Statistics Norway
Statistisk sentralbyrå

Statistics Norway
Research Department

Andreas Benedictow and
Torfinn Harding

Documents

Modeling Norwegian balances of financial capital

1. Introduction[1]

Financial markets have gone through some major changes over the last twenty years. Deregulation, increased international flows of financial capital and increased use of derivatives are some examples. The impact of these changes is not fully understood, but several examples point to important interplays between financial markets and the real economy. The deregulation of Norwegian capital markets during the mid-eighties led to a strong upturn in the business cycle, and a following adjustment that also included a banking crisis in the early nineties. The bubble of technology stocks in the late nineties and the consequences for the real economy when it crashed is another example. It seems important to capture what is going on in financial markets to understand what is going on in the real economy. Therefore, models for the real economy should also include financial markets. This document sums up the first stage of a project about financial markets under progress in Statistics Norway. The project sheds light on the workings of financial markets from different angles. The long-term goal is to develop one or several empirical sub models of these markets in the Norwegian economy, and ultimately incorporate it/them in the macroeconomic models KVARTS and MODAG. The main focus of the present work is the portfolio balance model. Several attempts have been made to estimate and incorporate portfolio balance models into macroeconomic models internationally (see for instance The MEFISTO team (1992), Dam (1995) and Markowski (1996)) and in Norway (Bergan et al (1987) and Leitemo (1995)). The appealing theoretical framework has however led to disappointing empirical results. Today the data situation has improved considerably compared to what was the case for these studies, and this was a major motivation for the present project. The FINDATR database (Norges Bank) is a rich source of long time series on a quarterly basis of institutional sectors' holdings of financial objects, and is the source of data for the model described in the following.[2]

The next section describes a framework for aggregating and structuring data from the FINDATR database and gives an introduction to the portfolio balance model. Two different approaches to estimate demand for financial assets within this framework are applied, both with disappointing results. Section 3 describes a more disaggregated model that could make a better basis for estimating economic behavior in a portfolio balance model, and that is also better suited for partial analysis of sectors and objects. Due to unsatisfactory estimation results for the portfolio balance model, we conclude that partial analyses of specific objects and/or sectors may prove to be a more fruitful approach. An analysis of the household portfolio in Harding et al (2004) is the first work along this

[1] Thanks to Torbjørn Eika, Ådne Cappelen and Suzan Hol for comments and suggestions

[2] The FINDATR database was revised in 2002 and 2003, leading to the new database FINSE that is even more disaggregated. The model presented in the present report can be linked to FINSE. See for instance Norges Bank (2001 and 2004) for a description of FINDATR and FINSE respectively

path. Section 4 presents a brief summary of some portfolio balance models developed internationally and in Norway that has inspired the work presented in this document. In the final section, data from the model is utilized in an example describing the households' portfolio of financial assets to illustrate the rich source of data (FINDATR) and the ability of our (accounting) model to structure this data.

2. An aggregated model

A model of the financial side of the Norwegian economy was constructed utilizing data from Norges Banks' database FINDATR.[3] This database contains institutional sectors' holdings of financial assets. The model is mainly based on Rødseth (2000), which implies a relatively aggregated portfolio balance model - three sectors (public sector, private sector and a foreign sector) and four objects (money, certificates, bonds and foreign currency). It is assumed that only the public sector can issue money, certificates[4] and bonds, and that only the foreign sector issues foreign exchange. Thus, the private sector does not issue any assets at all.[5] It follows that the private sector only has assets on the other sectors and no liabilities. The aggregation level is illustrated in table 1:

Table 1

		Public sector		Private sector		Foreign sector	
	Obj/Sect	**g**		**p**		**f**	
		Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Money	**M**		Mg= - (Mp+Mf)	Mp		Mf	
Certificates	**C**		Cg= - (Cp+Cf)	Cp		Cf	
Bonds	**B**		Bg= - (Bp+Bf)	Bp		Bf	
Foreign ex	**F**	Fg*E		Fp*E			Ff*E = - (Fg*E+Fp*E))
Wealth	**Wi**	Wg		Wp		Wf	

The purpose of the model is to determine the corresponding financial macro prices. It is assumed that these prices are determined in equilibrium, where supply equals demand for each object. Supply is exogenous (equal to the actual holdings in FINDATR) and it is assumed that all markets are in equilibrium in the quarterly observations available in FINDATR. It follows that supply equals demand, and that demand can be modelled econometrically with the holdings of the object as the dependent variable. Since there are three sectors and four objects, there are in principle twelve market equilibriums to be modelled. A problem with such an approach is that twelve corresponding prices are needed. In practice, only one price for each market is available. In this model, short-term interest rates corresponds

[3] Data is on a quarterly basis. In this report data from 1985 to 2002 is utilized.

[4] "Certificates" are defined as bank deposits and certificates

[5] The idea is that all assets issued by the private sector are also held by the private sector, thereby canceling each other out at this level of aggregation

to certificates, long-term interest rates to bonds, while the interest rate abroad and the exchange rate corresponds to investments in foreign currency. Furthermore, we assume that equilibrium is determined in the private sector. The major motivation for this approach is that the private sector includes the financial sector (like banks and other credit institutions) that dominates the asset markets in question.

Based on data generated in the accounting model above, we have estimated demand for certificates, bonds and foreign exchange. Demand for each object depends on the price of the object, the price on the other objects and wealth. We have not imposed all the restrictions that should apply to what could be called a thoroughbred portfolio balance model,[6] but our model is based on the general theoretical specification for portfolio balance models suggested by Tobin (1969) and Branson and Henderson (1985).

(1) $Z_i = z_i(rs, rl, de, ru+de, W_i)$

Z = M, C, B, F (M = Money, C = Certificates, B = Bonds, F = Foreign exchange)
i = g, p, f (g = public sector, p = Private sector, f = Foreign sector)
rs = short interest rate (3 month money market rate)
rl = long interest rate (interest rate on bonds)
ru = foreign interest rate (3 month money market rate)
de = expected depreciation of NOK (= 0 under static expectations)
W_i = financial net wealth in sector i (assets - liabilities)

The model thereby consists of demand functions for the private sector p, estimated by restricting the right hand side in equation (1) to the holdings of the corresponding object in sector p. The behavioural equations are:

(2) Cp = cp(rs, rl, de, ru+de, Wp)

(3) Bp = bp(rs, rl, de, ru+de, Wp)

(4) Fp*E = fp(rs, rl, de, ru+de, Wp)

[6] In a portfolio balance model, the following theoretical restrictions should ideally be satisfied:
-The cross price effects sum up to zero
-Financial wealth is homogenous of degree one
-N-1 markets are modeled, the last market is determined as a residual
-The sum of assets and liabilities in an object over all sectors is zero
-The sum of financial wealth over all sectors is (likewise) zero
-Direct effects are positive
-Cross effects are negative (substitution)

Assuming static expectations, de = 0, this block of three equations can be solved with respect to the three prices rs, rl and E. Financial net wealth is assumed to be determined from the real side of the economy and ru is determined in the foreign sector.

The model described above only covers parts of the financial side of the Norwegian economy. All sectors are included, but not all objects. Among others, stocks, loans, insurance claims and gold are left out, but are all available in FINDATR. This means that the model does not describe the entire portfolios of the three sectors. This need not be a problem if the omitted objects do not affect the prices in the markets we model. In our model, this implies that there are no relationships between demand for the omitted variables and short interest rates, long interest rates, foreign interest rates and the exchange rate.

Bringing the theoretical model to empirical testing is a very ambitious task. Even though there are good theoretical reasons for the financial prices to be determined in a system as the one described here, it has proved difficult to estimate a system like this in practice. In particular, the exchange rate seems to be a problem. The problems concerning empirical exchange rate models, in Norway as well as internationally, are well documented in the literature. Consensus seems to be that it is difficult to estimate a robust model that forecasts the exchange rate better than a random walk model, at least in the short run (see Meese and Rogoff (1983), Sarno and Taylor (2002) and Bjørnland and Hungnes (2003)). Estimating a model as the one described above, where the exchange rate is such a central variable, is therefore optimistic. Our experiences from trying to estimate the model, both with a structural approach and a VAR model, were also discouraging. Especially the VAR model proved to be difficult, and we found no significant cointegrating vectors.

3. A more disaggregated approach

The next step of the project was to disaggregate the model further. The motivation was partly to investigate the problems discussed above with more appropriate and precise definitions of sectors and objects, and partly to accommodate more detailed studies of financial markets on a more general basis. The disaggregated model consists of six sectors and eight financial investments objects. The sector structure in the disaggregated model differs from the aggregated by a split of the private sector into four new sectors: financial sector, local government sector, household sector and a residual sector. The central government sector and the foreign sector are kept as in the aggregated model. The four new objects are: Loans, stocks, insurance claims and a residual object. Money and foreign assets are as in the aggregated model. Deposits are defined as an independent object, while certificates are moved from deposits to bonds. The new model offers a complete description of both the asset and liability

side.[7] Table 2 shows the bookkeeping, as the total exposure the sectors have in different objects. The model is actually even more detailed than showed below: It can tell how large claims a sector has on another specific sector, in each specific object.

Table 2. Disaggregated model

		Centr govnmt		Bank		Municipality (kommune)		Households		Foreign sector		Residual	
		g		**b**		**k**		**h**		**f**		**x**	
		Assets	Liab	Assets	Liab	Assets	Liab	Assets	Liab	Assets	Liab	Assets	Liab
Notes and coins	**M**	Mg	Mtg	Mb		Mk		Mh		Mf		Mx	
Bank deposits	**D**	Dg	Dtg	Db	Dtb	Dk		Dh		Df	Dtf	Dx	
Bonds and certif	**B**	Bg	Btg	Bb	Btb	Bk	Btk	Bh	Bth	Bf	Btf	Bx	Btx
Loans	**L**	Lg	Ltg	Lb	Ltb	Lk	Ltk	Lh	Lth	Lf	Ltf	Lx	Ltx
Insurance claims	**K**				Ktb			Khb				Kxb	
Stocks	**A**	Ag	Atg	Ab	Atb	Ak	Atk	Ah		Af	Atf	Ax	Atx
For ex	**F**	Fg		Fb		Fk		Fh		Ff	Ftf	Fx	
Residual	**X**	Xg	Xtg	Xb	Xtb	Xk	Xtk	Xh	Xth	Xf	Xtf	Xx	Xtx
Net fin wealth	**W**	Wg		Wb		Wk		Wh		Wf		Wx	

The data for the disaggregated model is also based on the FINDATR-database from Norges Bank. This database structures the Norwegian financial economy in eight main sectors and ten main objects, but it's possible to disaggregate further down to at most 26 sectors and 25 objects. It is also possible to divide each main sector and each main object in even more detailed sub-groups.

