Formation of Wealth, income of capital and cost of housing in SESIM*

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Version 2

October 6, 2004

1. Introduction

This paper describes the modeling of financial and real wealth in the Swedish micro simulation model SESIM[1]. Information on wealth from the LINDA[2] (Longitudinal Individual Data for Sweden) as well as complementary information on housing characteristics from HEK[3] is used to estimate relations describing the portfolio allocation as well as the cost of housing of individuals or households. Estimated relations combined with simple rules are used to forecast financial wealth and income of capital and also real wealth and cost of housing.

To model household's savings, or accumulation of wealth, serves several purposes in SESIM. First the stock of wealth has an importance in itself, for example for the retirement decision but also for taxation.[4] Secondly, wealth is used to generate capital income and without capital income the disposable income will be underestimated as well as the governmental tax revenue[5]. Thirdly, tax-deferred pension savings is considered as a separate wealth component and this can have important implications for the timing of retirement and also for the level of disposable income after retirement as well as for the calculation of deductions. Finally cost of housing is calculated and this is used in order to calculate whether a household is entitled to housing allowance and if so how much.

A careful treatment of wealth, capital income and cost of housing allows a more detailed calculation of disposable income. If these income components are not included there will be an underestimation of disposable income but also an underestimation of the variance in income, and in a micro simulation model the latter is about as important as the first.

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* This documentation has benefited from help from Tommy Blomqvist at SCB and all the members of the SESIM team at the Ministry of Finance.
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[1] See www.sesim.org

[2] Edin & Fredriksson (2000)
[3] Household Finances, SCB.
[4] There is a direct wealth tax on net wealth above a ceiling, 900 000 SEK, (in 1999) but there is also a tax on properties, 1.5% (in 1999) on the tax assessed value.
[5] There is a 30% tax rate on capital income.

Even if most economists agree of the importance that wealth has on many households decisions, the amount of empirical work is rather limited. There are many reasons for this, but one important is access to high quality wealth data. For a recent study in the Netherlands see Alessie, Hochguertelm and van Soest (2000), for studies using Swedish data see Andersson, Berg, and Klevmarken (2001), Påhlsson (2002) and also SCB 2002.

Many studies are based on survey questions and this has implication on the quality of the data. It is difficult to answer questions about wealth, the non-response rate can be quite high and also the non-response can introduce selection bias, for instance a higher rate for wealthy household. Further, survey data are typically not large enough to focus on the upper tail of the wealth distributions. We believe the ideal is administrative data and a large sample. In many respects the Swedish Linda sample merged with wealth information is close to the ideal. Linda consists only of administrative records so there are no complicated patterns of non-response and the total sample used here is about 8% of the Swedish population.

The first part of this study presents the data, both at an aggregate level as well as for the different assets. In this presentation a special interest is given to the age-profile of financial and real wealth. After all the primarily purpose of the dynamic micro simulation approach is to construct age-profiles for different variables of interest. The second part presents and explains the interaction of estimated relations and different rules/calculations. Finally, the estimated relations included in SESIM for producing forecasts are presented. A description at a more detailed level is given in several appendices; a definitions of the wealth components are given in appendix A, a description of the construction of pension savings in appendix B and estimated parameters and goodness of fit in appendix C.

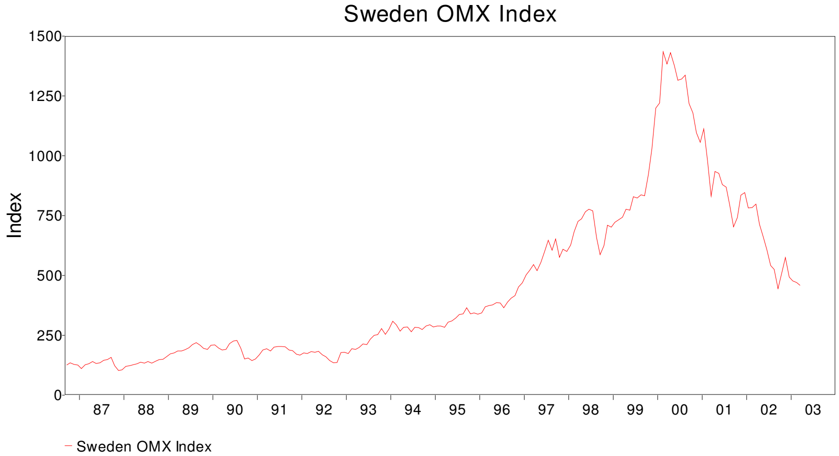
2. Financial and real wealth 1999 and 2000

Data on income taxes and benefits comes from administrative records. Information on ownership of properties and the tax assessed values comes from the National Tax Board. In order to calculate the market values of properties, regional information on the relation between market value and tax assessed values, purchase price coefficient, from SCB have been used. This might give a correct average level but not a correct value at the household level, also the variance in market values will be underestimated.

Properties abroad, financial wealth and liabilities comes from the National Tax Board control and tax registers. The market value of financial assets has been calculated using registers from Stockholm stock exchange.

How reliable are the data? One problem is that some assets like car, boats and other durables as well as some assets abroad is underreported. Another problem is related to household wealth, since there is a problem of the definition of a household in administrative data like LINDA. The definition used for tax purpose does not always match the economic relevant definitions. Individuals who are taxed jointly, married or have children together are correctly recorded as a household. However income register generally codes cohabitants with no common children as singles. Thus number of households will be overestimated and this can cause some problem in calculations of household wealth. The final, but probably the most important problem, is lack of wealth information over time. Unfortunately we only have access to wealth data for 1999 and 2000, the implication being that we are not able to identify time or cohort effects.[6] Further, both 1999 and 2000 represents a period of an unprecedented high level on Stockholm Stock Exchange, see Figure 1.

Figure 1 The Stockholm exchange market 1987-2003



Source: EcoWin

However, the importance of the dramatic decrease thereafter should not be overemphasized. The reason being the unequal distribution on shares, from table 2 it follows that 67% of the total value on Swedish quoted shares is owned by one percent of the population. Household where shares represents both a substantial value as well as a substantial part of the portfolio are quite few. On the other hand the decreased return on financial wealth have a broader and more general effect on other asset, like reduced buffer funds, pension savings, including PPM, mutual funds, etc. However, this decrease is less dramatic than the decrease on Swedish quoted shares. In a sense it is the benefit of the unequal distribution of financial wealth that explains why the effect of the collapse on the Stockholm Stock Exchange does not have had more dramatic effects on household incomes.

A special effort has been spent on the construction of accumulated tax tax-deferred pension savings. To the best of our knowledge, this is the first time in Swedish data that the value of the stock of pension savings has been calculated at the individual level. This has been achieved by accumulating yearly tax tax-deferred pension savings. In order to minimize the starting value problem we have used data from1980 and followed the individuals up to year 2000, the details are described in appendix B.

[6] Andersson, Berg, and Klevmarken, (2001) reports important cohort effects.

Table 1 gives a summary of the wealth data for 1999 and table 2 for 2000. These tables are constructed without any sample selection; further the statistics are weighted by the relevant sample weights, indicating that the sums reported refer to total wealth in Sweden. A definition of the different wealth components is given in appendix A, as well as a list of the original names in Swedish.

Table 1. Financial and real wealth in Sweden, December 1999.

	Sum Billion SEK	Mean all tkr. SEK	Share With Value %	Mean >0 tkr SEK	Share of total sum for top 10%	5%	1%
Total real Wealth	**2 233**	**252**	**42.2**	**598**	**60.1**	**42.5**	**18.6**
Total liabilities	1 075	121	50.9	239	57.4	39.9	18
Total net real wealth	**1 158**	**131**	**34.9**	**472**	**89.6**	**64.8**	**27.6**
Total financial assets	**1 915**	**216**	**71.5**	**303**	**72.6**	**57.4**	**30.9**
Bank deposits	365	41	38.2	108	75.1	57	25.8
Fixed income and other securities	312	35	27	131	91.3	76.9	42.6
Mutual fund shares	326	37	36.3	102	83.4	65.6	29.1
Swedish quoted shares	419	47	18.4	257	98.8	94	70.9
Pension savings (deductible)	278	31	30.3	104	85.3	66.5	28.4
Other real and financial assets	214	24	5.4	446	100	100	70.6
Total net wealth	**3 073**	**347**	**65.4**	**568**	**69.9**	**51.8**	**24.9**

Source Linda 1999: 771 771 individuals no sample selections. For pension savings see appendix B.

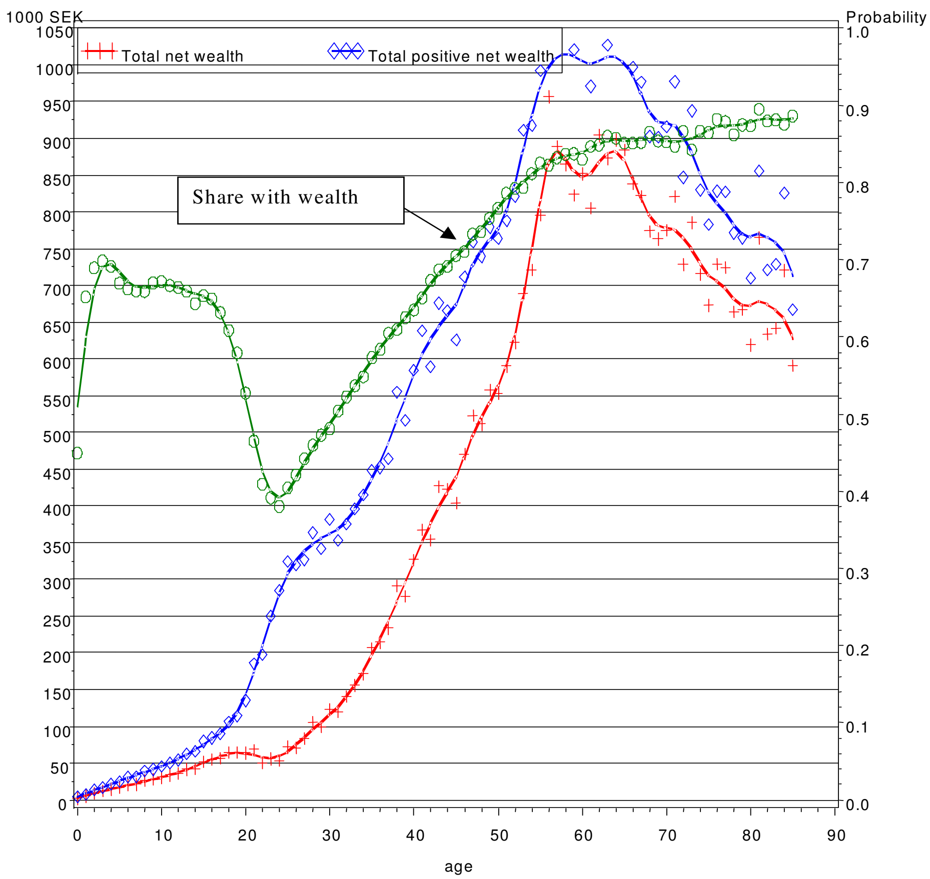
Table 2. Financial and real wealth in Sweden, December 2000.

	Sum Billion SEK	Mean all tkr. SEK	Share With Value %	Mean >0 tkr SEK	Share of total sum for top 10%	5%	1%
Total real Wealth	**2 539**	**286**	**42.2**	**677**	**59.8**	**41.9**	**17.6**
Total liabilities	1 160	131	52	251	57.6	40.3	18.4
Total net real wealth	**1 379**	**155**	**35.7**	**531**	**85.2**	**61**	**25.2**
Total financial assets	**1 922**	**217**	**75.8**	**286**	**70.6**	**55.3**	**29.2**
Bank deposits	358	40	39.5	102	75.4	57.8	27.1
Fixed income and other securities	299	34	28.9	116	89.3	73.2	36.5
Mutual fund shares	387	44	44.7	98	80.1	62.5	27.9
Swedish quoted shares	415	47	23.9	196	97.1	91.1	66.7
Pension savings (deductible)	315	36	32	111	84.4	65.7	27.6
Other real and financial assets	148	17	3.4	483	100	100	89.2
Total net wealth	**3 300**	**372**	**68.5**	**578**	**67.6**	**49.3**	**23.0**

Source Linda 2000: 785 985 individuals no sample selections. For pension savings see appendix B.

In December 1999 the total net wealth of the Swedish households was 3 073 billions SEK and in 2000 it had increased to 3 300 billions. Not very surprising, as displayed in Figure 2, wealth varies with age. Since several figures are constructed based on the same design as figure 2, it is worthwhile to describe it in more details. Every symbol in the figure represents a mean value per age. For instance at 40 years the mean value of total net wealth is 325 000 SEK and the mean value for individuals with a positive wealth is almost 600 000 SEK. Also displayed is the share of individuals with a positive wealth (the right hand axes). Approximately 64% of the individuals 40 years of age have a positive total net wealth. The smooth lines give a polynomial approximation to these mean values. The overall age profile of total wealth is similar to what can be expected from a life cycle perspective but the peak value comes rather late at (56 years) and then it stays at that level until 65 years. The highest value is at age 64 and for individuals who has a wealth the mean value is more than a million kronor. Note that the mean value of wealth drops rapidly after 65, but the volatility in the mean values also increases. This is a consequence of a smaller sample size due to higher death rates at higher ages.

