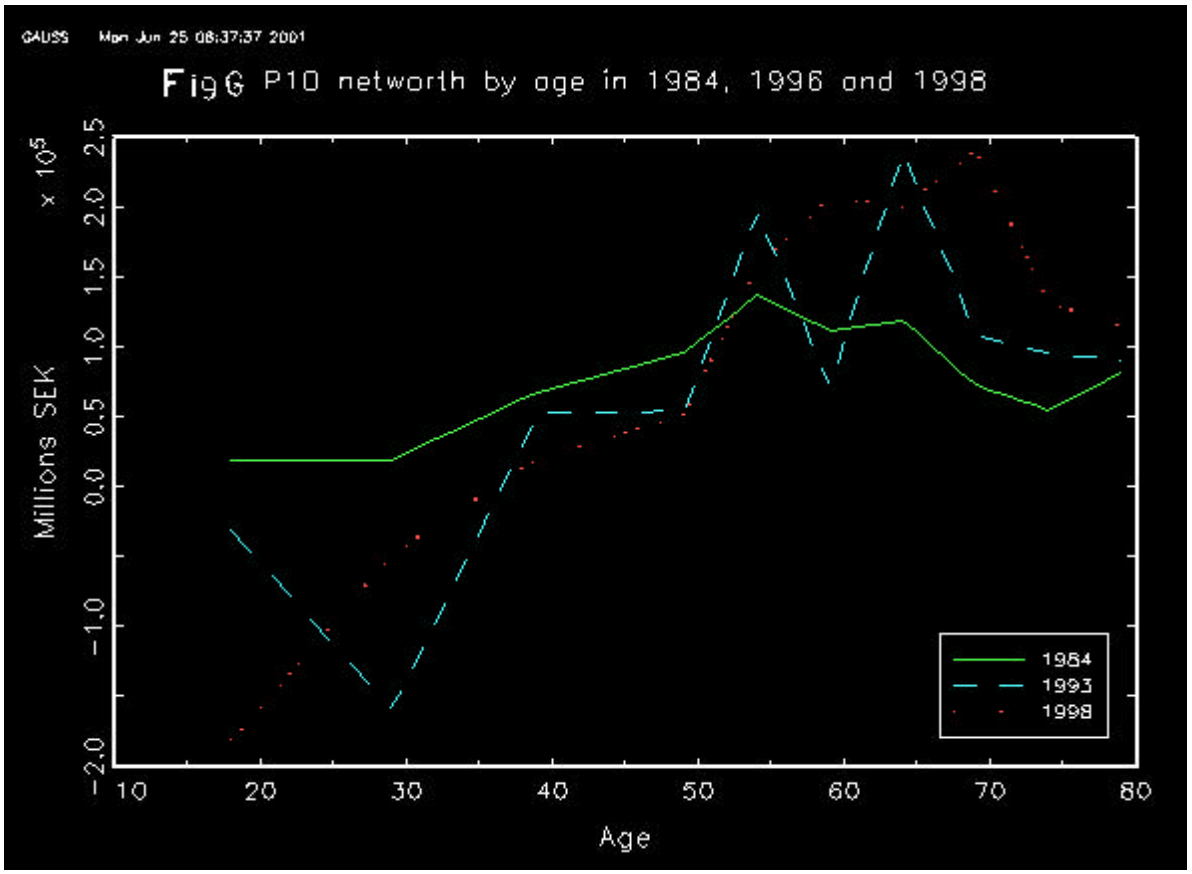
Fig.1 Distributions of networth 1984, 1993 and 1998
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
1998
1993
1984
−0.2 0.1 0.3 0.5 0.7 0.9 1.1 1.3 1.5 1.7 1.9 2.1 2.3 2.5 2.7 2.9
Millions SEK
x 10^6