The disaggregated model contains six sectors: central government (g), financial (b), local government (k), households (h), foreign sector (f) and a residual sector (x). There are eight objects: money (M), deposits (D), certificates/bonds (B), loans (L), stocks (A), insurance claims (K), assets issued in foreign exchange (F) and a residual object (X).[8,9] Five objects occur almost directly in FINDATR, while F is constructed for this model. The F-object envelops all assets denoted in foreign currency, i.e. F includes all assets where foreign countries are issuers. Because assets issued in foreign currency partly are issued as deposits, bonds, loans, stocks and X, our definition of D, B, L, A and X does not correspond exactly to what is called deposits, bonds, loans and X in FINDATR. For example, D is deposits as in FINDATR minus the deposits issued by the foreign sector. D is thus only deposits issued by Norwegians. The same goes for B, L , A and X.

[7] FINDATR is formulated in terms of the asset side only.

[8] The model allows us to easily decide different levels of aggregation, and thereby provide tailored data for specific tasks.

The motivation for the F-object is to separate all assets with an exchange rate risk for the Norwegian investors. This is useful when the model is used for analysing the behaviour of the different Norwegian sectors. If we, on the other hand, use the model to analyse complete asset markets, we still have to deal with the foreign exchange risk of foreign investors: Foreign investors are exposed to foreign exchange risk when buying assets issued in Norwegian kroner and (if F is a substitute to the other assets) foreign exchange rate risk affects the demand for the other assets.

The bookkeeping of the model is shown in table 2. As usual in a portfolio balance model, the sum of all assets and liabilities in one object adds up to zero when we sum over all sectors. This is the sum of each row in table 2. The sum of the two columns corresponding to each sector in table 2 is the sectors net financial wealth, namely the sum of all assets and liabilities.

As mentioned above, FINDATR generally provides us with the asset side. The liabilities of a sector in our model are defined as the assets all other sectors have on this specific sector. This can be illustrated by an example: deposits (D) are issued of the public sector (g), the household sector (h) and the foreign sector (f). This means that these three sectors have debt in D. From FINDATR it is possible to identify the debt for example sector g has in D, by summing up the D-assets all sectors have on g.

As described above, the disaggregated model is an accounting model - a way to structure data. There are no estimated equations. The model is a useful tool for generating data for empirical investigations of financial markets. That goes for portfolio modelling or a totally different approach, as for instance in Harding et al. (2004).

To follow the portfolio balance approach all the way to an operational sub model for KVARTS/MODAG describing the complete financial side of the Norwegian economy is not a small task, and would demand considerable resources. Combined with the disappointing results from the attempts to estimate behavioural equations in the aggregated model as described above and the limited success of other models of this kind experienced by other institutions, we conclude that this may not be the most fruitful path to follow. Instead, the project moves on to focus on partial analyses of specific sectors and objects. The first step is to investigate the households' exposure to capital markets, see Harding et al (2004).

[9] We have ignored notes and coins issued in foreign exchange. It is possible to extend the model with an object n to avoid this simplification.

4. A brief survey of related portfolio balance models

Studies similar in spirit to ours have been done earlier both in Norway and internationally. In this section we present a short survey of related work that has inspired the present project. The survey intends to give the reader a hint on some interesting work in this field, but is not to be regarded as exhaustive.

In Statistics Norway, modelling of the financial side of the economy has been on the agenda several times over the past two decades. On the background of the deregulation of financial markets in the 1980s and the increasing importance of financial markets for the real economy, a project was started at Statistics Norway in the mid-1980s to model financial markets. The goal was to improve the modelling of the financial side of KVARTS/MODAG. A portfolio balance model was developed and documented in Bergan et al (1987). The poor data situation at the time limited the model to an exercise illustrating theoretical aspects of financial markets, and the model was for the very same reason not further developed with the intention to describe or analyse Norwegian financial markets. In Leitemo (1995) a new effort was made to improve the financial side of the macro econometric models of Statistics Norway. Household demand for financial assets was modelled. The main findings were indications of a low degree of short term speculation in financial assets, and that tax deduction was the major motivation for saving in stocks. The empirical analysis was hampered by the difficult data situation, and the demand equations were not incorporated in KVARTS/MODAG. The present work can be seen as an extension of these two early efforts. As explained, we did not find support for the portfolio balance model in spite of better data.

The financial model KOFI (Markowski 1996) was developed at the National Institute of Economic Research in Sweden to serve as a financial block in their model KOSMOS, used for forecasting. KOFI can also be used as a self-contained model. KOFI is based on the portfolio balance framework of Tobin (1969), but the portfolio is defined to include only net foreign assets, certificates, bonds and (bank deposit) money. Other assets are assumed acquired for other reasons than pure portfolio investment and their purchase is assumed effected before any portfolio decision is taken. Interest rates and exchange rates are endogenous. However, the model has faded out of use in recent years. Statistical input was an important bottleneck, and the model performance discouraging.

In the Danish macroeconomic model, ADAM (Dam (1995)), the interest rate in the bond market is a central output from a financial block. The interest rate in the bond market is determined so that demand for bonds adjusts to the (exogenous) bond supply. Other interest rates in the model are either exogenous or determined in simple reaction functions. A connection between the Danish interest rate level and the foreign interest rate level is established through a formulation of capital movements and

the foreign demand for Danish bonds. In the long run, the interest rate on Danish bonds is determined by the interest rate on foreign bonds. In the short run, the Danish bond rate can differ due to changes in the bond supply, changes in the financial wealth of the private sector, changes in the interest rate level abroad or the expectation for the exchange rate. The bond demand's sensitivity for a change in the interest rate is high: A small change in the interest rates gives a big change in the portfolio allocation. The financial markets affect the real economy through the interest rate. It affects demand and also the flow of interest between different sectors. The channels from the real economy to the financial markets are bond supply and wealth of the private sector. The Danish approach is not directly applicable to the macro economic models at Statistics Norway, as there are no long interest rates in KVARTS/MODAG. Thus, a link between financial markets and the real economy must be found elsewhere, given the present state of KVARTS/MODAG.

MEFISTO, developed at Bank of France (The MEFISTO team (1992)), offers additional ideas for the modeling and incorporation of financial markets. The money market rate is determined by a reaction function of the monetary authorities. Changes in the bond market rate are determined by changes in the gap between long and short term foreign interest rates, by changes in the money market interest rate, by the level of annual growth in consumption prices and by the level of annual growth of energy import prices relative to consumption prices. A default premium model determines the difference between the lending rate and the money market rate. The default premium should compensate for the risk of losing the funds invested. The model shows that changes in the premium are influenced by changes in the money market rate, changes in real money market rate, the changes in the output gap, the level of energy import prices relative to the consumption prices and a ratio of corporate indebtedness to GDP. Ideally also share prices and exchanges rates, in addition to interest rates, should be modelled as determined in the financial markets. At least in the short run. These seem to be very hard to model, and are therefore held exogenous in MEFISTO. Two types of yield are also exogenous; the zero interest rate on 'cash' and the 'the regulated positive interest rate for liable assets'.

5. An example of data from the model: the households' portfolio[10]

Introduction

Financial theory predicts a dispersion of saving between several different investment objects because of the risk reduction that diversification of funds can offer. Risk diversification makes fulfilment of the main goals for household saving most likely: Consumption smoothing and preparation for a possible rainy day. Diversification makes the household portfolio more robust against unpredictable shocks. Generally, the degree of diversification will vary with the households risk preferences, but it is likely that households are relatively risk averse (see for instance Reilly and Brown (1997) and Guiso et al (2002)). Based on these fundamental considerations, we should expect to find households' wealth to be spread between many investment objects. This seems however not to be the case.[11]

In figure 1 (all figures are found in the appendix), household wealth is aggregated into three objects; net financial wealth, housing capital and real capital (other than housing). Housing was the dominating object all through the observed period. Housing prices rose remarkably in 1985-1987. This explains the increase of the share of housing capital in this period. During the next five years, the level of housing prices decreased. The level of 1985 was reached in 1992, and from then it has been rising (see figure 2). Another striking point to be drawn from figure 1 is the very small (actually negative) share of financial capital during the late eighties. This is due to the very strong growth in loans after the deregulation of credit markets. This will be discussed in the debt section below. The last series in figure 1 is real capital, which has been falling steady as a share of total wealth since the early 1990s. This follows as a result of the increase in the other two variables.

We concentrate on financial wealth, and therefore leave the issue of housing capital and real capital in the household sector here (see Harding et al (2004) for more on housing capital in a financial context).

[10] In some of the figures data have been used that is not generated by the model, for instance to show holdings of assets as a share of net wealth or to disaggregate beyond the limits of the model. When data from FINDATR (that have not "passed through" our model) and from the KVARTS-database (Statistics Norway) are used, it is indicated in footnotes in the respective figures.

[11] Guiso et al (2002) describes some puzzles from model simulations:

Participation puzzle: There is no country in the world, where the majority of households hold stocks, despite the premium on equity. Hard to explain by simulations (need typically low current cash on hand and borrowing constraints), but fixed costs on entry and participation in the stock market can explain much of the participation puzzle (p. 56-57).

Three portfolio composition puzzles: 1) the degree of diversification tends to increase with the size of the savings, and small savers are predicted to put all their savings in to stocks due to the equity premium. 2) Among the households holding risky assets, the share of risky assets is decreasing by the amount of cash at hand. Data suggests however the opposite, that the share of the risky assets is increasing as the financial wealth and current labor income increase. 3) Among the households holding stocks, the portfolio share of risky assets is decreasing (strongly) with age. However, empirical studies cast doubt on the sign and significance of age effects on the portfolio composition. (p. 56).

Figure 3 shows net financial wealth relative to disposable income in the household sector. Insurance claims are excluded in the lower line. The differences between the two, indicates that insurance claims count for a large part of the asset side.[12] As shown in figure 3, the recession in the second half of the eighties led to the lowest net financial wealth ratio (to net disposable income) during the more than three decades covered in the figure. The net financial wealth ratio was steadily increasing from the bottom level of -0,05 in 1988 to 2000. Then a dip followed, related to the fall in stock prices in the early 2000s. Net financial wealth is defined as gross assets minus gross liabilities (see figure 4). In the following, the debt and the asset side of the household sector are described.

Household debt

The debt side of the households' portfolio is dominated by loans. As figure 5 shows, total debt in the household sector increased from about the size of disposable income during the seventies, to a peak ratio of 1,7 in 1988 and 1989. Then it decreased to a level of about 1,3 in the period 1994 to 2000. Since then it's been rising, and the level of debt relative to disposable income is at a historically high level to day.