Figure 2. Total net wealth and age.

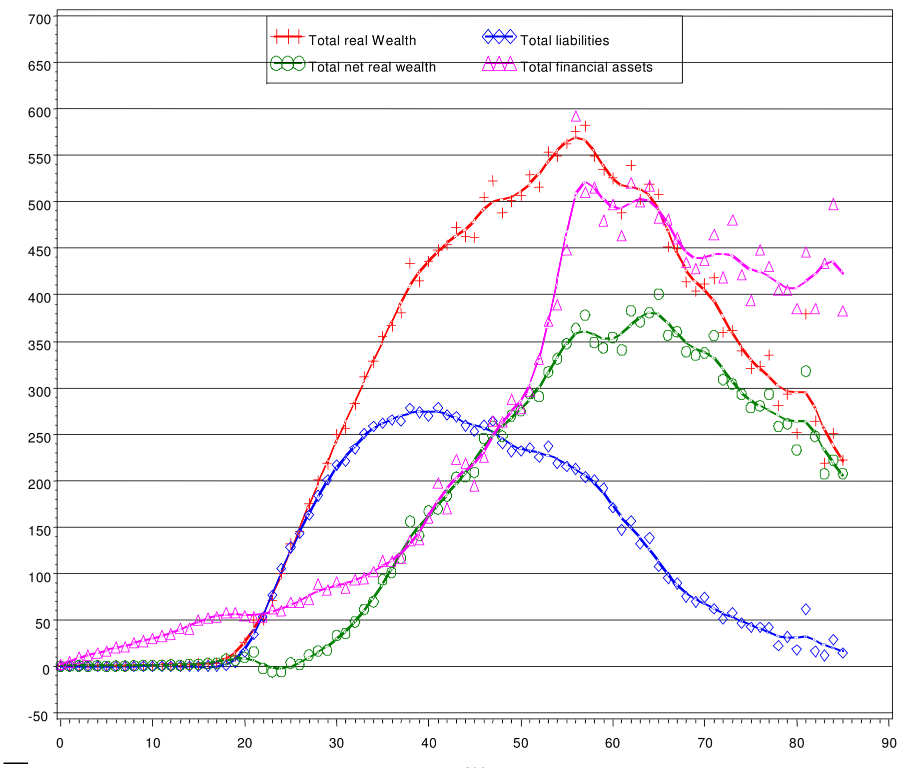


The share of children with a positive wealth, is quite high, for instance about 70% of all children age 2 have a wealth, however even if many children have a positive wealth the value is on average quite small. One reason for this pattern could be related to tax planning, a gift less than 10 000 SEK/year is allowed free of tax. However, even if the amounts are small in a long run perspective this early savings can result in substantial values at retirement ages. The lowest value is at age 24, 38% and then it increase up to almost 90% for the oldest.

A comparison of table 1 and 2 shows that the increase in total net wealth is almost entirely due to an increase in real wealth, which has increased 14%.

Next, we will present the components, the portfolio, of wealth for the individuals. First in Table 2 and figure 3 we present real and financial wealth. Real wealth is the largest asset in households portfolios 2 539 billions SEK compared to 1 922 billions for financial assets. Table 2 also gives information about debts, totally 1 160 billions. In this presentation we consider debts to represents debts on real wealth. Therefore we define net real wealth as real wealth reduced by debts. The reason for this is that this is the way we model it in SESIM, in reality a debt is not necessary a debt on real wealth, but as an approximation we believe it has a high degree of realism.[7] Figure 3 shows how these four components change with age. Real wealth and debt shows a clear life cycle pattern. Real wealth increase steadily from age 18 to 58, the peak value is 560 000 thousand SEK including zeros, and then it drop sharply. This reflects first the increasing share of house owners and the reduction in debts, and then after 58 the decline in ownership. The net real wealth shows a few negative values at younger ages and then increase steadily until the peak year 65, 400 000 SEK, and then decrease. The age profile of financial wealth is characterized by a sharper increase for individuals in early to mid fifties and thereafter slowly decreases. The reason for the relatively slow downturn in financial wealth is that the realized gains from real wealth are transformed into financial wealth.

Figure 3. Real and financial wealth



[7] In Linda 2000 about 31 % of all individuals older than 18 with no real wealth have debts above 50 000 SEK (excluding study loans), the corresponding figure for those with real wealth is 67%. The average debt for those with real wealth is about 250 000 SEK and for those without only 66 000 SEK.

Figure 4 and 5 show the distribution of financial and real wealth. A characteristic of financial wealth is the unequal distribution, the wealthiest one percent owns almost 30% of the total wealth, for real wealth the corresponding figure is about 18%.

Figure 4. Distribution of net real wealth

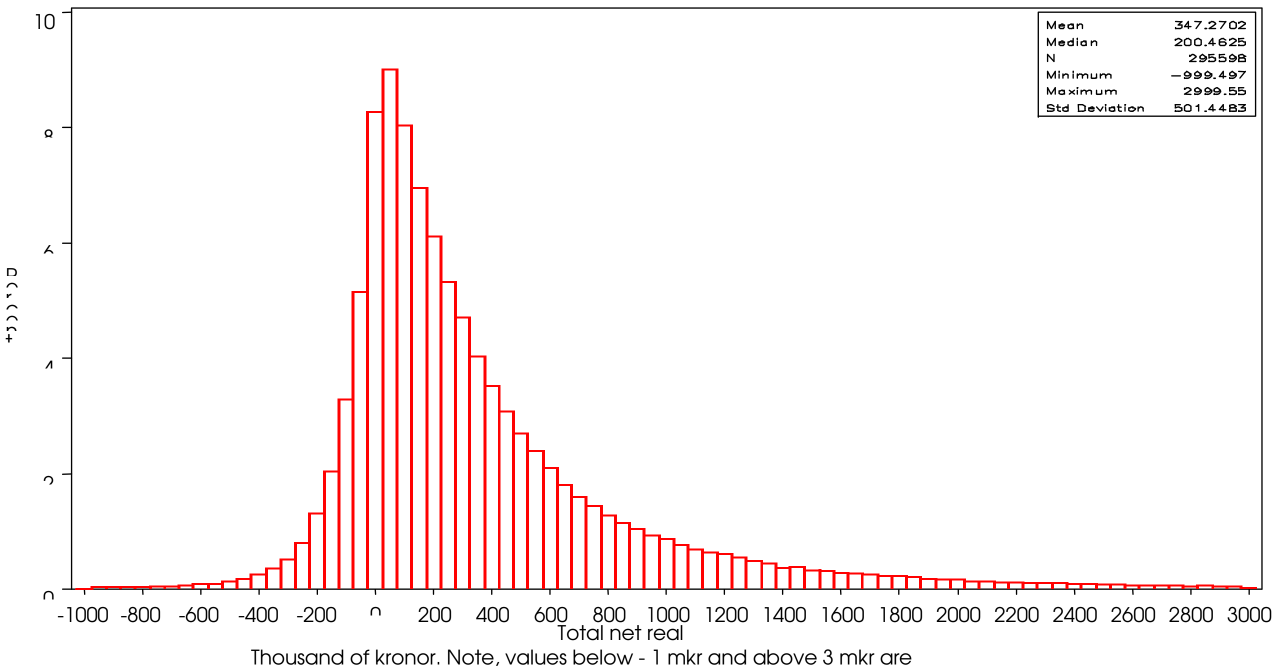
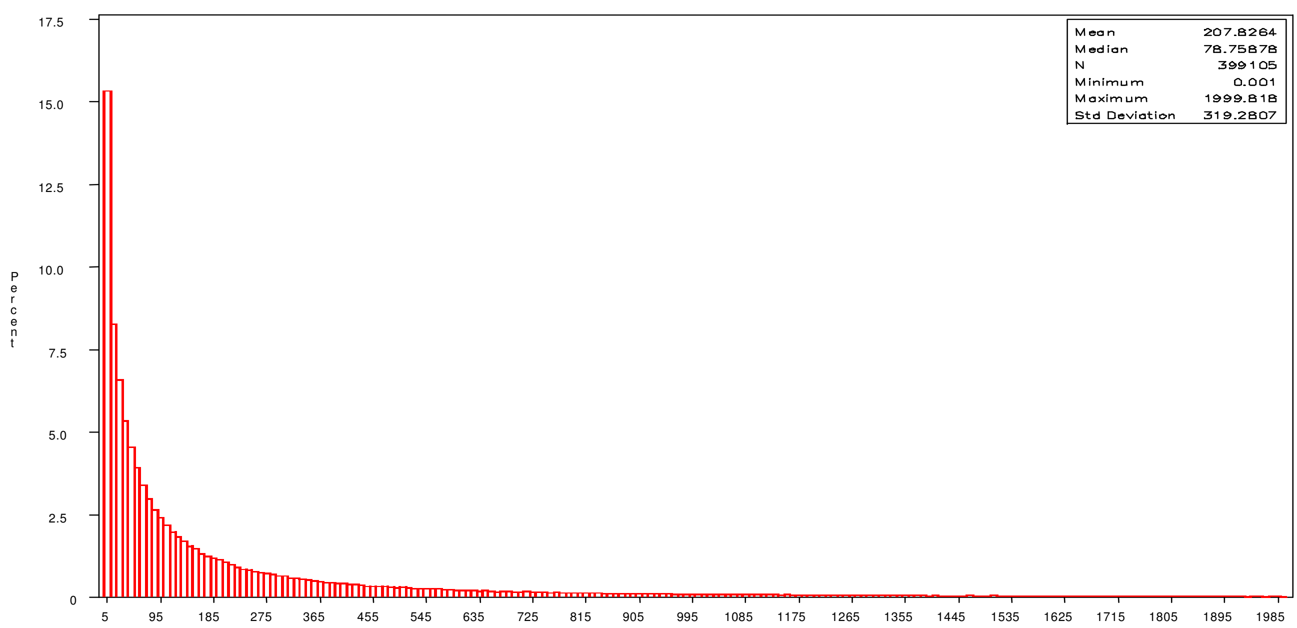
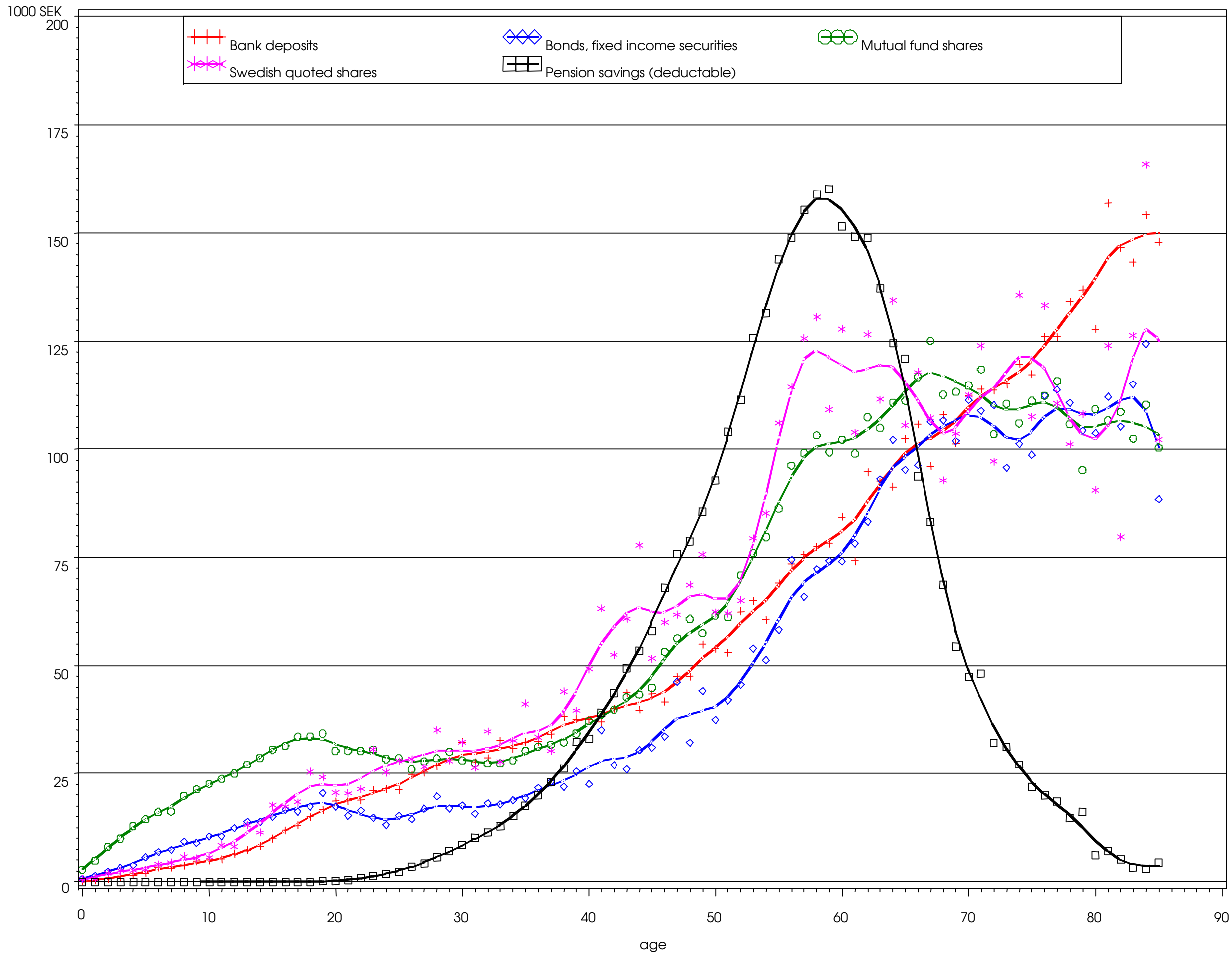


Figure 5. Distribution of financial wealth



Finally the financial portfolio is presented in Table 1 and 2 and the age profile in figure 6. In 2000 the largest component is Swedish quoted shares, 415 billion SEK. As expected the distribution of this asset is extremely skewed, the top decile owns more than 97% and the top percentage owns almost 67%.[8] Bank deposits are the second largest asset with a total value of 358 billions. Bank deposits increase steadily with age whereas shares reach a peak around age 55. Mutual funds and fixed income securities has a similar pattern as shares. Pension savings is an important asset, in total 315 billions, and the age profile shows a peak around 60 and then it drop rapidly. This pattern is given by construction since no new savings are added after retirement.