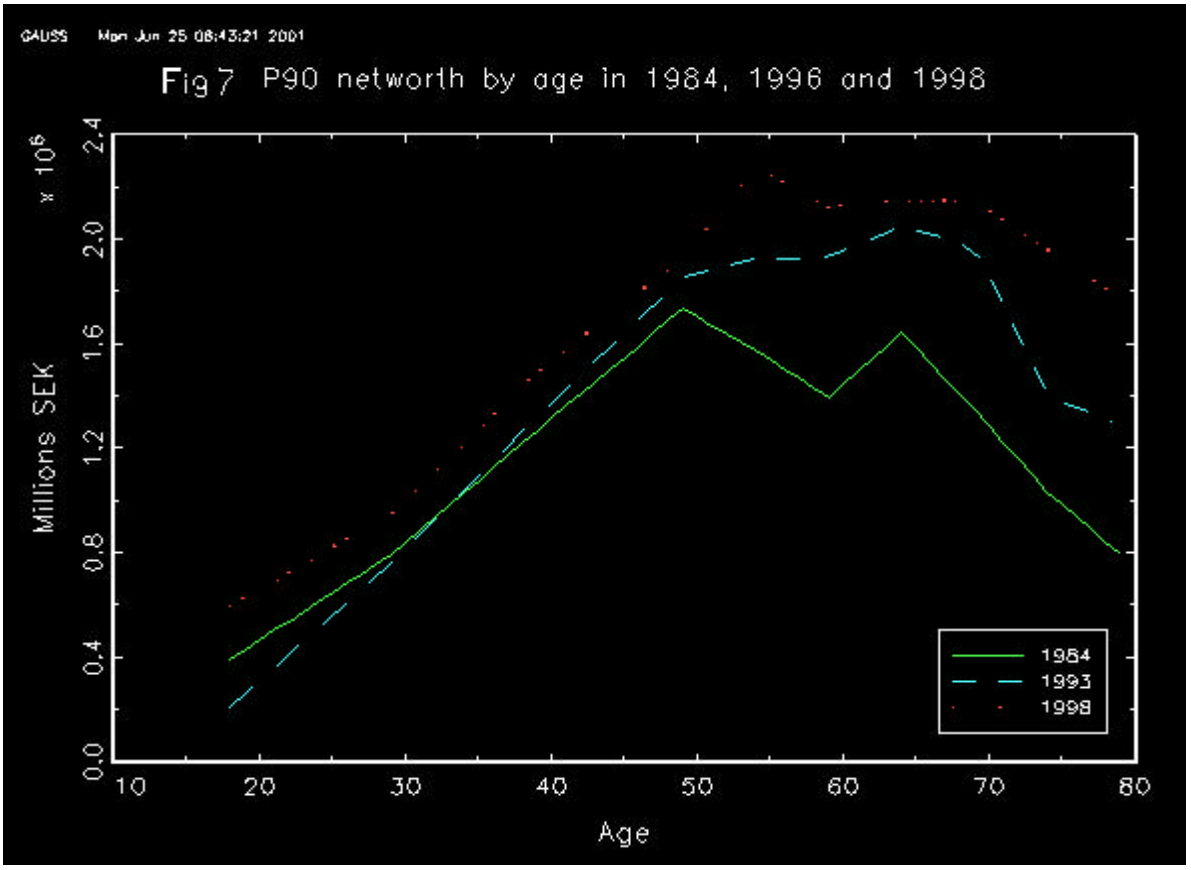

GAUSS Sun Jul 01 23:40:24 2001
Diagram 2 . Percentiles of networth 1984, 86, 93, 96 and 1998
x 10^6
Millions SEK
P10
P25
P50
P75
P90
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
1982
1984
1986
1988
1990
1992
1994
1996
1998
Year