Within the framework of our model, the debt of the household sector is distributed on three different objects: Bonds (B), Loans (L) and the residual object (X). Figure 6 shows the relative size of the three objects. The distribution has been stable and the debt is dominated by loans, which has counted for more than 90 percent of the debt through the entire period. Debt in Bonds is ignorable. This section focuses therefore on loans.

Loans are issued by several sectors, but as figure 7 shows, 90 percent is covered by the government sector and the financial sector. The distribution between these two sectors has changed through the period, towards the financial sector, see figure 7. The government sector has decreased its relative position from financing 30 percent of all household loans in 1985, to 16 percent in 2002. A bit more surprising is the (temporarily) increasing fraction of public loans in the beginning of the nineties. What happened was that the governmental loans were fairly stable, while debt to financial sector (banks + credit inst.) was high in the late 80's/early 90's.

[12] According to Gallefoss (1999), Norwegian households save more in insurance claims than what is the case in most other countries. The accumulation and thereby the size of insurance claims are decided through fairly mechanical procedures (seen from each households point of view), because of the typical collective nature of these institutions. Saving in such claims is probably more similar to regular tax-payments than ordinary saving decisions. Further, the income stream from these claims are also far into the future for most of the households, and it's therefore questionable if the common household is taking this into account when making economic decisions regarding consumption and saving allocation. Both characteristics support a weak impact from insurance claims on economic behavior, and motivates therefore looking at net financial wealth (also) without them.

In the fourth quarter of 1994, Postbanken was transformed from g to b sector. This is seen as the positive vertical shift in the share of the financial sector and the similar negative shift in the public share in figure 7. Loans can be disaggregated into different creditors. This goes, for the current aggregation level, beyond our model. FINDATR contains however more specific information of the creditors within the financial sector, which as a first step can be split into banks and other financial institutions (insurance companies etc.). Figure 8 shows a trend of increased importance of banks as creditors. Banks can be split into 'commercial banks' and 'saving banks'. Figure 9 shows that the fraction of business banks has been larger than the fraction of 'saving banks'.

The sector "other credit institutions" contains credit institutions and insurance companies, and figure 10 gives the fractions. The most interesting point to be drawn from figure 10 is perhaps the decrease of loans issued by life insurance companies, and the increasing importance of the credit companies.

Household assets

First, we take a look at the main financial objects as a share of total financial assets. Figure 11 point out four objects that stand out as more significant than the others. Bank savings fell from about 45 per cent to 35 per cent during the observed period, and stocks increased from 10 to more than 15 per cent. Insurance claims have increased from about 25 to 35 per cent, while the X-object has been relatively stable around 10 per cent.

Bank savings and stocks constitute more than 50 per cent of total financial assets through most of the period, and dominate the household portfolio if we exclude insurance claims and the X-object. Generally, bank savings has decreased, while stocks have increased. However, after the stock market collapse in 2000, this development reversed.

Figure 12 shows that the largest share of household stock wealth is held in stocks not listed at Oslo Stock Exchange (OSE), followed by stock funds and stocks listed at OSE respectively. The share of stocks listed at OSE are lower now than at the end of the 1980s, while stocks not listed at OSE has increased threefold. The share held in funds has increased since the early 1990s. From 1992 to 2000, it increased fivefold, but has dropped since, in line with general developments in the stock market.

Together, stock funds and listed stocks have developed quite similar to unlisted stocks, although listed stocks and funds are more volatile, see figure 15. Holdings in Primary capital certificates increased from the early 1990s, but has fallen back the last couple of years, and has made a very small share of the household portfolio all through the observed period.

Figure 14 shows how stocks are distributed on different sectors as a share of the households' total portfolio of stocks. Until the early 1990s, stocks in "private non-financial and non-personal enterprises" dominated the households' portfolio of stocks. Since then, investment in funds has increased significantly, at the expense of "private non-financial and non-personal enterprises", and has become the second most important sector[13] for stock investments. However, after the stock market collapse starting in 2000, this development has reversed. In absolute terms, the value of stocks in both sectors has decreased since 2000, but most in funds, as shown in figure 15. This figure also shows that the majority of stocks held in "private non-financial and non-personal enterprises" are unlisted, and that the value of unlisted stocks continues increasing after 2000, although at a slower rate than before. Funds, on the other hand, contain only listed stocks, which fell substantially from 2000.

Before 1990 households did not hold shares abroad (prevented by institutional conditions), see figure 16. Through the 1990s foreign stocks increased to around 4,5 per cent of the stock portfolio. Especially in 1999-2000, foreign stocks became popular. Since 2001 this development has come to a standstill, in line with worsening expectations for the world economy and the poor performance of international (and domestic) stock markets.

Bank savings fell as a share of total financial assets towards 2000, when the development reversed, see figure 17. This turning point must be seen in light of the poor development in the stock market in recent years, as mentioned above. All bank savings are in the financial sector after 1994, except from a small share abroad. Earlier, about 10 per cent of total bank savings was registered in the public sector. That was due to savings in the then state owned Postbanken.

In FINDATR, bank savings in the financial sector are distributed between the sectors "business banks and Postbanken" and savings banks. Postbanken shows up in the former sector in 1995, see figure 18. Savings banks and Postbanken together dominate the household segment of bank savings. Business banks except Postbanken is marginalized.

Figure 19 shows the share of the portfolio placed in coins and notes (money), bonds and certificates, loans, and abroad. These are minor objects in the household portfolio: in 2002, none of them consisted of more than 3 per cent. Nevertheless, these variables have several interesting features. They have all shown relatively large variations over time in the portfolio. Furthermore, there has been an increasing focus in the media on investments in bonds and other interest bearing assets and on investments abroad. Only loans seem to have faded out of interest.

[13] Funds is defined both as a sector and an object.

The share of money in the portfolio is halved since 1985. Increasing use of credit and debit cards can probably explain most of this change. Bonds and certificates have increased their share the last couple of years. One reason for this is that low returns in the stock markets since 2000 made interest-bearing assets more appealing.

Investments abroad have also increased. Since the late 1990s, stocks have accounted for most of this, see figure 20. This may be due to easier access for small investors to international stock markets lately, and reflects a general tendency towards increased diversification of financial wealth. The stock market collapse starting in 2000 probably increased consciousness about risks associated with investments in the stock market, thereby fuelling demand for diversification. Most foreign stock investments are now in funds, about 57 per cent in 2002, see figure 21. Households started investing in stock funds in 1999. There was a fast increase through 2001, but expansion paused in 2001, and fell in 2002. Investment in foreign stocks apart from funds have been made since 1990, and was about 43 per cent of total foreign investments in 2002. Bank savings and loans abroad have also increased, see figure 20. Investments in bonds and certificates abroad are close to zero.

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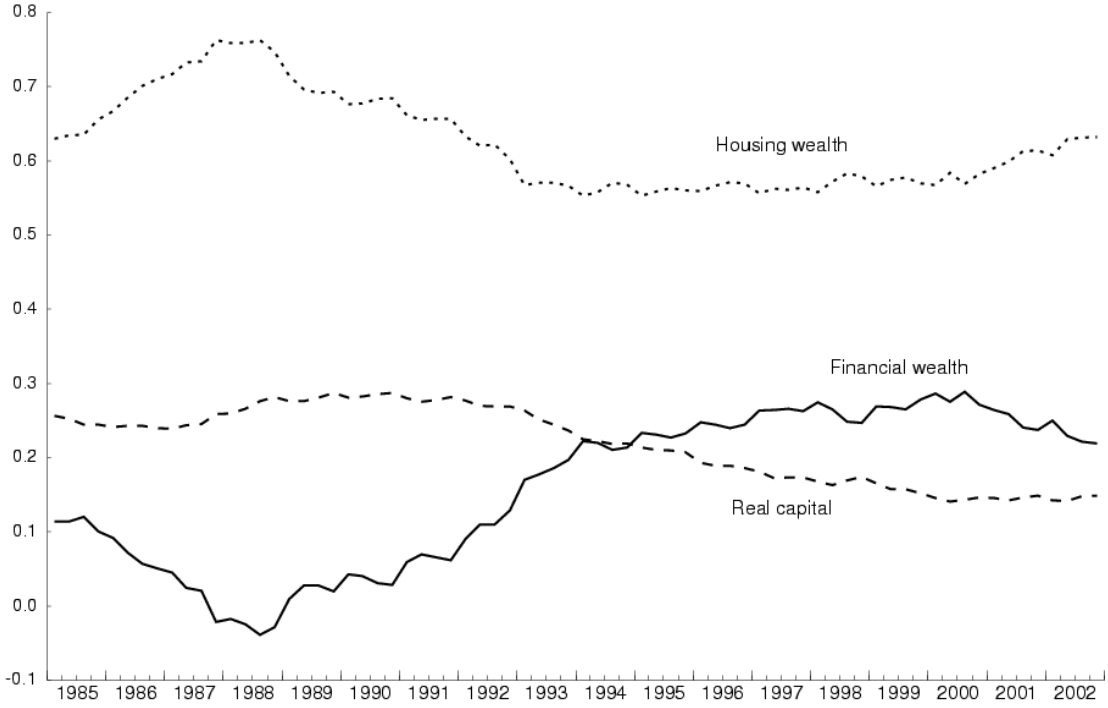
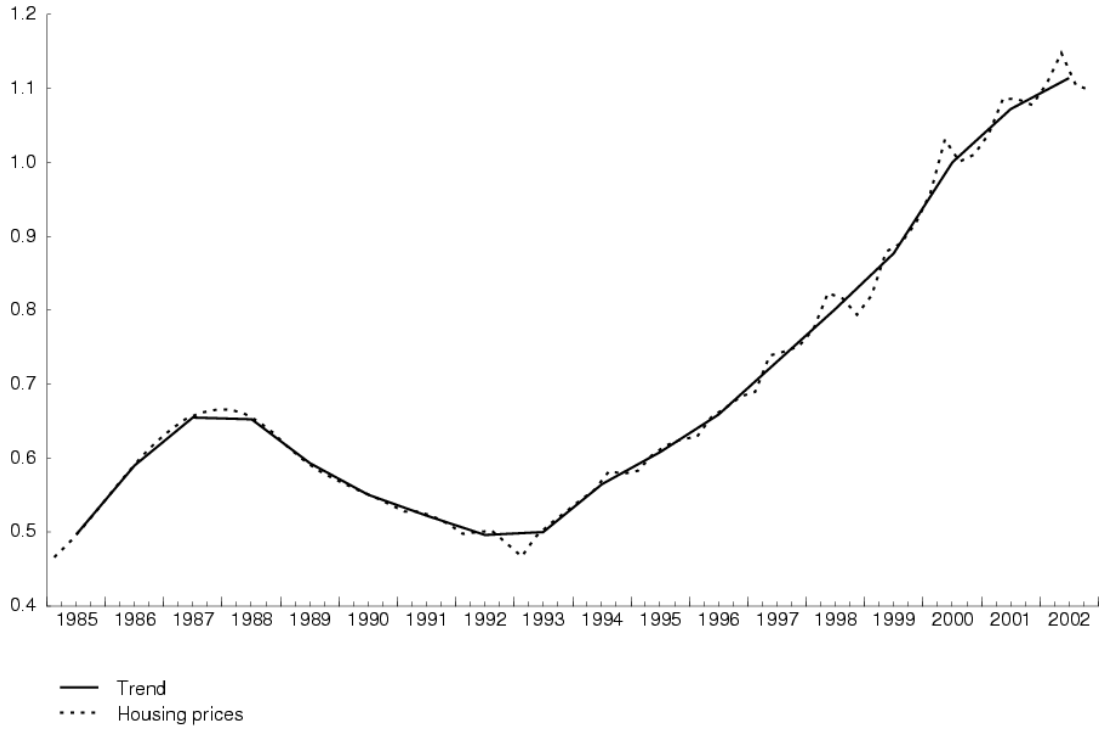
Figures