Figure 6. Financial wealth



[8] The extreme skewness of this variable produces some measurement problems. The values reported in SCB (2002) are almost 60 billions higher. We believe this result is due to a smaller sample used by SCB. This problem is further highlighted if changes are considered. SCB reports 517 billions in 1999 and 472 in year 2000, our corresponding results are 419 and 415. Thus, we report almost no change compared to a decrease of almost 9 percent by SCB.

3. Modeling real and financial wealth.

Before explaining the wealth and housing module in SESIM it might be helpful to see where, in the SESIM structure, this module fits in, Figure 7, gives a description of the sequential structure in SESIM. First there is a block describing demographics, mortality, fertility, family formation etc. and then disability, education, retirement, unemployment and sector. After this a status can be assigned to each individual and then income is calculated conditional on status. After that the wealth and housing module is entered and then all the rules for the pension, tax and benefit systems. A model for take up ratio in social assistance, models for public consumption (education, care of children and elderly, health, medicine) and finally disposable income is calculated.

The wealth and housing module includes a large number of variables modeled or calculated using simple rules. To summarize the following variables are defined:

Table 3. SESIM Wealth and housing variables.

SESIM-variable	**Description**
h_house_area	House area in square meter
h_house_cost	Total housing cost, SEK
h_house_operating	Housing operating cost (heating, water, waste disposal etc.)
h_house_history	Ownership history, 0= no ownership, 1=bought house, 2=sold house
h_house_interest	Interest payments, (x_interest * h_house_debt), SEK
h_house_marketvalue	Market value, SEK
h_house_netgain	Net after tax profit from house sale (1-x_taxhouseprofit)*h_wealth_real
h_house_owner	Ownership of house (0/1)
h_house_tax	Tax assesed value, (h_house_marketvalue / x_kb), SEK
h_house_debt	Loan on the house, SEK
h_wealth_financial	Household financial wealth, SEK
h_wealth_real	Household real wealth, (h_house_marketvalue-h_house_debt), SEK
i_wealth_financial	Individual financial wealth, SEK
i_wealth_pension_year	Individual tax-deferred pension savings, SEK
i_wealth_pension_total	Individual accumulated pension savings
SESIM-constants	**Description**
x_interest	Interest rate on house loan, in 1999 a value of 0.06 is used.
x_taxhouseprofit	Tax rate on realized profit from selling a house, in 1999 this is given as 0.2.
x_kb	Observed purchase price / assessed values in the Swedish municipalities in 1999 (purchase price coefficient)
x_fastp	Tax rate on properties, 0.015 in 1999-2000 and 0.01 thereafter.

Of course, the SESIM constants can be changed in the initial year 1999, and they can also be changed for later years.

The calculations are carried out sequentially; the order is given in Figure 8. It is instructive to start with financial wealth and pension savings and later real wealth, cost of housing and finally income of capital.

Note that all the descriptive statistics on wealth, discussed above, was presented for the whole sample, without any selections. In order to estimate models for financial and real wealth, as well as housing cost, several selections has been applied. Since we believe it is difficult to estimate models for children, the lower age limit is set to 17. Financial wealth is further bottom and top coded at 50 000 tkr and 10 mkr respectively. Many of the values given in the data are quite small and we believe that in order to explain the observed patterns we have to have a reasonable lower limit, concerning the upper limit we do not believe that any estimated model can represent the observed distribution of financial wealth. The outliers are deleted in order not to influence the estimated parameters too much. An alternative approach could have been to use more robust methods, such as LAD, in the estimation. The question of replicating outliers is of a more general interest in a micro simulation model, which claims to generate a realistic level of variance.

The flow chart in Figure 8 starts the process in year 2000 (the first simulated year) at the diamond-shaped box in the upper left-hand side. This is a check whether an individual had financial wealth in the start data (year 1999), if yes his financial wealth is updated using a simple random walk. If no the probability of financial wealth is imputed using model (1). The purpose of the first model (1) is to estimate the probability of financial wealth. This is given in Figure 8 as the second diamond box in the upper right hand side. Next, the prediction from model (1) is evaluated and a Monte Carlo experiment is applied[9]. If a positive wealth is predicted the next model (2) is applied in order to calculate how much. As a final step individual financial wealth is aggregated to household wealth.

Next pension savings are imputed, model (3) and (4). These refer to yearly tax-deferred pension savings. These savings are then added to the stock of pension savings. As with financial wealth, we assume that the stock of pension savings increase by a specific amount each year.[10] The intention is that model (3) and (4) applies for first time savers, and then a simplifying assumption is that this amount, adjusted by consumer price index, applies each year until retirement.

Next step involves formation of real wealth. For each household a net real wealth can be imputed. We assume that all loans are loans on your home, thus people do not have any other debts, and therefore financial wealth is never net of debts. Home ownership as well as the market value is known in the start data, however in the simulation new households are created and for those the probability of being a house owner have to be imputed, model (5). Next, we check whether the household owns a house. If yes the housing area is imputed, model (8), this has to be imputed for all households since this is not known in the data and this information is needed as an RHS variable in other models as well as for calculation of housing cost. If the household does not owns a house the probability that they will buy one, model (6), is calculated. If they buy a house, the housing area is

[9] Let P denote the predicted value from model (1), then this value is compared to a random draw from the uniform(0,1) distribution, say R. If R < P then the individual is given a financial wealth. This principle is applied on most predictions in SESIM.

[10] This specific value is given by the macro variable m_tavk_pp which denotes the yearly return on PPM savings. Of course the value of m_tavk_pp can easily be changed.

imputed, model (8). Next step for new house owners is to impute market value, model (9), and then to calculate debt, real wealth and household financial wealth. For old owners the probability of selling is imputed, model (7), and given a sale the net real wealth, net gain from the sale and financial wealth is calculated or adjusted. Note that only households where the oldest member is older than 40 can sell a house.

Next step for all households who owns a house is to update housing and wealth variables. We assume that all house owners who have a debt and financial wealth pay mortgage, we assume that they decrease their debts by 1/50:th each year and that the financial wealth is decreased by the same amount and real wealth is adjusted accordingly.

There are a series of variables that are updated yearly by consumer price index, these are, h_house_operating (heating, water, disposal etc), h_house_marketvalue. As a result of these yearly changes also the tax assed value (h_house_tax) and interest payments are changed. Tax assed value is defined as h_house_marketvalue divided by the purchase price coefficients (x_kb) in the Swedish municipalities 1999. Note that x_kb, never change, thus an implied assumption is that the relation between market values and assessed values does not change in the future. Intererest payments is simply defined as x_interest*h_house_debt, where x_interst is a constant, which presently is set to 0.06.

Given this information the yearly cost of housing for houseowners can be defined as, h_house_cost = h_house_interest+ h_housetax*x_fastp + h_house_operating. Where x_fastp is tax rate on properties, which is set to 0.015 1999-2000 and 0.01 thereafter. The remaining component in cost of housing is h_house_operating. This part consists of two components, heating cost and cost of other utilities. Heating cost is calculated according to region (climate zone) and house area, the definition used is: Climate zone 1, 131*h_housearea, zone 2, 114*h_housearea, zone 3 and 4, 105* h_housearea. We also use as an imputed cost of utilities per square meter, 114. Given this information operating cost is defined as, h_house_operating = 114 * h_housearea + heating cost

For renters cost of housing is calculated based on number of household members and region. For information about housing cost 1999 see (BO 39 SM 0002, table 3). Each household is assigned a size of an apartment depending on number of household members. Cost of housing is then given as an average rental cost for each region and size of apartment.

Table 4. Cost of housing for renters in 1999 based on BO 39 SM000.

Household members	Number of room	Region[1] A	Region B	Region C	Region D
1	1	34 109	35 093	31 470	29 132
2	2	47 230	47 065	42 742	40 261
3-4	3	57 931	56 698	52 770	49 908
5-6	4	70 816	70 714	65 671	61 162
7	5+	92 141	88 174	81 307	69 562

1) Region A =Stockholm and surrounding areas, B = Göteborg and surrounding areas, C = other municipalities with a population more than 75 000, D = other municipalities.

However, according to BO 39 these housing expenditures tend to underestimate actual expenditures since the assumed size of apartment is underestimated. In order to correct for this, information from HEK-99 have been utilized. The table below use the HEK-variable UBOENDE for the different regions.

Table 5. Cost of housing for renters in 1999 based on HEK.

Household members	Region A	Region B	Region C	Region D
1	45 278	46 921	41 371	39 075
2	59 828	58 710	53 195	48 711
3-4	69 076	65 693	61 123	55 577
5-6	73 816	64 849	65 455	61 354
7	73 942	60 965	84 439	82 449

Thus, the difference is substantial. However the average values for large families in Table 6 are based on very few observations, therefore, in SESIM we use the information in Table 6 for household with less than 5 members and Table 5 for larger households.

Finally, since housing area is needed even for renters (this is used in the calculations of housing allowance), we impute a value by multiplying the number of household members by 30.

Returning to figure 8, there are three more boxes to be explained. First, household financial wealth is disaggregated into individual. This is done in order to calculate income of capital. Income of capital is calculated as a share of financial wealth. Every year, each individual capitalize a share of his financial wealth, this share is exogenously given and can be set by the user.

In order to minimize computational time, some time saving structure has been imposed.

Probability of financial wealth is imputed only for individuals older than 17, if anyone younger than 18 has a positive wealth in 1999, that will be set to zero.

The household can only own one home during its lifespan. If that home is sold the household will not be allowed to buy another home but will use a rented home thereafter. The information about the history of ownership is collected in the variable h_house_history. One justification for this simple scheme, apart from computer time, is that we are interested in the realized wealth of a house sale. If the household sell one house and than buy another, the net profit is typically not realized and therefore not taxed.

Since real wealth is a household variable changes in the family composition have to be considered. The following rules applies; a divorce, the woman stays in the house, however the market value is split in two and the husband have one half. As an illustration, consider the consequences of a divorce. The wife stays in the house but the husband’s financial wealth increase by half the market value and the wife’s decreases. The wife must therefore increase the loan by the same amount; the result is that her interest payment will go up and therefore her cost of housing. Next, year when she enters model (7), the probability of selling, several attributes have changed and this might produce a high probability of selling. For instance a single have a higher probability, low income and low financial wealth also increase the likelihood of selling.

When a household is formed the following rules applies. If one of the spouses has a house then the other moves in. If they both have a house, the husband sells his and move in to his wife’s.[11]

[11] These rules are intended to minimize computing time and should not be regarded as an ambition to describe reality or to imply any preferences about how it should be.

Figure 7. Structure of the SESIM model

Initial data approximately 110 000 individuals (from 1999). 100 000 from a longitudinal database (LINDA) and 10 000 emigrants. Variables: demographic, income, pension points from 1960.

Mortality: Different age groups, SCB and Logit

Adoption: Selection of possible families and assign estimated probabilities

Migration: - Immigration (Swe), - New immigration, - Emigration

Fertility: Separate Logit for 1, 2, 3 , 4 children

Children leave home: Probabilities calculated based on HEK

Cohabitation: Logit for Females and different age groups HEK.

Dissolution of cohabitation: Logit for Females and different age groups.