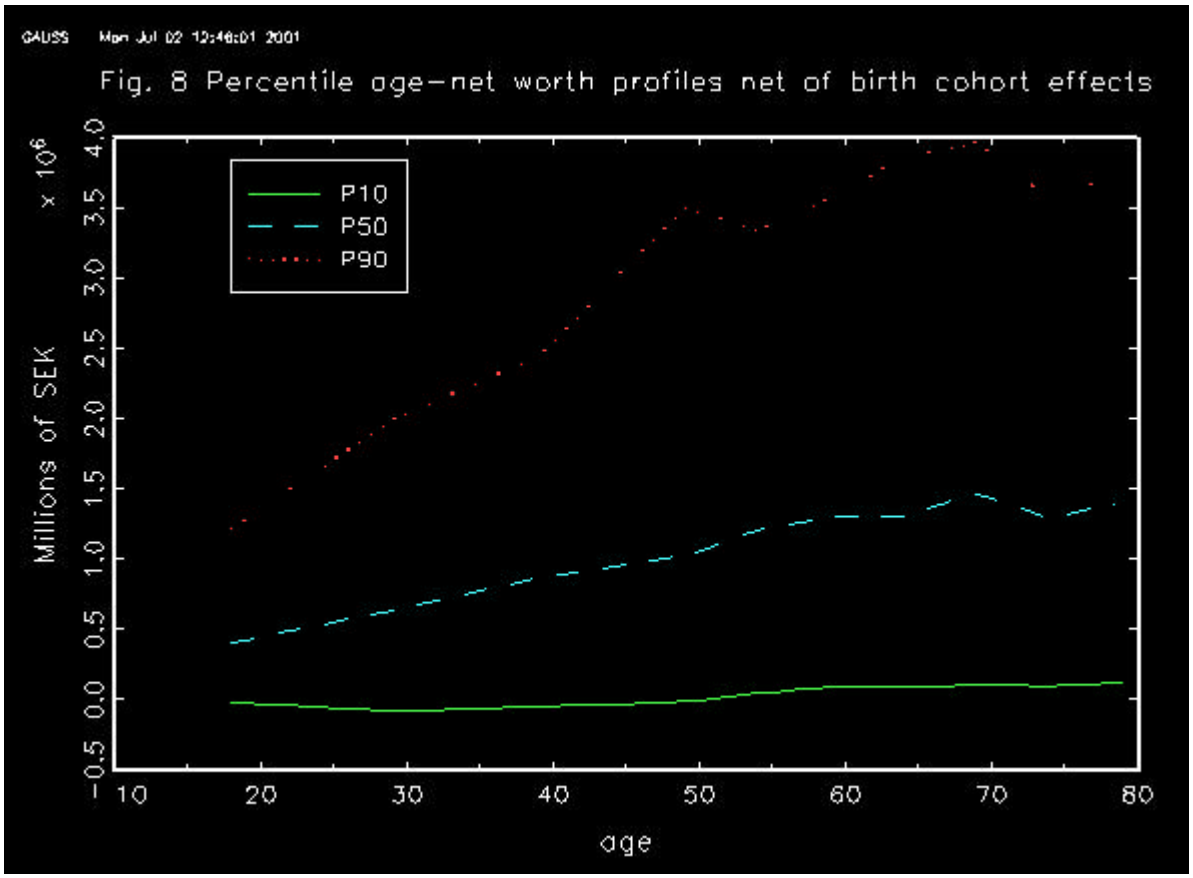

GAUSS Mon Jun 25 09:00:48 2001
Fig 3 P10, P50 and P90 networth by age in 1984
x 10^6
Millions SEK
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
P10
P50
P90
10
20
30
40
50
60
70
80
Age


GAUSS Mon Jun 25 09:05:51 2001
Fig 4 P10, P50 and P90 networth by age in 1998
x 10^6
Millions SEK
2.6
2.2
1.8
1.4
1.0
0.6
0.2
-0.2
P10
P50
P90
10
20
30
40
50
60
70
80
Age


GAUSS Mon Jun 25 08:27:34 2001
Fig 5 Median networth by age in 1984, 1996 and 1998
Millions SEK
x 10^6
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
10
20
30
40
50
60
70
80
Age
1984
1993
1998


GAUSS Mon Jun 25 08:37:37 2001
Fig6 P10 networth by age in 1984, 1996 and 1998
Millions SEK
x 10^5
2.5
2.0
1.5
1.0
0.5
0.0
-1.0
-2.0
10
20
30
40
50
60
70
80
Age
1984
1993
1998


GAUSS Mon Jun 25 08:43:21 2001
Fig 7 P90 networth by age in 1984, 1996 and 1998
Millions SEK
x 10^6
0.0
0.4
0.8
1.2
1.6
2.0
2.4
10
20
30
40
50
60
70
80
Age
1984
1993
1998


GAUSS Mon Jul 02 12:46:01 2001
Fig. 8 Percentile age-net worth profiles net of birth cohort effects
x 10^6
Millions of SEK
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
P10
P50
P90
10
20
30
40
50
60
70
80
age