Figure 1. Household wealth
Shares of total



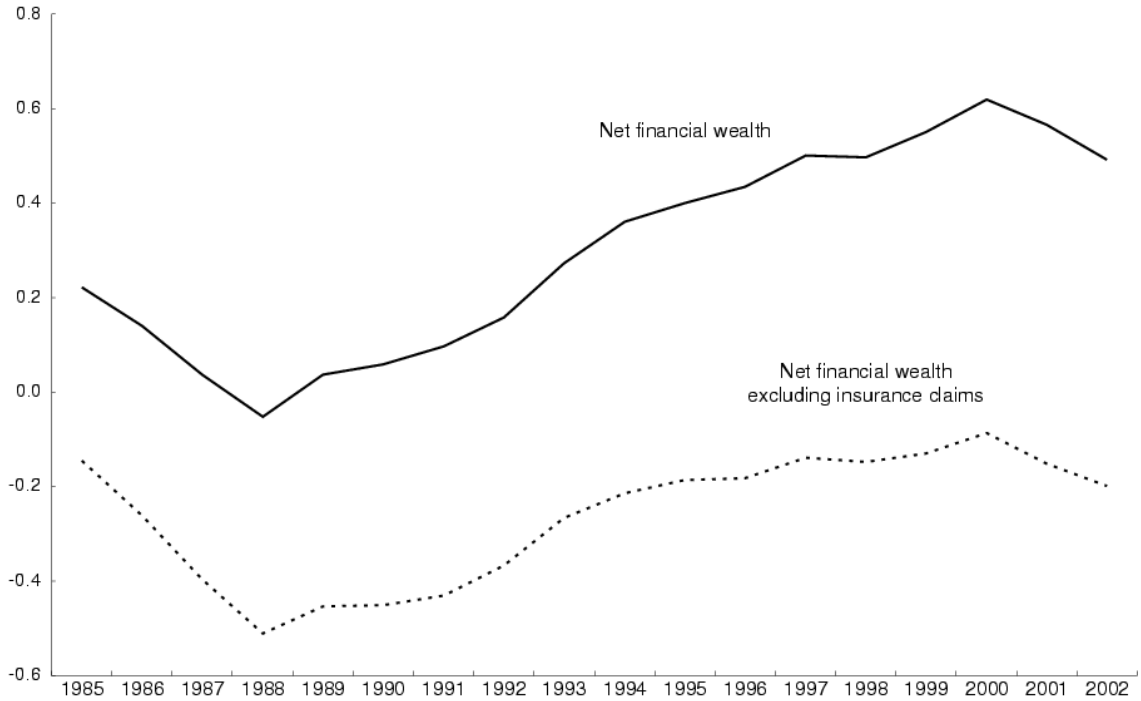
Source: KVARTS.

Figure 2. Housing prices
Yearly and quarterly growth, quarterly rates



Source: KVARTS.

Figure 3. Net financial wealth
As a share of net diposable income

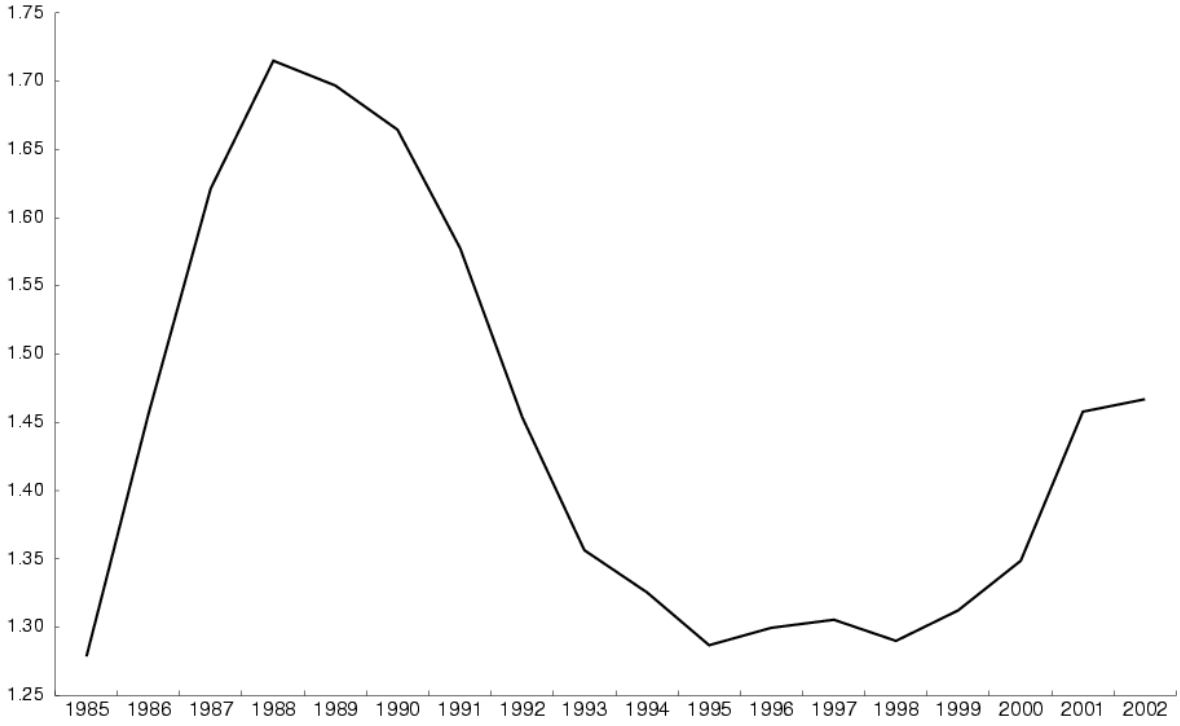


Source: KVARTS.

Figure 4. Gross assets and liabilities
As a share of net disposable income

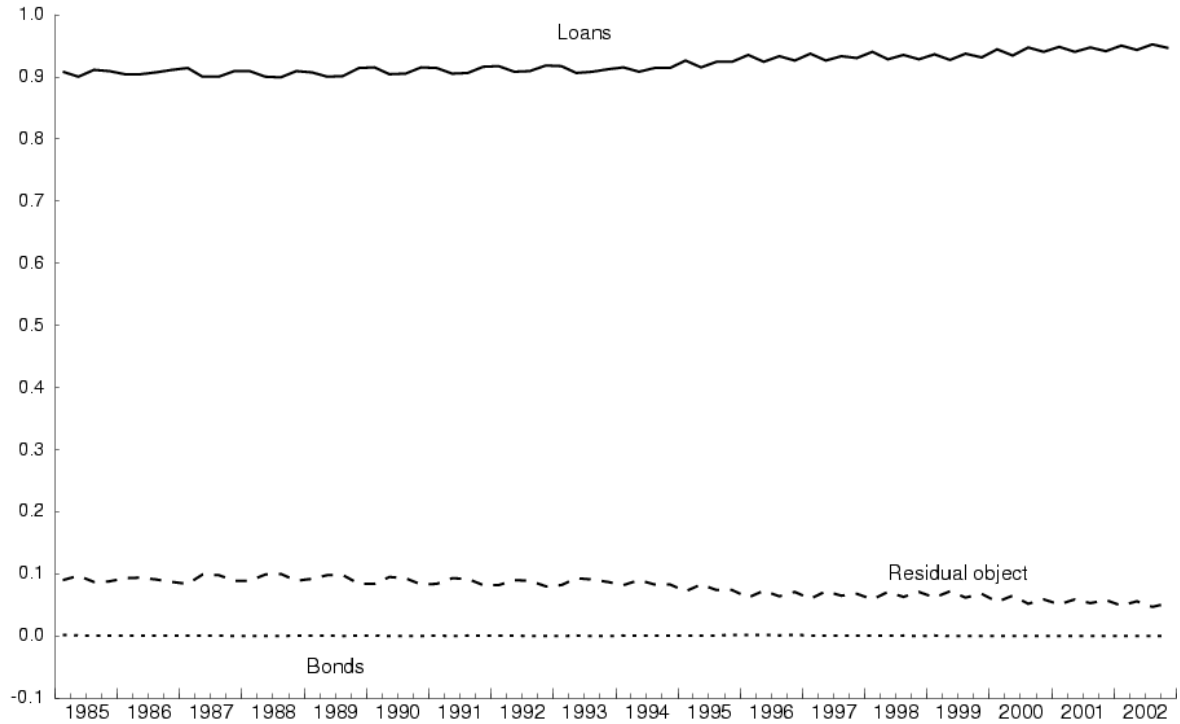
Source: KVARTS.