Disability Pension: Logit for different age groups

Rehabilitation from Disability: Logit

Education: Sequence of models for entry and exits

Old age Pension / retirement: Benefit accrual model

Unemployment: Dynamic Logit

Sector: Sequential Logit

Status

1. Child (0-15 years old)
2. Old age pensioner (from 61)
3. Student (19-45 years old)
4. Disability pensioner (16-63)
5. Parental leave (women. 16-49)
6. Unemployed (19-64 years old)
7. Miscellaneous (19-64 years old)
8. Employed
9. Emigrant

Income generation

Conditional on status

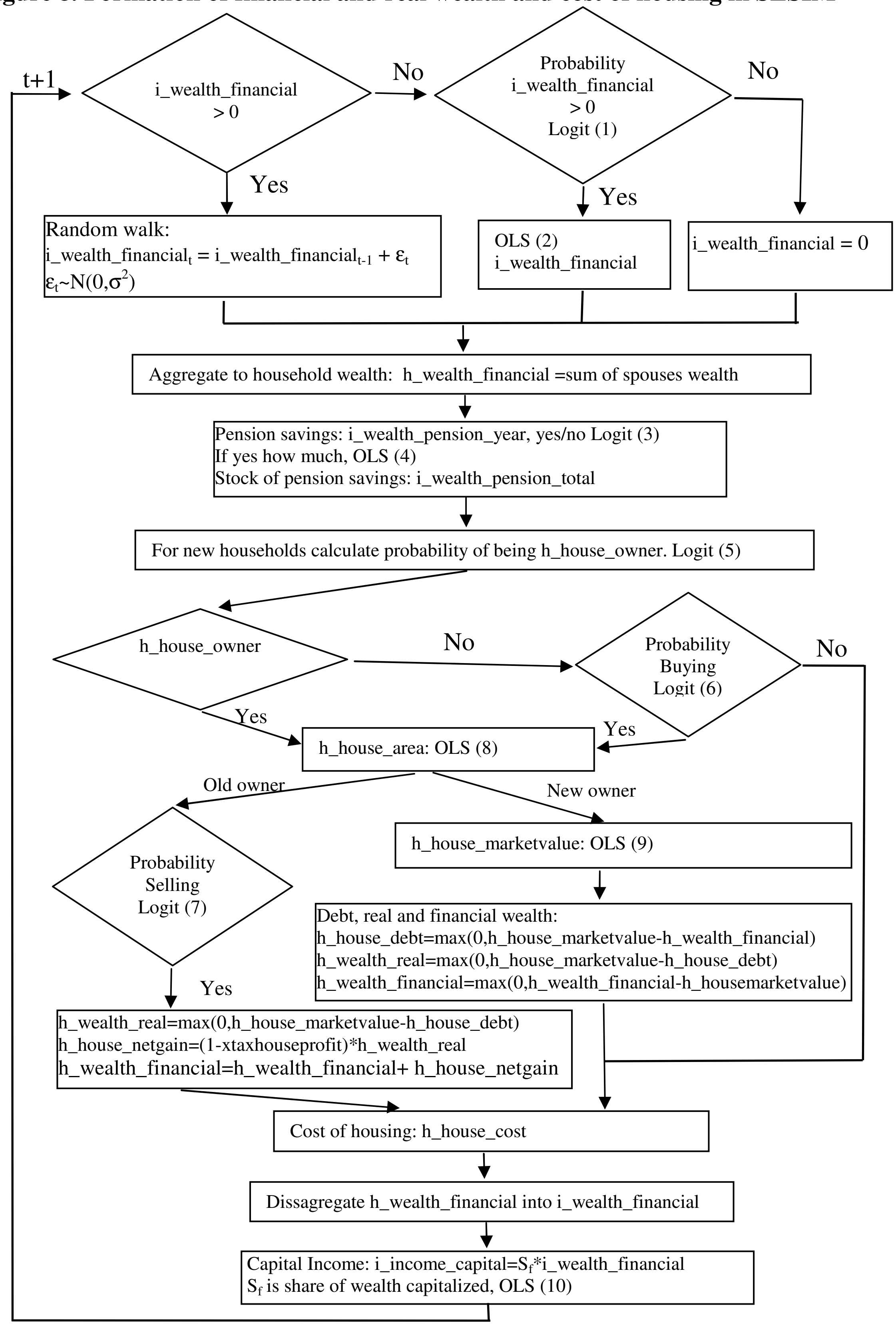
Income for employed
Random effect model

Wealth and Housing: Predicts Financial Wealth, Real Wealth, Cost of Housing, Income of Capital

Rules: Pension system, tax and benefit systems, take up ratio social assistance
Public consumption (education, care of children and elderly, health, medicine)

Household Disposable Income

Figure 8. Formation of financial and real wealth and cost of housing in SESIM



4. Estimated relations

There are also large numbers of estimated relations; they are summarized in the table below.

Table 6. SESIM estimated Wealth and housing relations.

Variable	Model	Method	Year	Population at risk **For all models :** age>17 i_wealth_financial <= 10 mkr	Dependent variable
i_wealth_financial	1	Logit	2000	Selected individual (burvkodf=1)	y=v4-v9 1 if y > 50 000 else 0
	2	OLS	2000	if y > 50 000	Log(y/1000)
i_wealth_pensionssavings	3	Logit	2000	No pension saving 1999	y= pension savings dy=1 if y > 0 else 0
	4	OLS	2000	dy=1	y= pension savings
h_house_owner	5	Logit	2000	Status <=2 [1]	y=property tax 1 if y > 0 else 0
Probability buying	6	Logit	2000	Household who did not owned in 1999 and who did not sold during 2000	1 if owned 2000 & not 1999, else 0
Probability selling	7	Logit	2000	Household who owned in 1999 and who did not buy home during 2000 and older than 40	1 if owned 1999 & not 2000
H_house_area	8	OLS	1999	HEK h_house_owner=1	y=bboyta/1000
H_house_marketvalue	9	OLS	2000	h_house_owner=1 50000 <= h_house_marketv <=10 mkr	marketv= v1 /100 y=log(marketv)

1) Note, status 1=not single, 2=single, 3=child<18, 4=child>=18

All the estimated parameters together with observed and predicted age profiles are presented in appendix C.

Financial wealth is modeled as a two part model. That is, the probability of financial wealth is estimated independent of the value. The reason for using the two part model compared to, for instance a generalized tobit estimated by maximum likelihood or two-stage methods (heckit), is that we are not interested in explaining selectivity. Here, the purpose is to obtain good predictions, it is demonstrated in Manning, Duan and Rogers (1987) that the two part model performs at least at good as the tobit type 2. Flood and Gråsjö (2001) demonstrates the sensitiveness of the generalized tobit model, errors in the specification of the selection equation produce bias in all the estimated parameters. Here we are much more concerned in robustness compared to a potential increase in efficiency.

The parameters of the estimated logit model and the OLS-model, presented in Table 1C, are generally estimated with both reasonable levels and a high precision. The estimated parameters have in general the same sign, meaning that the variables have a similar effect on the probability of wealth as well as on the level of wealth. The estimated age effects demonstrate a strong increase over age; see Figures 1C and 2C. In fact, for the probability of wealth, this age effect is even stronger than what was suggested by Figure 3. The reason is that figure 2C shows the probability of having a financial wealth above 50 000 Sek for individuals older than 17, whereas Figure 3 show the average wealth ≥ 0 for all individuals. Figure 2C suggest an almost monotonic increase in the probability of financial wealth up to about 80 years of age, and then a moderate decrease. The age profile conditional on a positive wealth is strictly increasing up to 60 years and then stay rather stable up to 80 years after which it drops. Education has a strong effect, odds ratio for lowest education is only 0.44, thus the odds of having a financial wealth are reduced by 56% for those with the lowest education holding all other variables constant. There is also a strong effect of income; higher income implies a higher probability of wealth. Note the very strong effect of nationality, being a Swedish born imply a 180% increase in the odds of having wealth, and conditional on having wealth a Swedish born has on average almost a $(e^{0.18}-1)100 \approx 20\%$ higher value.

The results for pension savings are included in Table 2C and Figures 3C and 4C. This model is estimated as a two part model based on a sample of individuals 18-64 year in 2000 who did not have any accumulated pension savings in 1999. Thus, our intention is to model new pension savers. First, the probability is estimated and then how much. Given this value we assume that this is the amount (adjusted by CPI) they will continue to save until the year of retirement. Accumulated private pension wealth is obtained by summing up over the years. The probability of being a new saver in year 2000 show an interesting age profile, a sharp increase in probability of saving from age 18 up to below 30 and then a decrease until 65, the maximum probability is more than 11%. Table 2C, provides further insights about differences in the propensity for pension savings. Attributes that has a strong positive effect on savings are being a female, high education, high income and financial wealth and being born in Sweden.

Many of these effects are also similar for amount of savings for those who save, but there are some interesting differences. The age effect shows an almost linear increase over age, from about 1 000 Sek up to more than 10 000 Sek. The gender effect now indicates a higher amount for males. Thus, a higher probability for females but given savings male saves more. Also nationality has a different sign, thus, conditional on saving non-Swedish saves more. Since non-Swedish is a very heterogeneous group this result is not surprising.

The parameters for model 5, probability of house ownership, are displayed in Table 3C and the age profile is displayed in Figure 5C. As expected there is a strong quadratic age effect with a maximum probability of about 0.65 around 60 years of age. Other strong effects are marital status, (being non-single imply more than 300% increase in the odds) and nationality (Swedish born almost 200% increase).

Probability of buying a house is given in Table 4C and Figure 6C and selling in Table 5C and Figure 7C. Our intention is that these models should impute probabilities for first time buyers and last time sellers. However, the data have been constructed in such a way that the sample available for estimation does not exactly correspond to our intentions.

The model for buyers is estimated on a sample of household who did not own a house in 1999 but did so in year 2000. Of course, this does not mean that this was their first house. In principle it could be possible to go further back in time and check whether they ever owned a house. However, due to changes in household composition this will be rather complicated. A similar criticism also applies for the probability of selling. In order to correct for this in a simple way the probability of selling have been estimated based on households in age 40 – 80.

The age profile in figure 6C looks as expected for first time buyers, a rapid increase up to age 35, the maximum probability is about 6%, then a rapid decrease down to about age 40 and then a more slowly almost linearly decrease. Apart from age, marital status, number of children, nationality, income and financial wealth has a large impact. Financial wealth, relates to wealth in 1999, one year before the purchase. For a household with financial wealth below the median the odds of buying a house are decreased 63% holding all other variables constant. Corresponding results for a household belonging to the lowest income quartile in is a decrease of 85%. Noteworthy are also the low odds ratios in the big cities, .29 (Stockholm) and .36 (Gothenburg and Malmo).

The age profile for probability of selling shows a slow decline to 62-63 years of age and then a rapid increase. The strong increase in ages above 60 indicates an important interaction between retirement and probability of selling. Also note the importance of income, low income households have a much higher probability of selling, the odds ratio in lowest quartile more than two indicating a 100% increase in the odds of selling. The result shows that high income household does not sell the house at the age of retirement. These results suggest that real wealth act as an income buffer for retirement. There is also a strong regional effect, the odds of selling in the Stockholm region is 1.79, however financial wealth does not have a major effect.

Table 6C reports the results for a model predicting the house size (area in $m^2/100$) for house owner. Again, age matters and the maximum size relates to household age 45-49. Marital status and number have a strong effect, on average single has a house $20m^2$. A strong effect of income, belonging to the first quartile implies 46 m^2 smaller than the highest income. A large negative Stockholm effect, $12m^2$ smaller compared to areas outside Stockholm, Gothenburg and Malmo. Note all the results reported here are obtained using HEK data; information about house area does not exist in Linda.

The Table 7C and Figure 8C summarizes our findings regarding market value. This model is estimated conditional on being a house owner and a house value between 50 tkr and 10 mkr. Even for market values there is a clear age effect and again an inverted-U relation, the maximum value is about 1.1 mkr for household in their mid forties to mid fifties. There are strong and significant effects of marital status, region, house area, financial wealth and nationality. The market value of a house in Stockholm region is $(e^{0.88}-1)100=141\%$ higher than a house in the reference region (undensed region). The market value for a household with a financial wealth below the median is 42% of the value for a household in the highest wealth group.

Capital income is imputed as a share of financial wealth. The share is defined exogenously and one value used recently is 6%.

Finally, a short remark on the needs of calibration. In order to obtain reasonable results some of the predictions from the estimated relations have been adjusted. The method used for this calibration is to start a simulation where no inflation or economic growth is assumed. Then predicted probabilities and amounts have been multiplied by a factor. The factor have been chosen in such a way that two conditions are fulfilled; first there is no dramatic change between the start year 1999 and the first simulated year 2000 and secondly there is no increasing or decreasing trend in the long run. These adjustments have been used for financial wealth and pension savings. The main reasons for the need of this adjustment are probably that the models are estimated on a cross-section, as mentioned above this is simply due to lack of wealth information for any other period then 1999-2000.

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Appendix A. Definitions of wealth.

The variable names refer to LINDA 2000.