Figure 5. Total debt
As a share of net disposable income



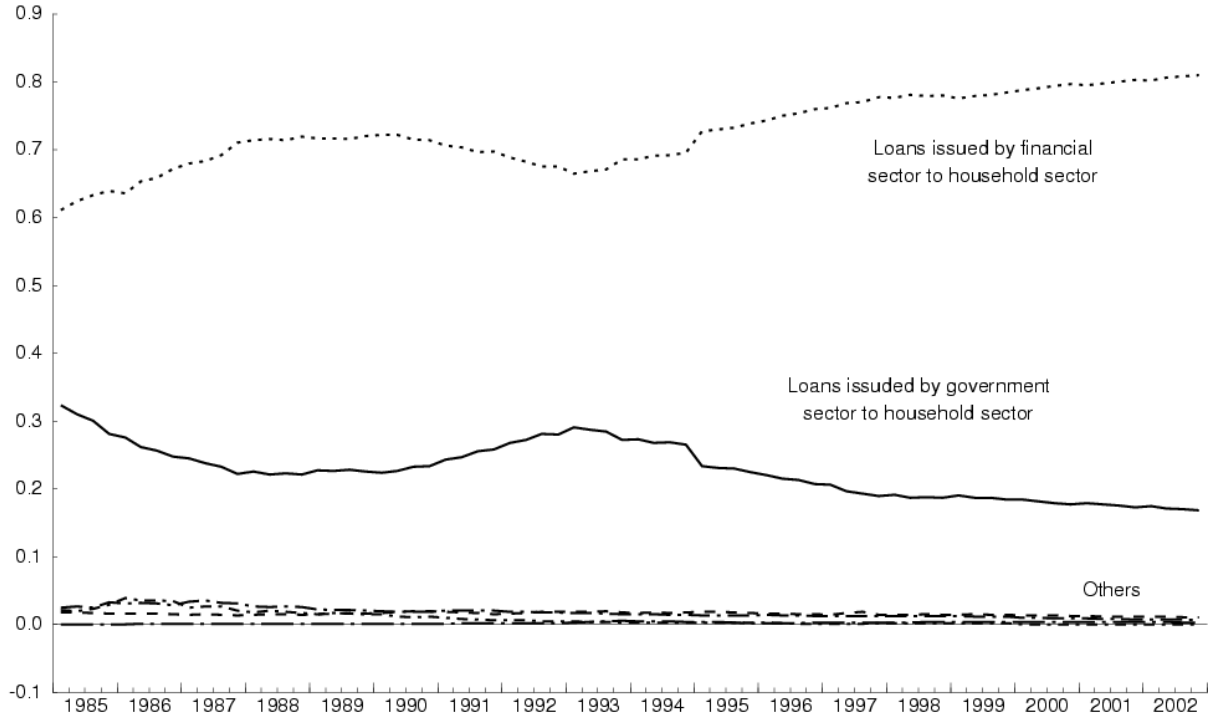
Source: KVARTS.

Figure 6. Distribution of debt



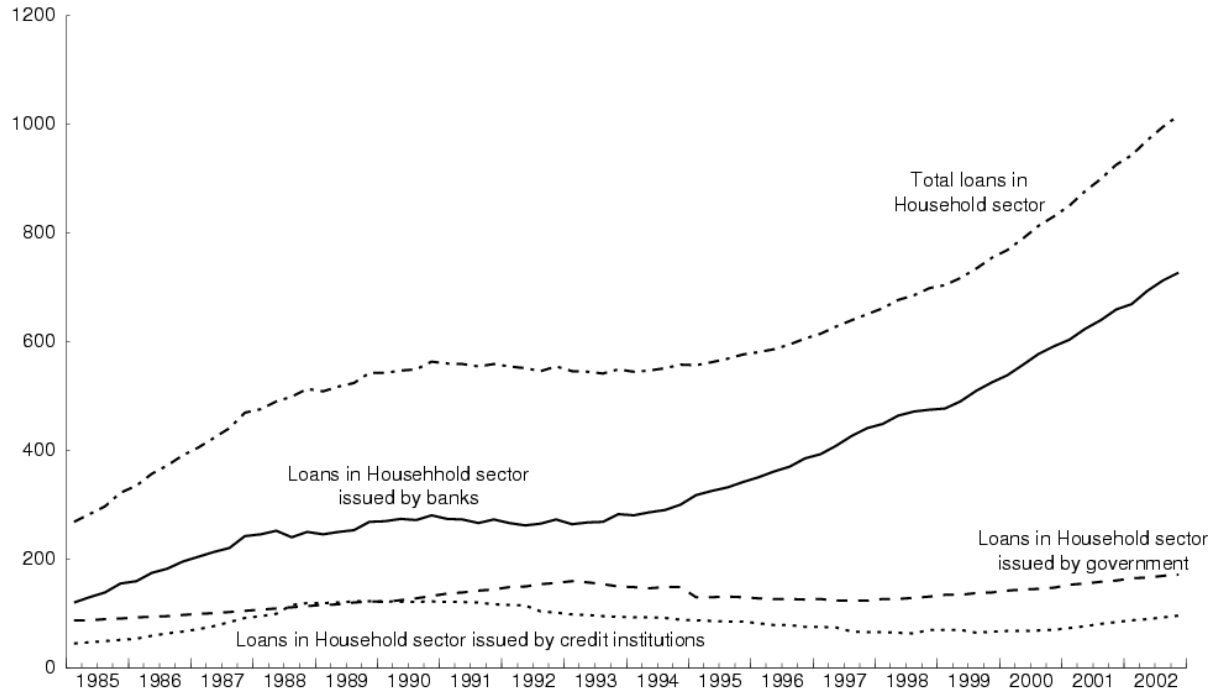
Source: Model.

Figure 7. Distribution of debt



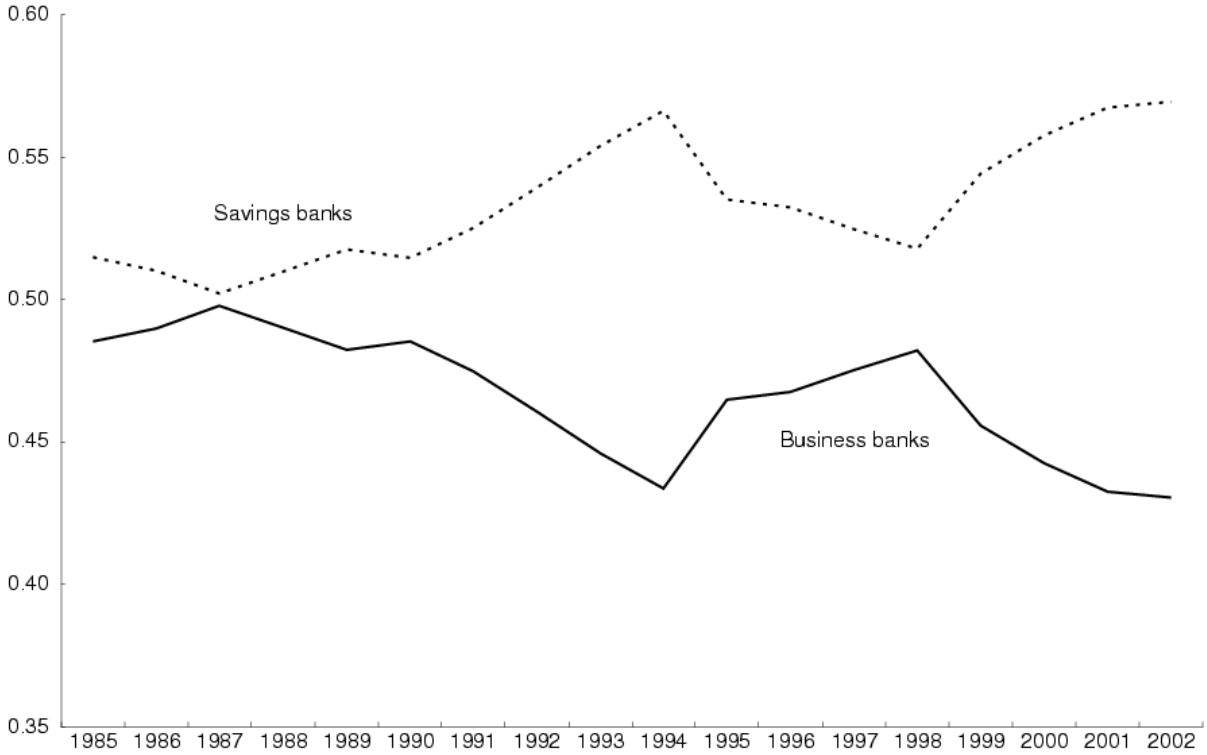
Source: Model.

Figure 8. Creditors
Bill. NOK



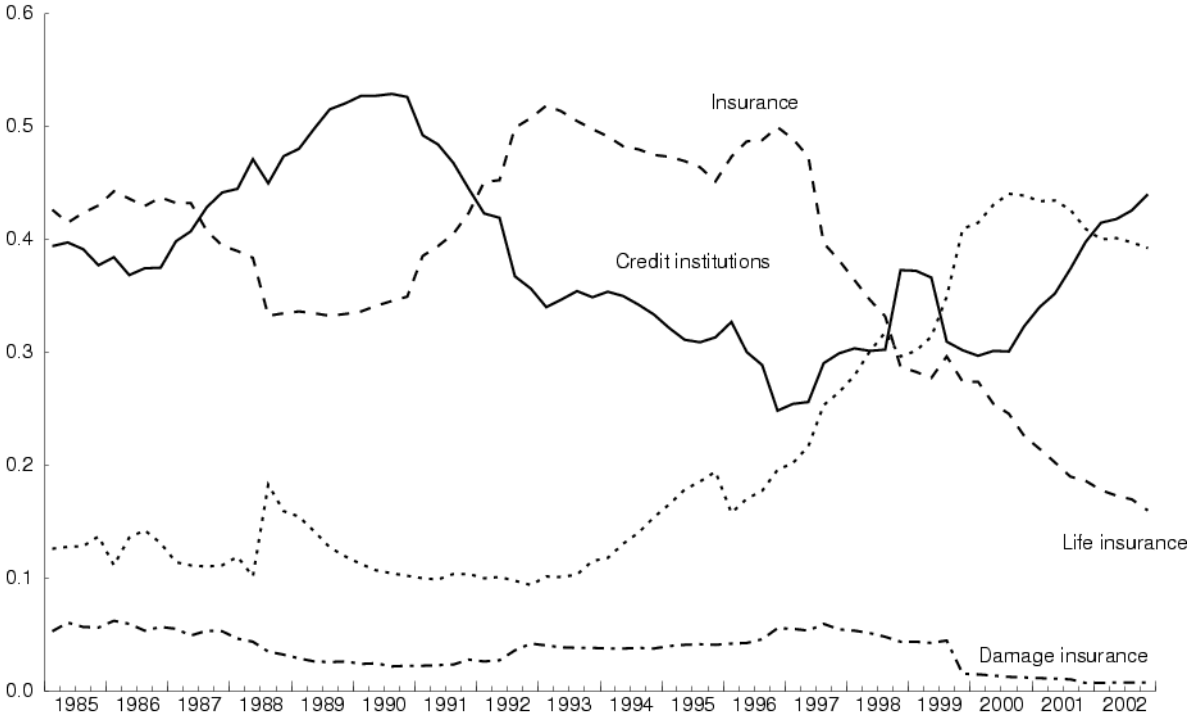
Sources: Model and KVARTS.

Figure 9. Loans issued by commercial and savings banks
Relative to total bank loans in the household sector



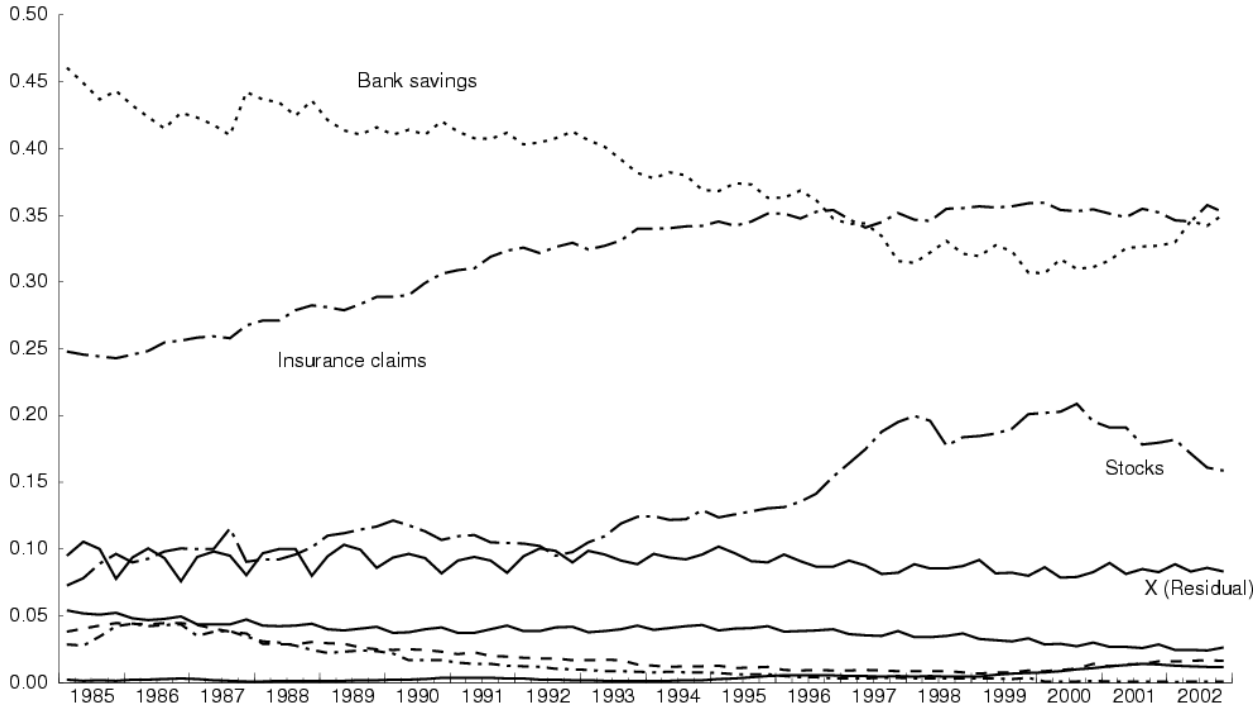
Sources: Model and FINDATR.

Figure 10. Fraction of total loans from financial institutions



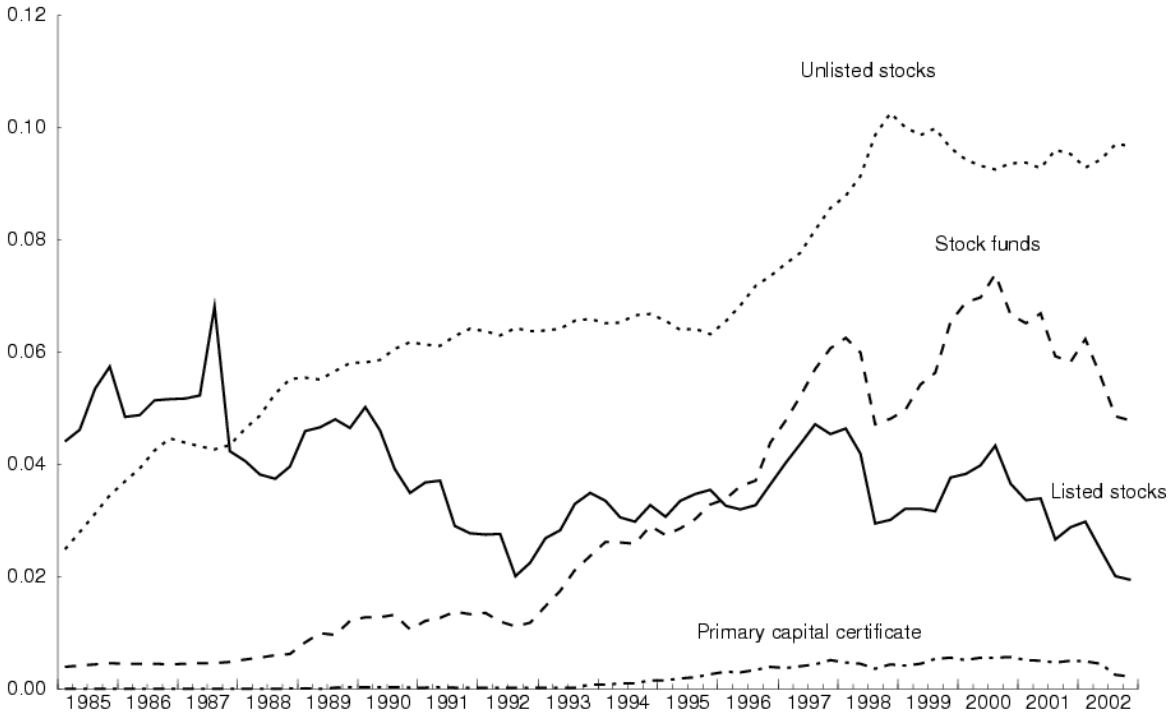
Sources: Model and KVARTS.

Figure 11. The household portfolio
As a share of total financial assets



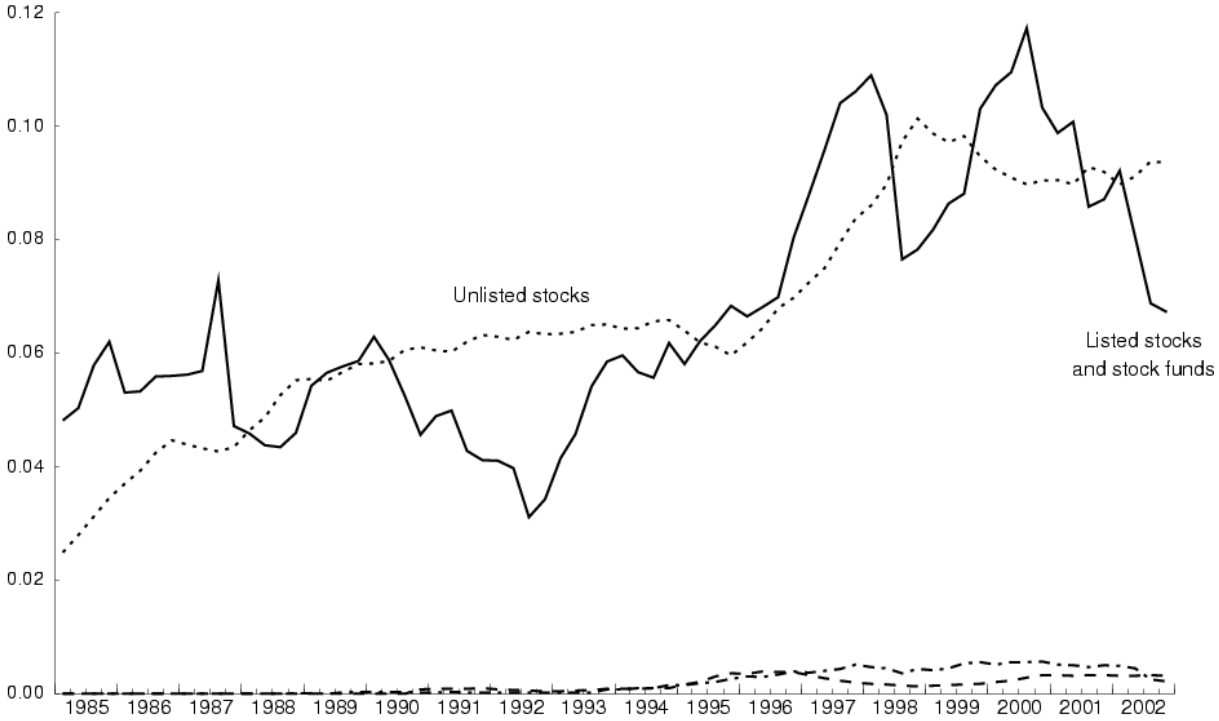
Source: Model.

Figure 12. Household investment in stocks
By object, share of total financial assets



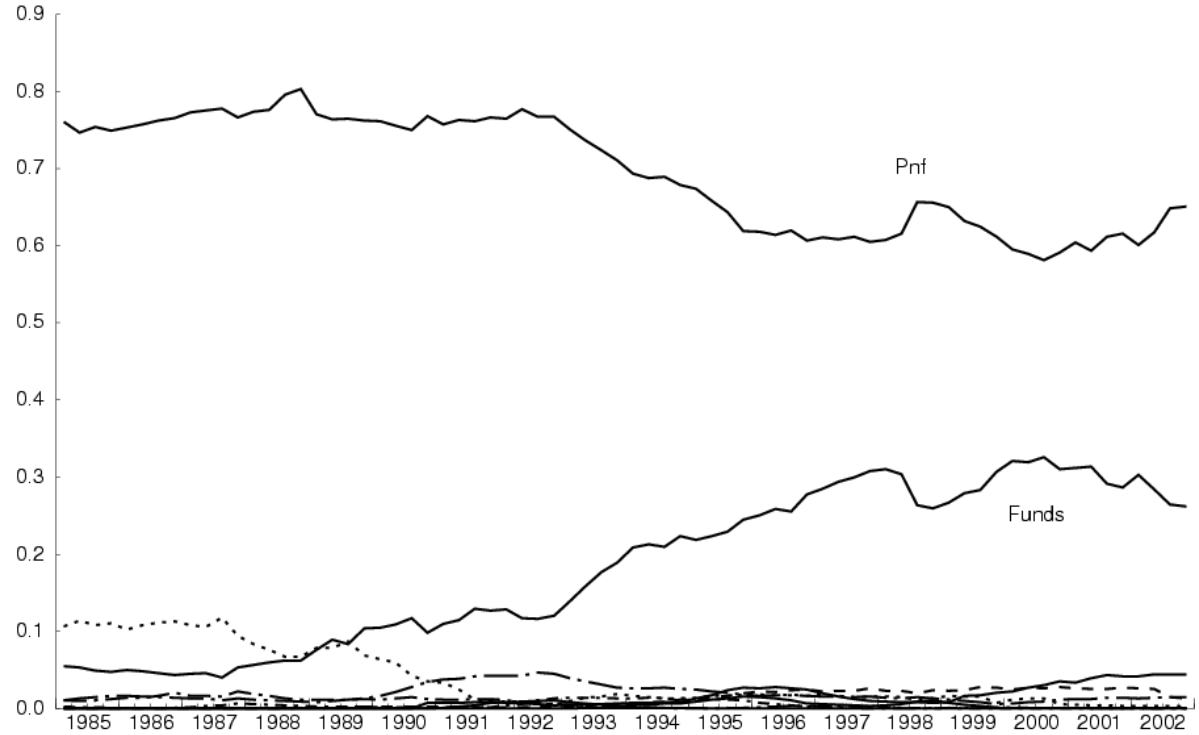
Source: Model.