Disaggregated level:

/* Real & Financial Wealth */

w2=ffstegm	/*Eget hem, marknadsvärde*/
+ffstego	/*Småhusenh, skattefri, andelsberäkn*/
+ffstejm;	/*Eget hem på lantbruk, marknadsvärde*/
w3=fborm;	/*Bostadsrätt, marknadsvärde. Bostadsrättslägenhetens värde. Ligger på person nr 1 i hushållet*/
w4=ffstfrm;	/*Fritidshus, marknadsvärde*/
w5=ffstjbm	/*Lantbruk, marknadsvärde*/
-ffstejm;	/*Eget hem på lantbruk, marknadsvärde*/
w6=ffsthym	/*Hyreshus, marknadsvärde*/
+ffsthyo;	/*Hyreshus skattefri,sum värde andel*/
w7=ffstinm	/*Industri sumvärde, marknadsvärde*/
+ffstsf	/*Skattefria, sumvärde, andelsber*/
+ffstum	/*Fastighet i utlandet, marknadsvärde*/+
+ftomtem	/*Tomter för eget hem, marknadsvärde*/
+ftomtfm;	/*Tomter för fritidsändamål, marknadsvärde*/
w1=w2+w3+w4+w5+w6+w7;	**/*Total real förmögenhet*/**
w9=fkubank;	/*Fodran på bankmedel, konto*/
w11=fkurfon	/*Räntefonder. Deklarationsvärde = marknadsvärde*/
+fkuvpr;	/*Fordran, räntebärande värdepapper. Deklarationsvärde = marknadsvärde*/
w12=fbfonmv;	/*Blandfonder, marknadsvärde*/
w13=fopmv	/*Innehavda standardiserade optioner, marknadsvärde*/
+fovrmv	/*Övriga värdepapper, marknadsvärde*/
+fkuprem;	/*Premieobligationer omsatta fr.o.m. 1996. Deklarationsvärde=marknadsvärde*/
w10=w11+w12+w13;	/*Total ränte- oblig och värdepapper*/
w14=fakfmv;	/*Aktiefonder, marknadsvärde*/
w15=faktibmv	/*Aktier enligt A-listan, marknadsvärde*/
+fotcmv	/*Aktier enligt OTC- och O-listan, marknadsvärde*/
+faalmv;	/*Aktier, andra listor. Endast marknadsvärde, ej skattepliktiga*/
w16=ffors;	/*Förmögenhetsskattepliktiga försäkringar*/
w8=w9+w10+w14+w15+w16;	**/*Total Finansiell förmögenhet*/**
w17=fovrtmv;	/*Övriga tillgångar. Variabeln innehåller bl a bil och andra yttre inventarier, utländska värdepapper, privata fordringar, onoterade aktier, premieobligationer omsatta före 1996 och bostadsrätter. Restpost skapad utifrån differensen mellan taxerade tillgångar och summerade tillgångar från kontrolluppgifter. Variabeln innehåller både reala och finansiella tillgångar */
w18=w1+w8+w17;	**/*Summa tillgångar*/**
w19=fkurta	/*Skuld från kontrolluppgifter*/
+fkuskop	/*Optionskontrakt, skuld*/
+fskurst;	/*Övrig skuld. Restpost skapad utifrån differensen mellan taxerad skuld och skuld från kontrolluppgifter. */
w20=fskurst;	
w21=fskust;	/*Studieskuld*/
w22=w18-w19+w21;	**/*Nettoförmögenhet exkl studieskuld*/**
w23=w18-w19;	/*Nettoförmögenhet*/
w24=pensionsavings;	**/*Pensionssparande*/**

Swedish	English
w1='Reala tillgångar'	**Total real wealth**
w2='Eget hem, inkl. bodel jordbruk'	Market value own home (including home on farm)
w3='Bostadsrätt'	Market value tenant ownership
w4='Fritidshus'	Market value leisure house
w5='Jordbruksfastighet'	Market value of real estate on farm
w6='Hyresfastighet'	Market value of tenant property
w7='Övriga fastigheter inkl tomtmark'	Market value of other properties incl. plot of land.
w8='Finansiella tillgångar'	**Financial assets**
w9='Bank'	Bank deposits
w10='Ränte- o andra,oblig,värdepapper'	Fixed income securities, bonds, other securities
w11='Räntebärande värdepapper'	Fixed income securities
w12='Blandfonder'	Balanced funds
w13='Övriga värdepapper, inkl premieobligatoner'	Other securities, incl. premium bonds
w14='Aktiefonder'	Mutual fund shares
w15='Börsnoterade aktier'	Swedish quoted shares
w16='Skattepliktig försäkring'	Capital insurance
w17='Övriga reala o finansiella tillg'	Other real and financial assets
w18='Summa tillgångar'	**Total real and financial assets**
w19='Sammanlagd skuld'	**Total liabilities**
w20='Övrig skuld'	Other debt
w21='Studieskuld'	Debt on study loan
w22='Nettoförmögenhet exkl studieskulder'	**Total net wealth excl. study loan**
w23='Nettoförmögenhet'	**Total net wealth**
w24='Pensionssparande'	Pension savings (tax-deferred)

Aggregate level:

```
v1=w1;                  /*Total real Wealth*/
    v2=w19;                 /*Total liabilities, excluding study loan*/
v3=w1-w19;              /*Total net real wealth*/
v4=w8+w17+w24;          /*Total financial assets*/
    v5=w9;                  /*Bank deposits*/
    v6=w10+ w16;            /*Fixed income securities, bonds, other securities and capital insurance*/
    v7=w14;                 /*Mutual fund shares*/
    v8=w15;                 /*Swedish quoted shares*/
    v9=w24;                 /*Pension savings (tax-deferred)*/
    v10=w17;                /*Other real and financial assets */
v11=v3+v4;              /*Total net wealth*/
```

Appendix B. Pension savings

Linda data does not include any information about accumulated tax-deferred pension savings. The reason being that these savings are not taxed until after retirement, the return on these savings are added to pension income and taxed as ordinary income. Therefore the only information available is the yearly deductible savings. For an analysis and descriptive statistics of these yearly savings, see Johannesson (2001) and konsumentverket (1999)

The simple idea here is to construct accumulated savings by using repeated Linda panels. Individual savings are summed up over years and the resulting stock is increased each year by applying the average return from the life insurance companies. In order to reduce the starting value problem, we start as early as 1980, in those years private tax-deferred pension savings was rather unusual.

Even if the basic idea is straightforward, there are a few problems that have to be addressed. Information about tax-deferred pension savings is collected from one variable, and the contents of this variable have changed over the years. Before 1985, only a part of the value of this variable is pension savings and the rest refers to other general deductions. We try to correct for this by applying a few simple rules: Individuals older than 60 year in 1980 have no pension savings. Finally, if pension savings is zero in 1985, then it is zero for the whole period 1980-84.

Further, adding yearly deductions would lead to an overestimation of pension savings. Older people, 55 and older, can also start consuming their savings and we must therefore make the appropriate reduction in accumulated savings. Fortunately, information about the income from pension savings is known and hence this information is used to reduce the stock values.

Thus, since an average return is applied the variability in savings is underestimated Another problem is that there is a tax on returns on pension savings. This tax is wealth*statslåneränta*0.15. We have not applied this tax rate, the reason for this is that this does only have a minor effect.

Table 1B, below summarizes the main characteristics of pension savings during the period 1980-2000. Column (2) gives the share of all individuals with pension savings; note this is the share of the whole population, regardless of age. Thus, during this period there has been an increase from about 4 to 21%. The share with a positive accumulated savings, i.e private pension wealth, is given in column (6). In year 2000, more than 30% have a positive accumulated savings, the mean value, column (7) is 110 863 SEK and the corresponding mean of yearly savings, column (3) is 6 591 SEK. Even if the share of pension savers has increased the yearly amounts have not. The yearly savings reached the highest values in 1989 and since then it has gone down. The reason for this is probably that changes in the rules after 1989 have done savings less generous, also in recent years the return on these savings are quite low.

Table 1B, also includes information about the share of individuals with income from private pension savings, column (4) and the mean values, given an income, column (5). The income from pension savings are relatively small, the reason for this is that this saving is a new phenomenon and the generated stock is to small in order to generate substantial amounts. However, still the average amount for those 4.8% who had an income in year 2000 was 32 196 SEK.

The accumulated pension savings are given in column (8). The low value in 1980 indicates that the starting value problem is quite small; pension savings were unusual before 1980. The total pension wealth has increased to 315 billion SEK.[12]

Table 1B, Pension savings 1980-2000

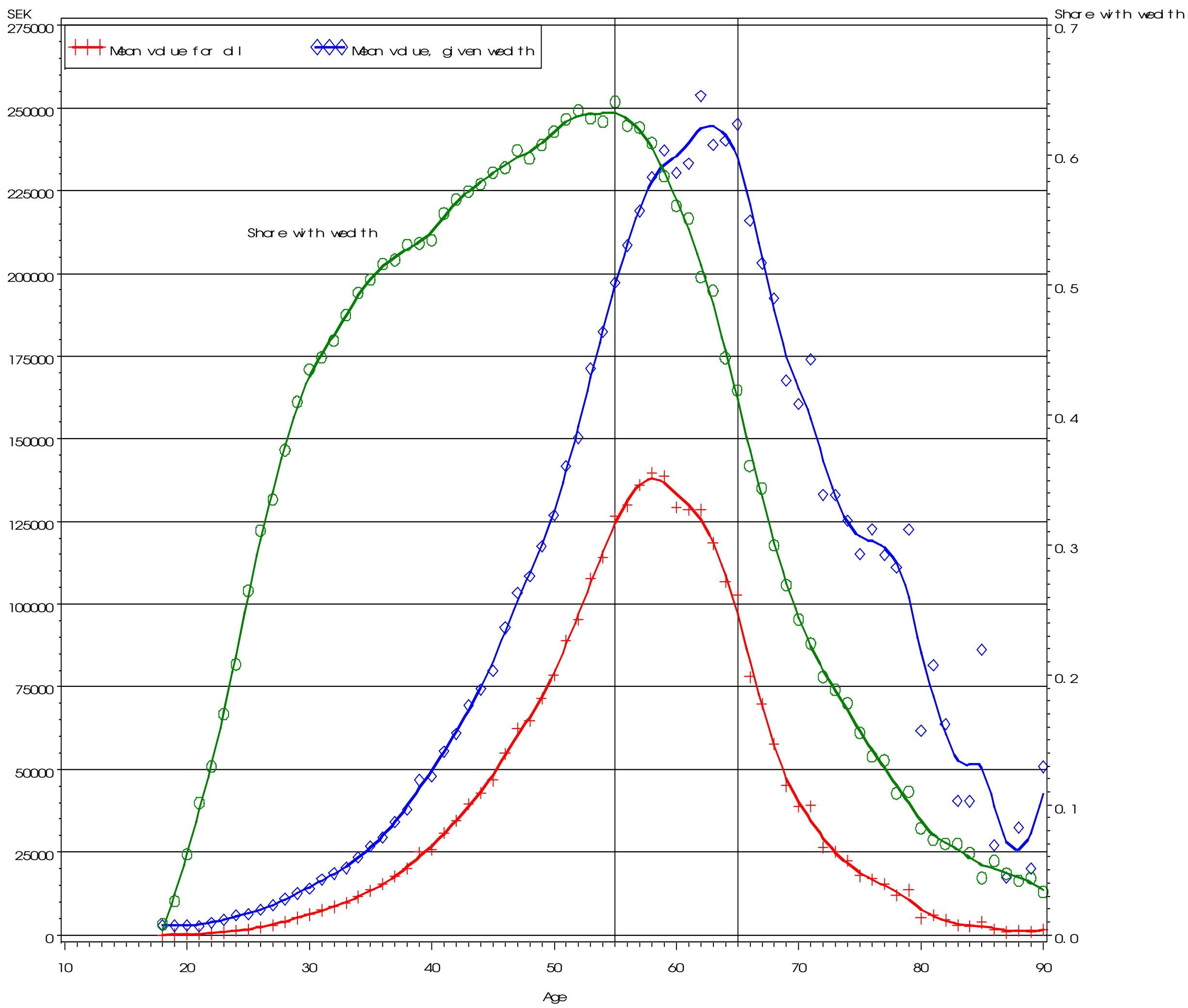
	Share with pension savings (%)	Mean value given savings (tkr)	Share with income from pension savings (%)	Mean value given income (tkr)	Share with pension wealth (%)	Mean value given pension Wealth (tkr)	Sum of pension wealth (mkr)	Assumed return on savings (%)
1980	4.60	3 529	0.00	936	4.10	3 882	1 396	10
1981	4.70	3 962	0.00	1 416	4.40	8 086	3 137	10
1982	4.90	4 748	0.00	981	4.70	13 136	5 449	10
1983	3.80	6 968	0.00	2 127	4.80	19 728	8 411	12
1984	4.40	7 846	0.00	1 469	5.00	28 427	12 550	13
1985	8.20	8 321	0.00	1 427	5.40	39 080	18 828	15
1986	8.50	9 229	0.70	11 621	6.90	43 074	26 553	14
1987	9.70	9 969	0.80	14 074	8.70	46 748	36 056	12
1988	11.90	11 170	0.70	7 676	11.00	51 523	50 285	14
1989	14.40	12 955	0.70	8 027	13.60	62 291	74 903	21
1990	14.50	8 138	0.70	8 319	15.50	69 798	95 710	16
1991	12.50	9 656	2.60	21 013	17.20	73 414	111 944	10
1992	12.80	8 339	2.90	22 175	18.50	76 117	125 012	7
1993	13.30	8 465	3.30	23 476	19.50	79 001	136 367	5
1994	15.00	8 762	3.50	23 572	21.40	80 551	152 702	7
1995	16.20	6 861	4.10	22 528	23.00	82 478	168 393	7
1996	17.30	6 764	4.10	23 608	24.60	85 822	187 482	8
1997	18.20	6 705	4.20	25 272	26.10	92 546	214 326	11
1998	19.20	6 659	4.30	27 870	27.80	100 973	248 870	13
1999	20.50	6 785	4.50	30 540	29.70	104 530	275 265	8
2000	21.90	6 591	4.80	32 598	32.00	110 863	315 101	12

Note, own calculations based on the Linda panel 1980-2000. Information on average returns, in column (9), comes from The Swedish Insurance Federation (www.forsakringsforbundet.com). Note, these returns are returns before tax and administrative costs.