Figure 13. Household investment in stocks
By object, share of total financial assets



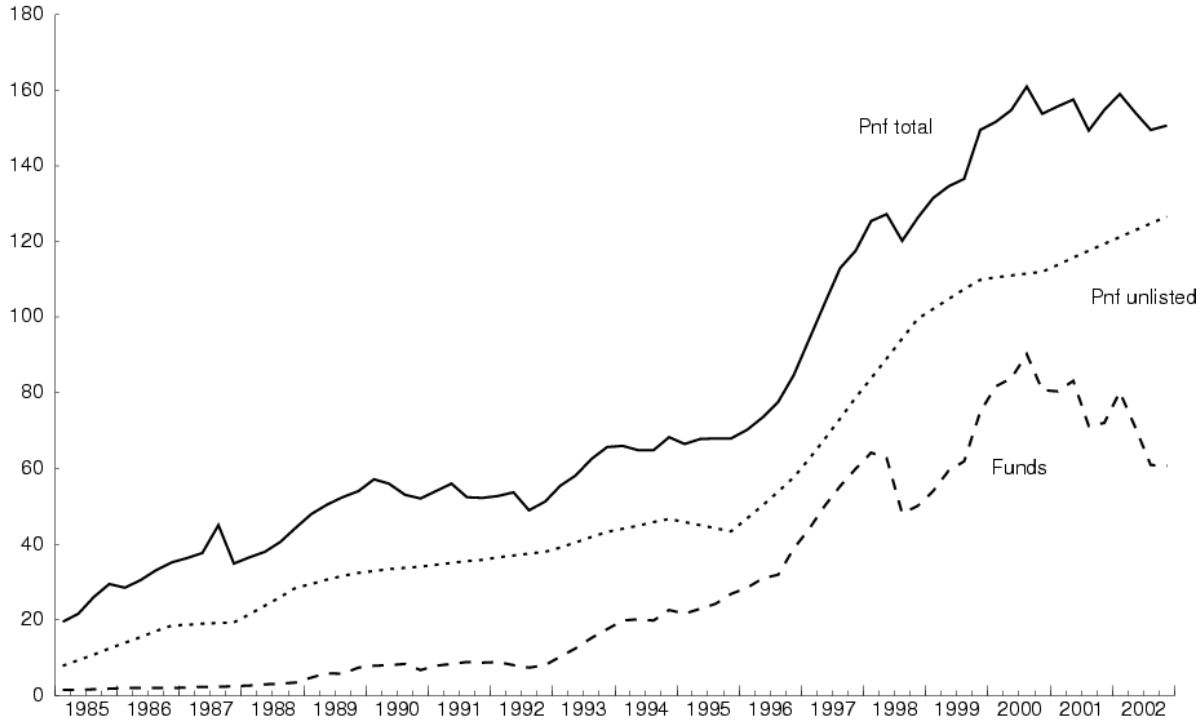
Source: Model.

Figure 14. Household investment in stocks
By sector, share of total stocks
Pnf=private non-financial and non-personal enterprises



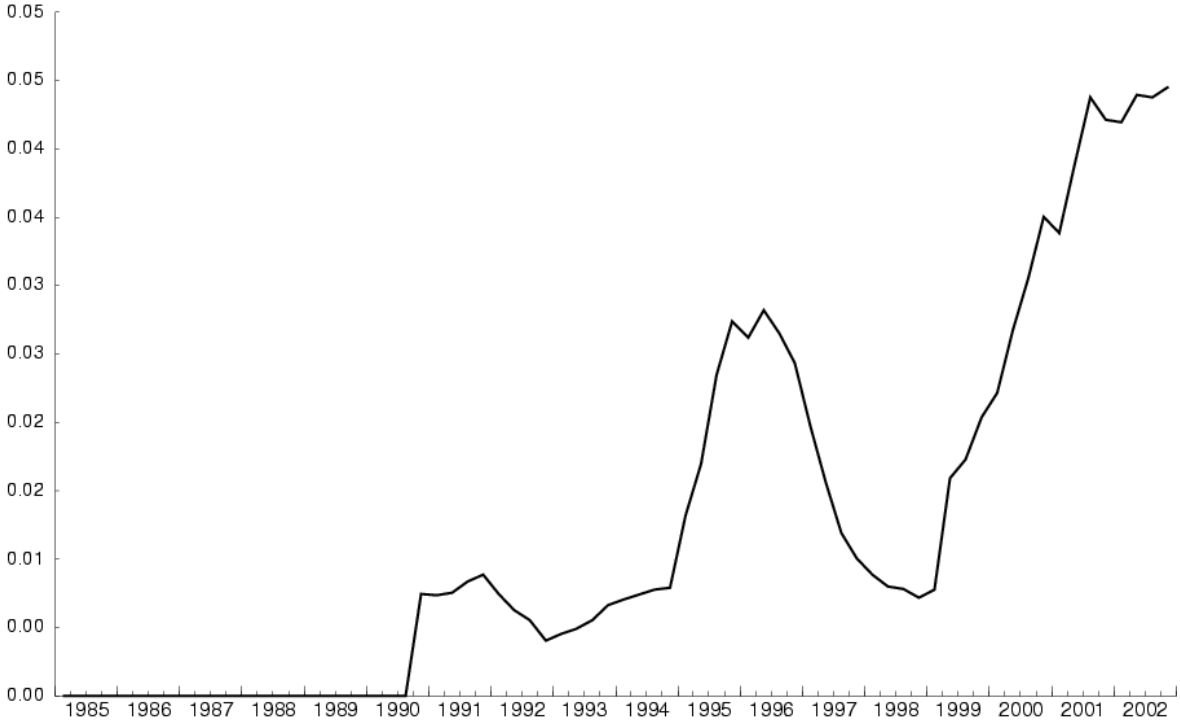
Sources: Model and FINDATR.

Figure 15. Household investment in stocks
By sector. Bill. NOK
Pnf=private non-financial and non-personal enterprises



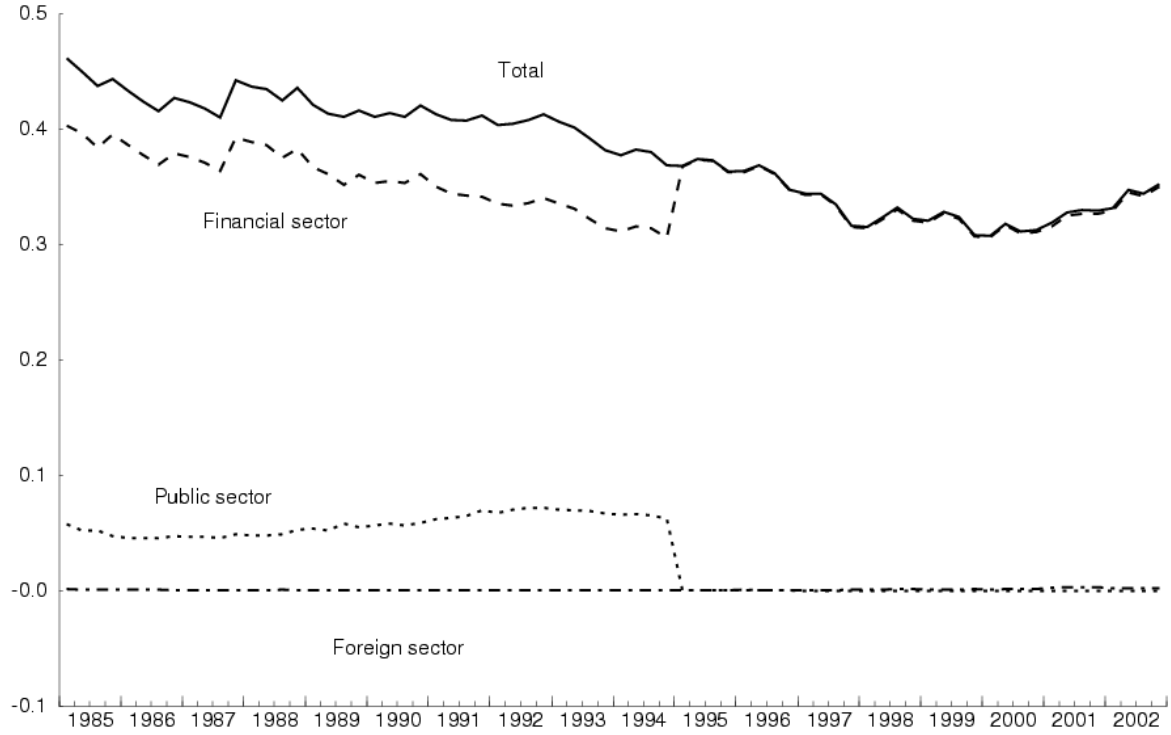
Sources: Model and FINDATR.

Figure 16. Household investment in foreign stocks
Share of total stocks



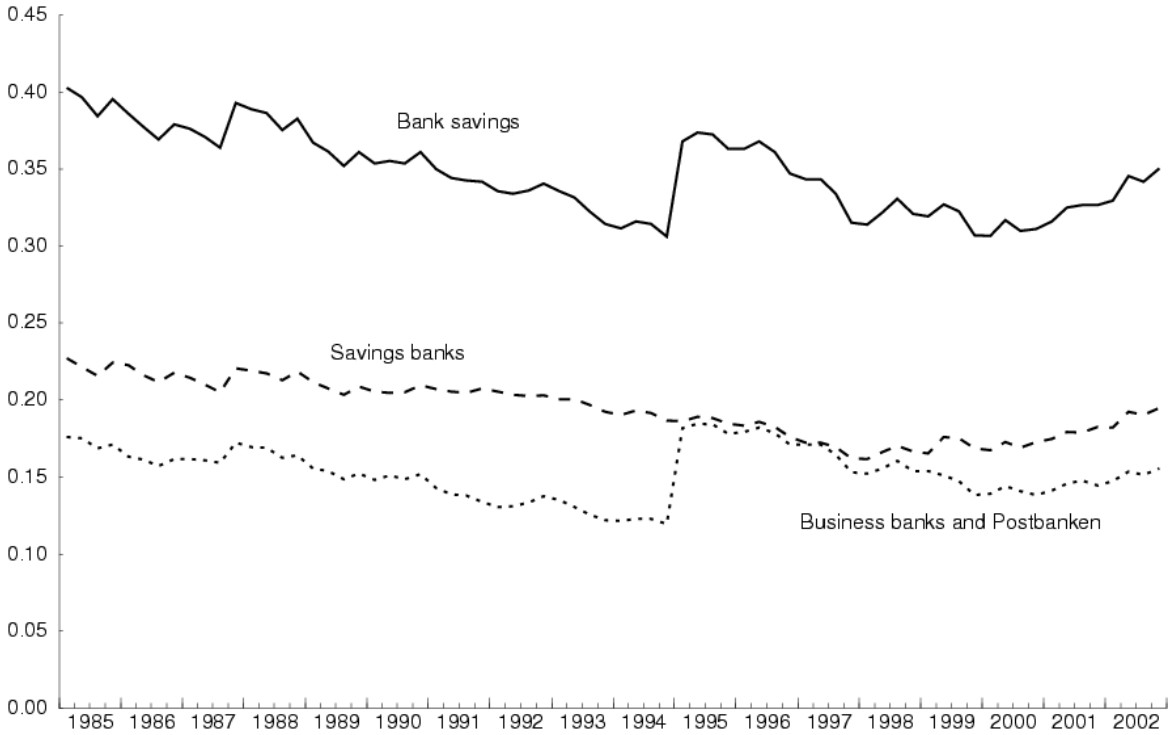
Sources: Model and FINDATR.

Figure 17. Bank savings
Public and financial sector. Share of total assets



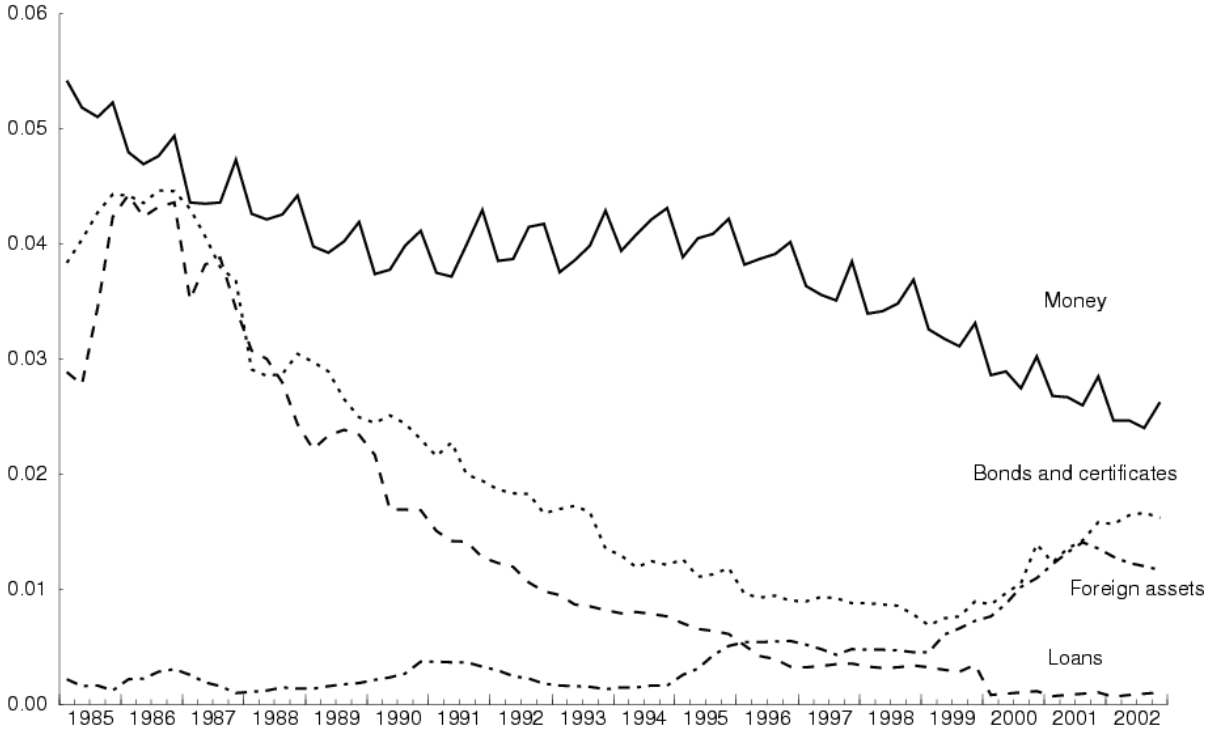
Source: Model.

Figure 18. Bank savings
Financial sector. Share of total assets



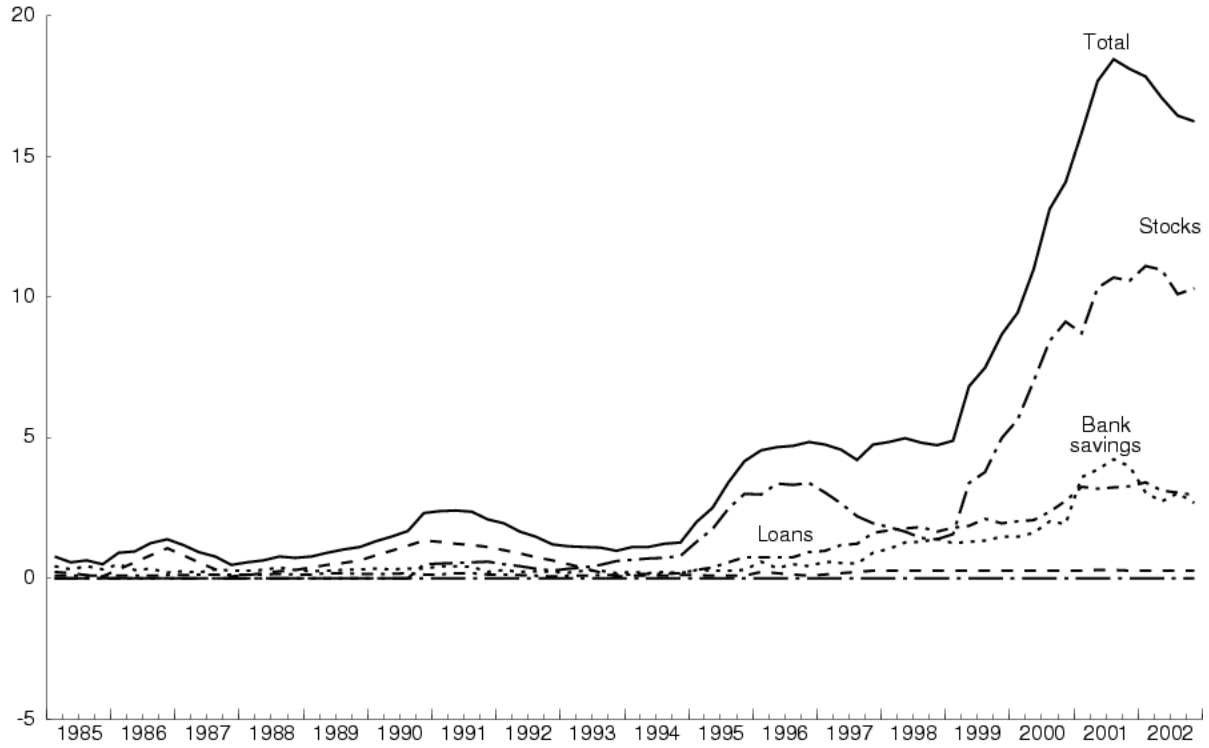
Source: Model.

Figure 19. Money, bonds and certificates, loans, and foreign assets
As share of total assets



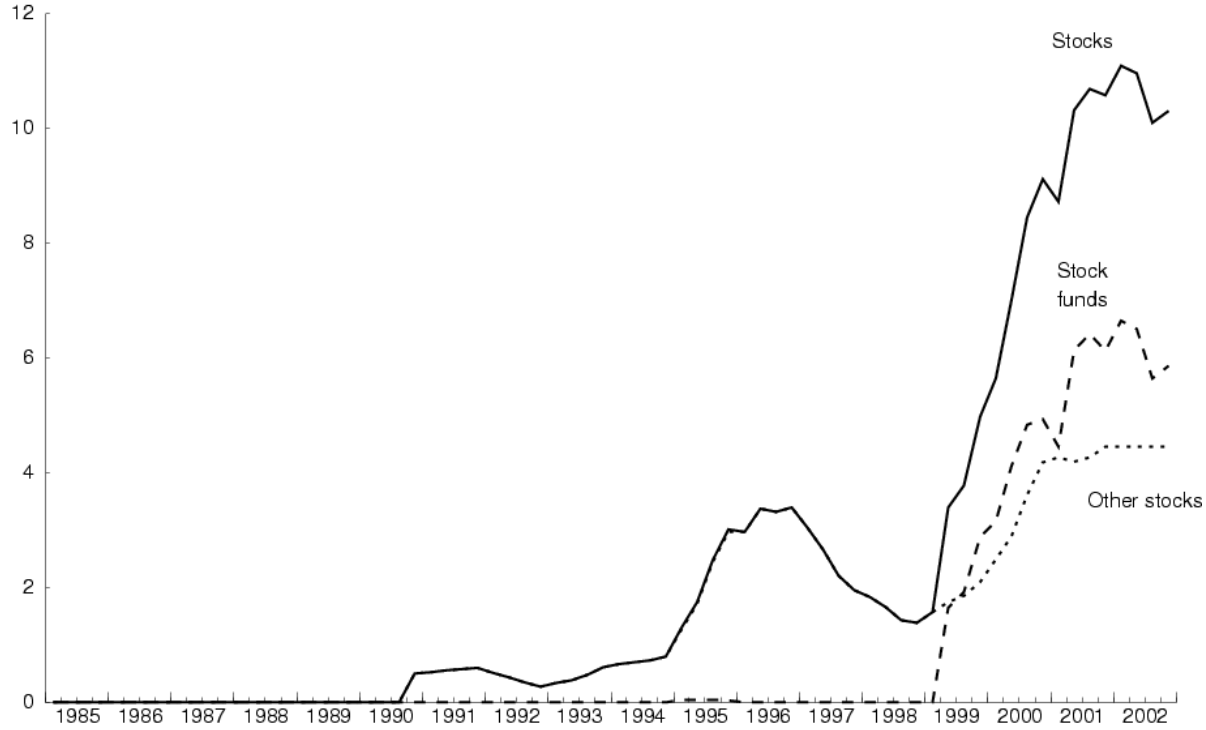
Source: Model.

Figure 20. Household investments abroad
Bill. NOK



Sources: Model and FINDATR.

Figure 21. Household investments abroad
Bill. NOK



Sources: Model and FINDATR.

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