[12] For year 2000 the value match the corresponding value in Table 2, for 1999 there is a small deviation. The reason being that Table 2 and 1B, is constructed for all individuals in the sample in year 2000. Table 1 is constructed based on all individuals in the sample 1999.

Of course, pension savings varies with age. Figure B1 show the age profile of accumulated pension savings for individuals older than 17.

Figure 1B, private pension wealth.



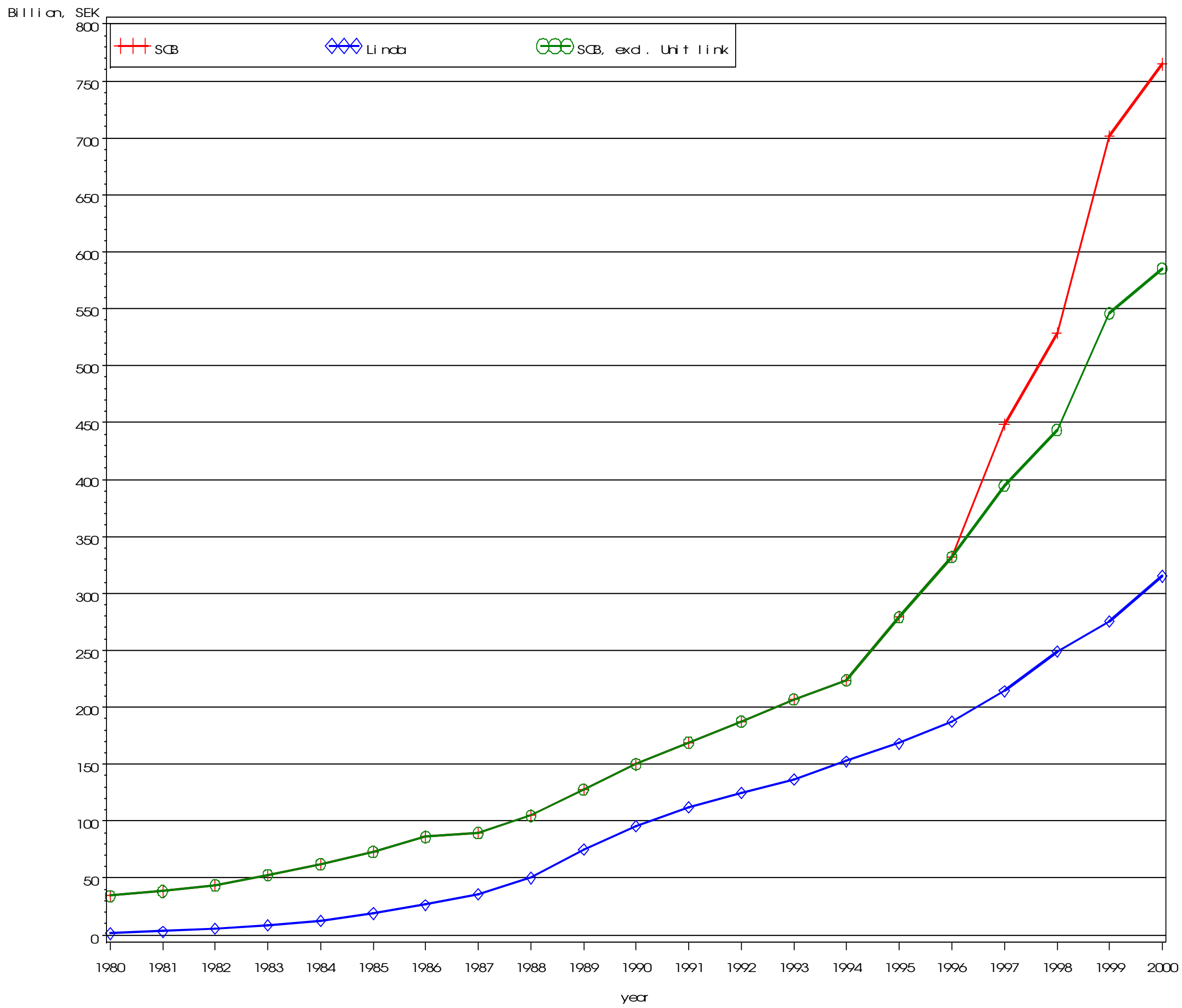
The profile for the share with a pension wealth increase sharply from age 18, and at age 35 about half of all individuals have some accumulated pension savings. The peak value at age 55, the first vertical line, is almost 65%. Note age 55 is the earliest age of payment from the insurance companies. The age profiles of people who have savings indicate that the importance of this wealth asset increase in future.

The amount of savings, given savings, reaches its peak just before 65 years of age, the second vertical line. The highest value is at age 62 and more than 250 000 SEK.

Regarding the payments stream many different options are possible, a limited time, the whole lifetime etc. In the current version of SESIM a five year period is used, but of course this can easily be changed.

How does the constructed private pension wealth match financial statistics?
Figure 2B, below compares our constructed based on individuals accumulated pension savings and statistics from SCB (2003). The lower line gives the profile of our measure. Compared with the upper line the series are relatively similar up to 1994 and then they deviate rapidly, producing a difference of about 450 billion SEK in 2000. This difference is reduced to about 300 billion SEK if unit link savings are excluded from pension savings. Thus, there is a substantial difference in the measure constructed here and the information about household insurance savings given in the official statistics.

Figure 2B, Comparison of Linda and SCB.



Given this accumulated stock on pension savings, we have information for each individual the starting year 1999. Also, known in 1999 is the savings that year. For individuals who made any deductions for pension savings in 1999, we assume that they will continue saving this amount (adjusted for CPI) every year until the age of 64. For individuals who did not have any savings in 1999, we estimate a two part model for new pension saving in 2000. Population at risk all individuals 18-64 year in 2000 who did not have pension savings in 1999. In forecasting accumulated pension savings we have to estimate the probability and the amount saved first time. Then we assume that the individual save the same amount (adjusted by KPI) each year until age 64.

This yearly savings are then added to the stock and an assumption on a yearly return is used.

Appendix C. Estimated parameters and predicted values

Table 1C. Financial wealth, logit for probability and OLS for level

	Model 1, Logit				Model 2, OLS		
	Parameter estimate	Standard error	Prob value	Odds ratios	Parameter estimate	Standard error	Prob value
Intercept	1.9798	0.00914	<.0001		6.07097	0.03315	<.0001
0=male, 1=female	0.0890	0.00180	<.0001	1.093	-0.10557	0.00671	<.0001
18-19	-1.8204	0.00723	<.0001	0.162	-0.64607	0.02939	<.0001
20-24	-2.2322	0.00613	<.0001	0.107	-0.76569	0.02292	<.0001
25-29	-2.4235	0.00608	<.0001	0.089	-0.74180	0.02196	<.0001
30-34	-2.4536	0.00606	<.0001	0.086	-0.74346	0.02159	<.0001
35-39	-2.3849	0.00603	<.0001	0.092	-0.65328	0.02127	<.0001
40-44	-2.2005	0.00600	<.0001	0.111	-0.56711	0.02090	<.0001
45-49	-1.9994	0.00595	<.0001	0.135	-0.46068	0.02043	<.0001
50-54	-1.5576	0.00580	<.0001	0.211	-0.34875	0.01937	<.0001
55-59	-1.1348	0.00577	<.0001	0.321	-0.13480	0.01892	<.0001
60-64	-0.7571	0.00591	<.0001	0.469	-0.04393	0.01907	0.0213
65-69	-0.4832	0.00600	<.0001	0.617	0.06362	0.01911	0.0009
70-74	-0.3152	0.00599	<.0001	0.730	0.10807	0.01893	<.0001
75-79	-0.00972	0.00599	0.1045	0.990	0.16243	0.01851	<.0001
80-84	0.1437	0.00647	<.0001	1.155	0.15238	0.01953	<.0001
>85 Reference	---	---	---	---	---	---	---
Low education	-0.8188	0.00278	<.0001	0.441	-0.24081	0.01038	<.0001
Medium education	-0.5750	0.00225	<.0001	0.563	-0.15076	0.00831	<.0001
University Reference	---	---	---	---	---	---	---
Tax inc <=p25	-1.6970	0.00480	<.0001	0.183	-0.51774	0.01521	<.0001
p25 < Tax inc <= p50	-1.5200	0.00463	<.0001	0.219	-0.48704	0.01413	<.0001
p50 < Tax inc <= p75	-1.2548	0.00447	<.0001	0.285	-0.42636	0.01340	<.0001
p75 < Tax inc <= p90	-0.8987	0.00454	<.0001	0.407	-0.35748	0.01353	<.0001
p90 < Tax inc <= p95	-0.5187	0.00538	<.0001	0.595	-0.25794	0.01615	<.0001
>p95 Reference	---	---	---	---	---	---	---
Stockholm	-0.0427	0.00408	<.0001	0.958	0.16664	0.01509	<.0001
Gothenburg, Malmo	-0.0893	0.00419	<.0001	0.915	0.06944	0.01552	<.0001
Larger cities	-0.0123	0.00383	0.0013	0.988	0.03324	0.01416	0.0189
Southern medium dense	0.0489	0.00405	<.0001	1.050	0.01002	0.01494	0.5026
Northern dense	0.0153	0.00506	0.0025	1.015	-0.01615	0.01865	0.3865
Non-dense Reference	---	---	---	---	---	---	---
Nationality:Swedish=1	1.0404	0.00479	<.0001	2.830	0.18084	0.02170	<.0001

Note. Financial wealth = 1 if it is above 50 000, else 0.
OLS on log financial wealth in thousand of SEK, given wealth > 50 000.

Table 2C Tax tax-deferred pension savings, logit for probability and OLS for level

	Model 3, Logit				Model 4, OLS		
	Parameter estimate	Standard error	Prob value	Odds ratio	Parameter estimate	Standard error	Prob value
Intercept	-2.465	0.033	<.0001		3.35064	0.4657	<.0001
0=male, 1=female	0.4726	0.00475	<.0001	1.604	-0.36754	0.13405	0.0061
Age	0.0345	0.0015	<.0001	1.035	0.20477	0.00584	<.0001
Age squared	-0.0837	0.00182	<.0001	0.92			
Low education	-0.4867	0.00732	<.0001	0.615	-1.3361	0.20714	<.0001
Medium education	-0.1925	0.00506	<.0001	0.825	-1.03162	0.1413	<.0001
University Reference	---	---	---	---	---	---	---
Marital Status 1=married	0.0555	0.00475	<.0001	1.057			
Tax inc <= p25	-1.6142	0.0117	<.0001	0.199	-4.95757	0.31969	<.0001
p25 < Tax inc <= p50	-0.689	0.0107	<.0001	0.502	-5.63135	0.29677	<.0001
p50 < Tax inc <= p75	-0.3699	0.01	<.0001	0.691	-6.05472	0.27749	<.0001
p75 < Tax inc <= p90	-0.2423	0.0102	<.0001	0.785	-5.32838	0.28191	<.0001
p90 < Tax inc <= p95	-0.1153	0.0122	<.0001	0.891	-4.34155	0.33838	<.0001
>p95 Reference	---	---	---	---	---	---	---
Nationality:Swedish=1	0.5569	0.0111	<.0001	1.745	-0.53785	0.31648	0.0893

Table 3C Probability of house ownership, 2000

Model 5	Parameter estimate	Standard error	Prob value	Odds ratios
Intercept	0.5193	0.0144	<.0001	
18-19	-10.8942	11.2673	0.3336	<0.001
20-24	-0.9082	0.0126	<.0001	0.403
25-29	-0.1900	0.00908	<.0001	0.827
30-34	0.2797	0.00876	<.0001	1.323
35-39	0.5638	0.00878	<.0001	1.757
40-44	0.6924	0.00880	<.0001	1.999
45-49	0.8414	0.00860	<.0001	2.320
50-54	1.0111	0.00840	<.0001	2.749
55-59	1.1058	0.00840	<.0001	3.022
60-64	1.1011	0.00863	<.0001	3.007
65-69	1.1620	0.00870	<.0001	3.196
70-74	1.0142	0.00855	<.0001	2.757
75-79	0.7035	0.00849	<.0001	2.021
80-84	0.3101	0.00891	<.0001	1.364
>85 Reference	---	---	---	---
Marital Status 1=married	1.4589	0.00290	<.0001	4.301
Number children <18	0.2084	0.00184	<.0001	1.232
Tax inc <=p25	-1.6940	0.00828	<.0001	0.184
p25 < Tax inc <= p50	-1.2119	0.00802	<.0001	0.298
p50 < Tax inc <= p75	-0.7835	0.00798	<.0001	0.457
p75 < Tax inc <= p90	-0.5041	0.00825	<.0001	0.604
p90 < Tax inc <= p95	-0.2757	0.00980	<.0001	0.759
>p95 Reference	---	---	---	---
Stockholm	-1.6748	0.00595	<.0001	0.187
Gothenburg, Malmo	-1.4744	0.00609	<.0001	0.229
Larger cities	-0.9527	0.00553	<.0001	0.386
Southern medium densed	-0.5233	0.00583	<.0001	0.593
Northern densed	-0.3426	0.00729	<.0001	0.710
Non-dense Reference	---	---	---	---
Nationality:Swedish=1	1.0657	0.00575	<.0001	2.903
Financial wealth <= p50[1)]	-1.4118	0.00685	<.0001	0.244
p50 < Financial wealth <= p75	-0.7564	0.00684	<.0001	0.469
p75 < Financial wealth <= p90	-0.3914	0.00709	<.0001	0.676
p90 < Financial wealth <= p95	-0.0950	0.00855	<.0001	0.909
>p95 Reference	---	---	---	---

Note: Logit model. 1) Financial wealth refers to wealth in 1999.

Table 4C Probability of buying house/apartment in 2000

Model 6	Parameter estimate	Standard error	Prob value	Odds ratios
Intercept	-4.0173	0.0819	<.0001	
18-19	-7.4881	21.8004	0.7312	<0.001
20-24	2.4098	0.0747	<.0001	11.132
25-29	3.0534	0.0731	<.0001	21.186
30-34	3.1624	0.0731	<.0001	23.626
35-39	3.0038	0.0733	<.0001	20.161
40-44	2.5182	0.0739	<.0001	12.406
45-49	2.3813	0.0739	<.0001	10.819
50-54	2.1863	0.0741	<.0001	8.903
55-59	2.0559	0.0744	<.0001	7.814
60-64	1.8314	0.0756	<.0001	6.243
65-69	1.8989	0.0762	<.0001	6.679
70-74	1.6924	0.0769	<.0001	5.433
75-79	1.3729	0.0774	<.0001	3.947
80-84	1.0127	0.0802	<.0001	2.753
>85 Reference	---	---	---	---
Marital Status 1=married	0.7290	0.0108	<.0001	2.073
Number children <18	0.1207	0.00546	<.0001	1.128
Tax inc <=p25	-1.8927	0.0230	<.0001	0.151
p25 < Tax inc <= p50	-1.1640	0.0213	<.0001	0.312
p50 < Tax inc <= p75	-0.8352	0.0208	<.0001	0.434
p75 < Tax inc <= p90	-0.5506	0.0213	<.0001	0.577
p90 < Tax inc <= p95	-0.3256	0.0254	<.0001	0.722
>p95 Reference	---	---	---	---
Stockholm	-1.2243	0.0197	<.0001	0.294
Gothenburg, Malmo	-1.0301	0.0202	<.0001	0.357
Larger cities	-0.6382	0.0185	<.0001	0.528
Southern medium densed	-0.3575	0.0197	<.0001	0.699
Northern densed	-0.3225	0.0247	<.0001	0.724
Non-dense Reference	---	---	---	---
Nationality:Swedish=1	0.4623	0.0173	<.0001	1.588
Financial wealth <= p50[1]	-1.0022	0.0265	<.0001	0.367
p50 < Financial wealth <= p75	-0.5422	0.0264	<.0001	0.581
p75 < Financial wealth <= p90	-0.3850	0.0275	<.0001	0.680
p90 < Financial wealth <= p95	-0.1600	0.0338	<.0001	0.852
>p95 Reference	---	---	---	---

Note: Logit model. 1) Financial wealth refers to wealth in 1999.

Table 5C Probability of selling house/apartment in 2000

Model 7	Parameter estimate	Standard error	Prob value	Odds ratios
Intercept	-2.7605	0.0515	<.0001	
40-44	-0.5406	0.0274	<.0001	0.582
45-49	-0.6982	0.0261	<.0001	0.497
50-54	-0.9871	0.0253	<.0001	0.373
55-59	-1.2211	0.0258	<.0001	0.295
60-64	-1.3189	0.0273	<.0001	0.267
65-69	-0.9167	0.0253	<.0001	0.4
70-74	-0.5077	0.0234	<.0001	0.602
75-79	-0.316	0.0229	<.0001	0.729
80-84	-0.0497	0.0235	0.0341	0.951
>85 Reference	---	---	---	---
Marital Status 1=married	-1.0397	0.0108	<.0001	0.354
Number children <18	-0.2059	0.00974	<.0001	0.814
Tax inc <=p25	0.6961	0.0304	<.0001	2.006
p25 < Tax inc <= p50	0.5717	0.0292	<.0001	1.771
p50 < Tax inc <= p75	0.3694	0.0292	<.0001	1.447
p75 < Tax inc <= p90	0.1196	0.0309	0.0001	1.127
p90 < Tax inc <= p95	0.1936	0.0363	<.0001	1.214
>p95 Reference	---	---	---	---
Stockholm	0.5821	0.0225	<.0001	1.79
Gothenburg, Malmo	0.517	0.0232	<.0001	1.677
Larger cities	0.4852	0.0203	<.0001	1.624
Southern medium densed	0.3076	0.0213	<.0001	1.36
Northern densed	0.197	0.0268	<.0001	1.218
Non-dense Reference	---	---	---	---
Nationality:Swedish=1	-0.1182	0.0304	0.0001	0.889
Financial wealth <= p50	-0.2073	0.0194	<.0001	0.813
p50 < Financial wealth <= p75	-0.2161	0.0187	<.0001	0.806
p75 < Financial wealth <= p90	-0.1086	0.0188	<.0001	0.897
p90 < Financial wealth <= p95	-0.052	0.0222	0.0188	0.949
>p95 Reference	---	---	---	---

Note: Logit model. 1) Financial wealth refers to wealth in 1999.

Table 6C Estimation of house area in 2000

Model 8	Parameter estimate	Standard error	Prob value
Intercept	1.33506	0.01933	<.0001
18-19	-0.35159	0.07937	<.0001
20-24	-0.30910	0.02650	<.0001
25-29	-0.28882	0.01827	<.0001
30-34	-0.17579	0.01524	<.0001
35-39	-0.15940	0.01531	<.0001
40-44	-0.12083	0.01527	<.0001
45-49	-0.03803	0.01377	0.0057
≥50 Reference	---	---	---
Marital Status 1=married	0.20469	0.00874	<.0001
Number children <18	0.12915	0.01223	<.0001
Children squared	-0.01167	0.00380	0.0021
Tax inc <=p25	-0.46524	0.01915	<.0001
p25 < Tax inc <= p50	-0.37560	0.01872	<.0001
p50 < Tax inc <= p75	-0.29305	0.01861	<.0001
p75 < Tax inc <= p90	-0.23555	0.01948	<.0001
p90 < Tax inc <= p95	-0.10200	0.02378	<.0001
>p95 Reference	---	---	---
Stockholm	-0.12207	0.01016	<.0001
Gothenburg, Malmo	-0.04758	0.01039	<.0001
Not big city Reference	---	---	---

Note. Estimated using HEK data

Table 7C Estimation of house market value in 2000

Model 9	Parameter estimate	Standard error	Prob value
Intercept	0.21501	0.04760	<.0001
Age	0.02748	0.00162	<.0001
Age squared	-0.02881	0.00131	<.0001
Marital Status 1=married	0.22295	0.01371	<.0001
Number children <18	-0.000493	0.00549	0.9284
Tax inc <=p25	0.16705	0.02972	<.0001
p25 < Tax inc <= p50	0.00117	0.02434	0.9618
p50 < Tax inc <= p75	-0.03867	0.01929	0.0450
p75 < Tax inc <= p90	-0.01329	0.01607	0.4080
p90 < Tax inc <= p95	-0.03896	0.01074	0.0003
>p95 Reference	---	---	---
Stockholm	0.88275	0.01085	<.0001
Gothenburg, Malmo	0.73231	0.00862	<.0001
Larger cities	0.40752	0.00707	<.0001
Southern medium densed	0.30120	0.00742	<.0001
Northern densed	0.15413	0.00929	<.0001
Non-dense Reference	---	---	---
House area square meter	0.81052	0.06021	<.0001
Financial wealth <= p50	-0.58996	0.00739	<.0001
p50 < Financial wealth <= p75	-0.41537	0.00719	<.0001
p75 < Financial wealth <= p90	-0.27278	0.00729	<.0001
p90 < Financial wealth <= p95	-0.15499	0.00879	<.0001
>p95 Reference	---	---	---

Figure 1C. Logit estimation financial wealth, model 1.

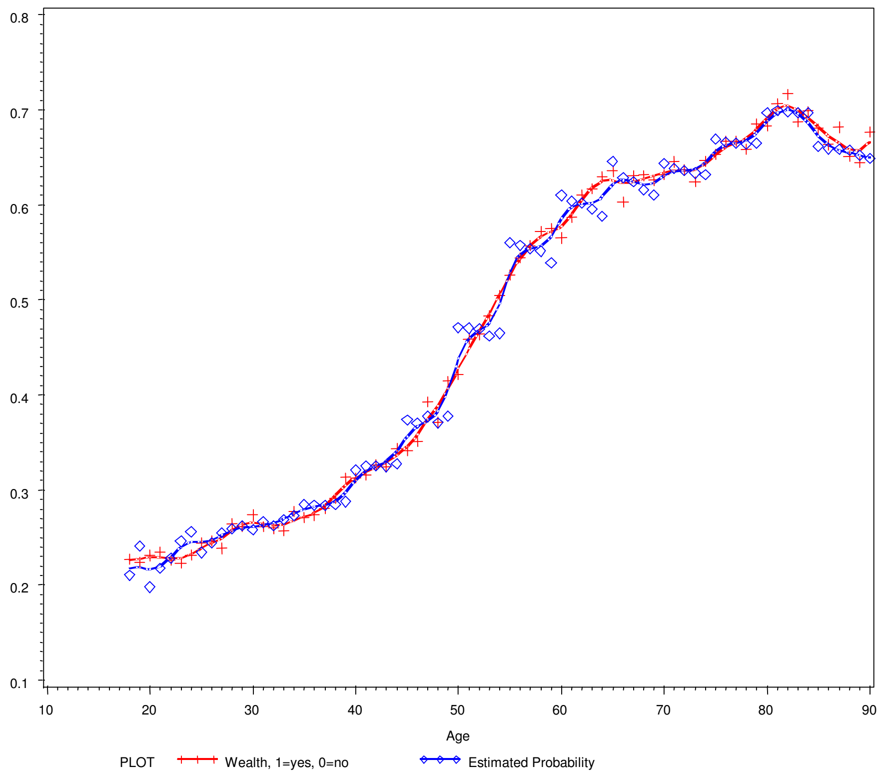


Figure 2C. OLS estimation of financial wealth, model 2.

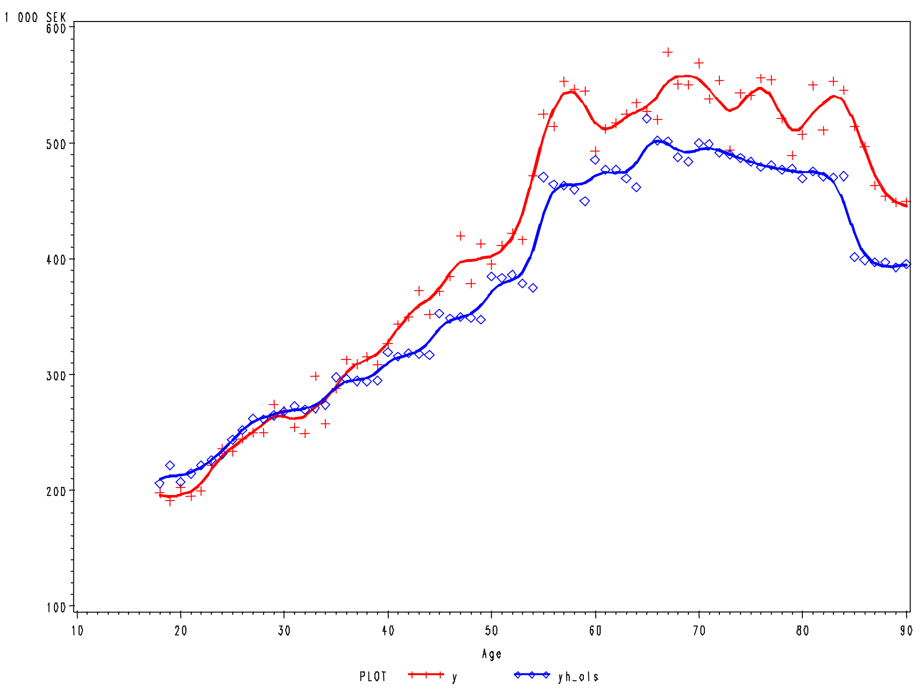


Figure 3C. Probability of pension savings 2000, given no savings 1999, model 3.

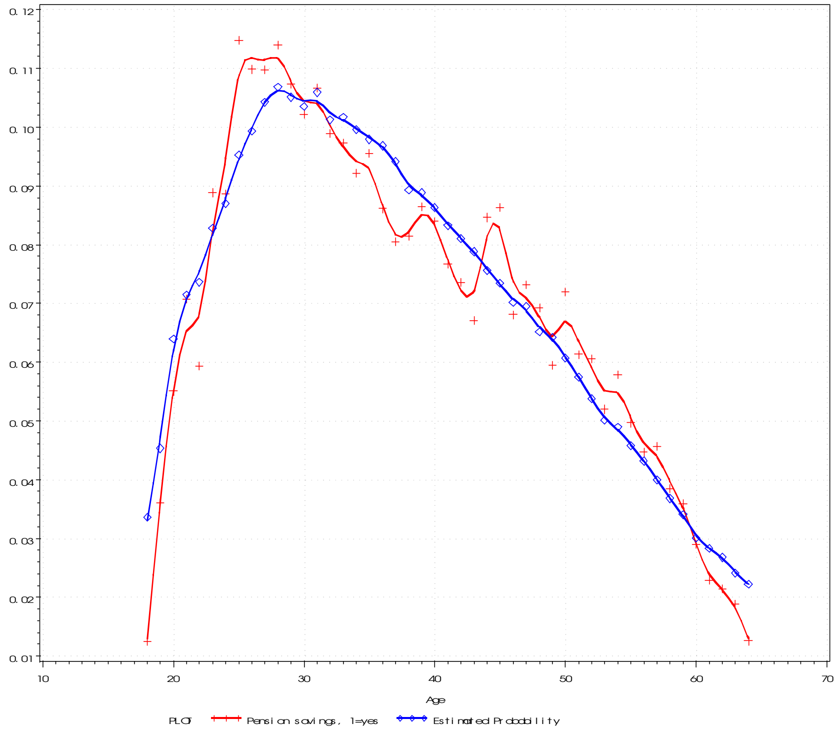


Figure 4C. Amount of pension savings 2000, given savings, model 4.

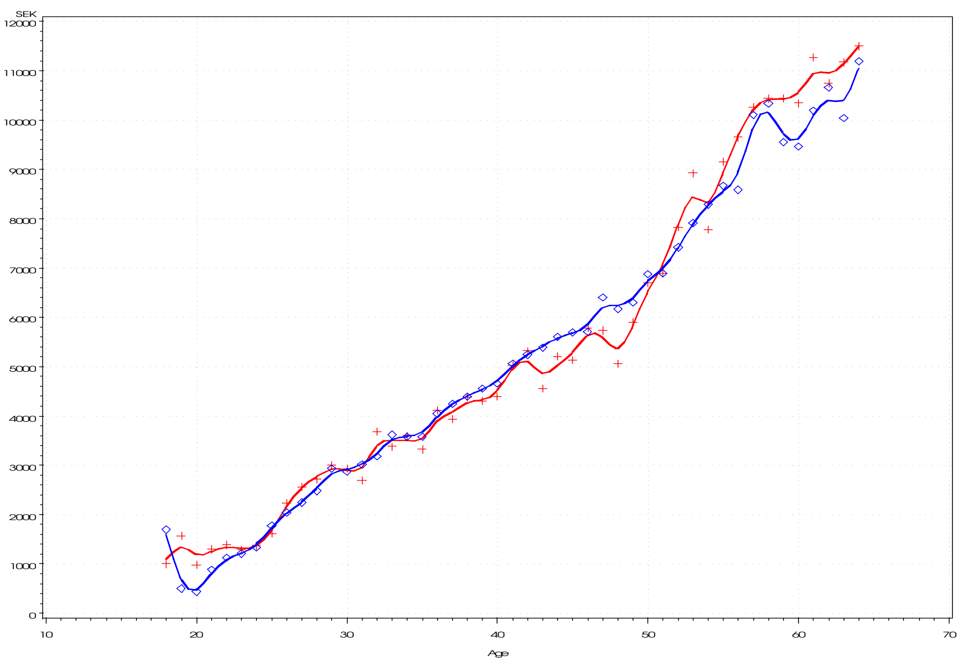


Figure 5C. Logit estimation, probability of house owner, model 5.

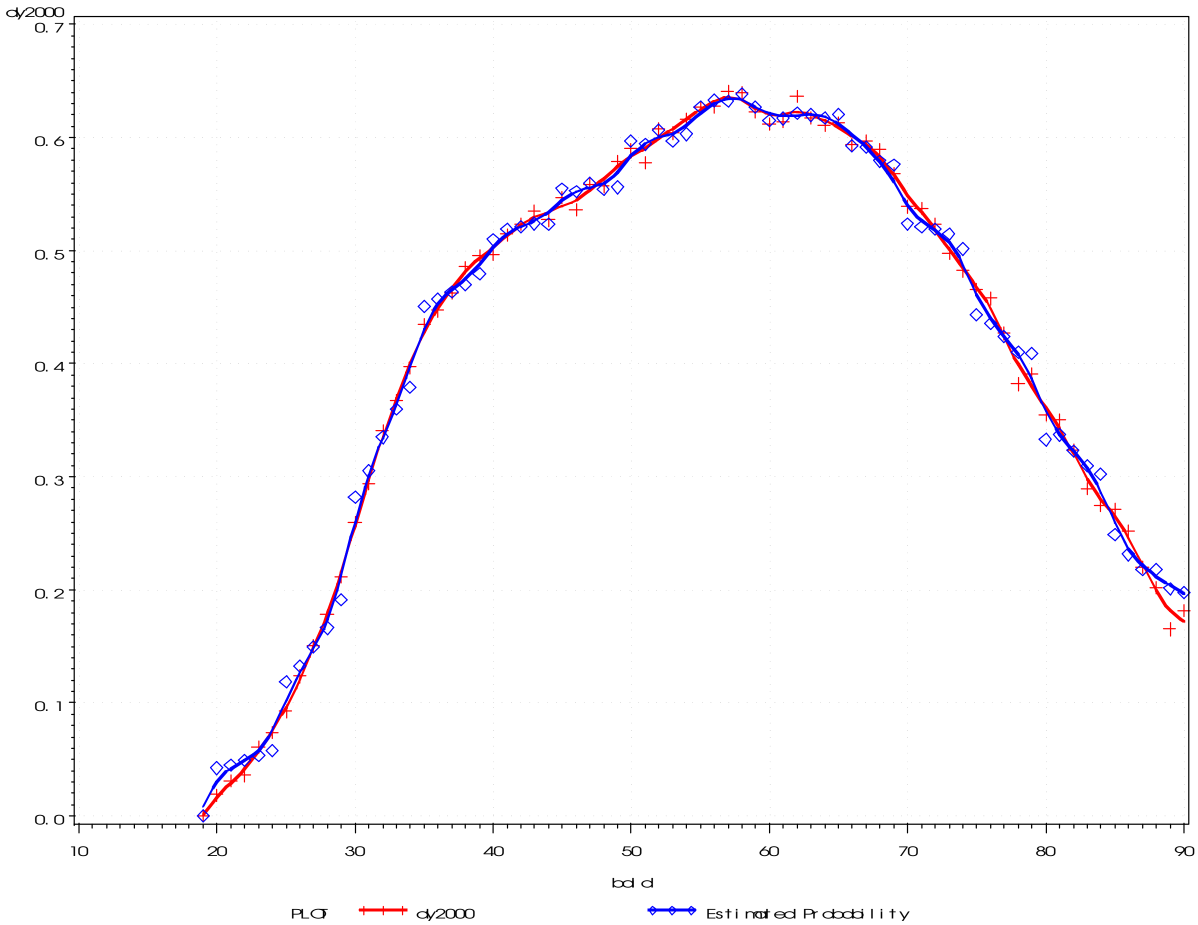


Figure 6C. Logit estimation, probability of buying house, model 6.

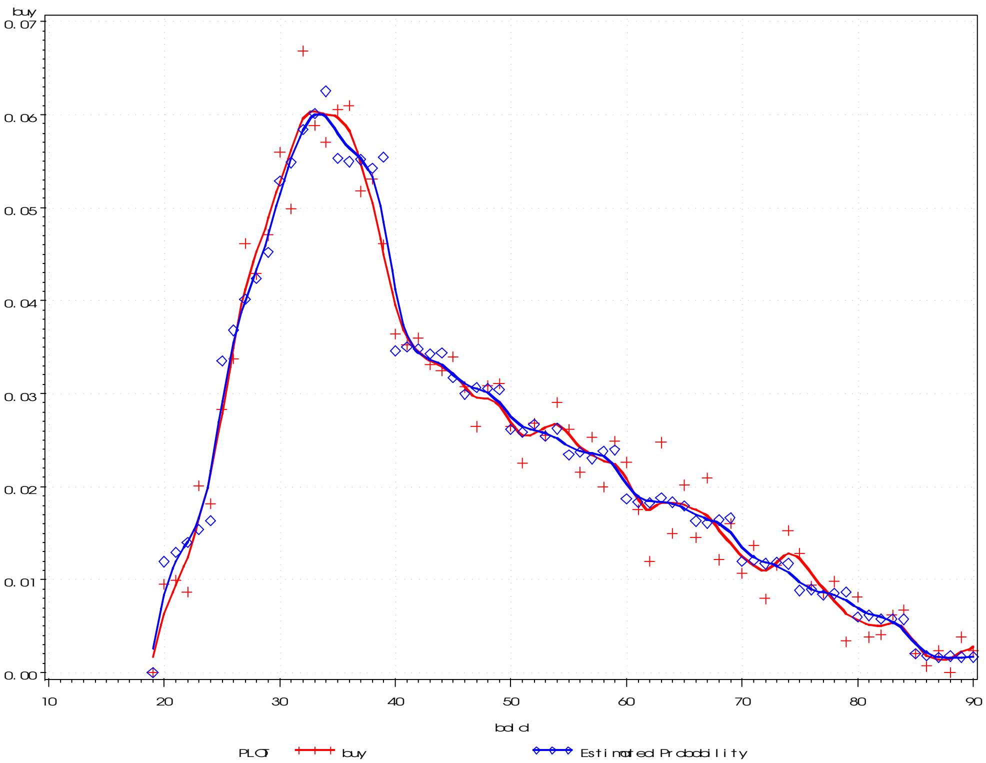


Figure 7C. Logit estimation, probability of selling house, model 7.

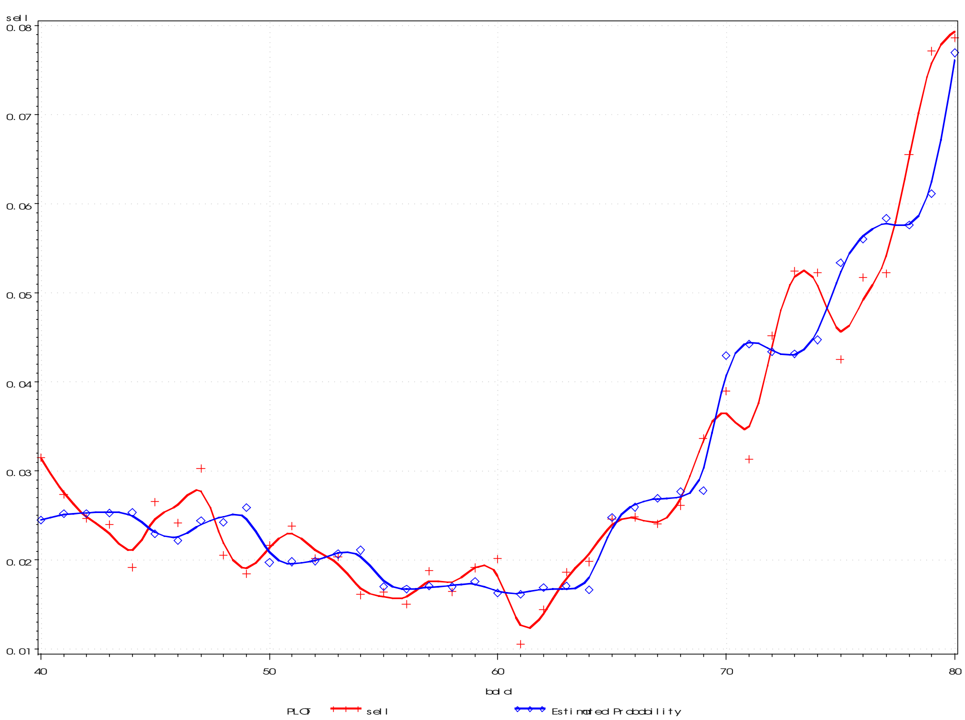


Figure 8C. OLS Market value, model 9.