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**Research Report**

## The Declining Deposit to Loan Ratio - What Can the Banks Do?

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Nr. 28 | 2012

# Staff Memo

Financial Stability

## The declining deposit to loan ratio - What can the banks do?

*Sigbjørn Atle Berg*

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# The Declining Deposit to Loan Ratio – What Can the Banks Do?<sup>1</sup>

Sigbjørn Atle Berg

## *1. Introduction*

Supervisors often advise banks that they should fund more of their loan book with customer deposits in order to become more robust to liquidity squeezes and contribute to the stability of the banking system. The background is that banks in many countries have become increasingly dependent on market funding. This may partly reflect larger trading books on their balance sheets, but it mainly reflects the fact that customer deposits have not kept up with the growth of the customer loan book.

Less deposit funding and more market funding is widely seen as negative for financial stability. Market funding requires that the bank continually rolls over bill and bond issues and renews borrowings from other financial institutions, in general depending on both domestic and foreign investors. These funding sources have proved to be less stable than customer deposits, and reliance on market funding has thus made the banks' liquidity positions more vulnerable to external shocks. The importance of this vulnerability was evident during the recent financial crisis from 2008, as discussed by for instance Beltratti and Stulz (2012).

There are also some empirical studies indicating that more reliance on market funding corresponds to higher risk exposure on the asset side of the balance sheet, see e.g. Demirgüç-Kunt and Huizinga (2010) and Norden and Weber (2010). But is perhaps not a causal relationship; it may rather be interpreted as different forms of risk-taking by banks who wants an overall high risk exposure.

In this paper we shall ask whether and how the banks in aggregate can in fact reduce their dependence on customer deposits. We do that by considering the determinants of the deposit-to-loan ratio for the entire banking sector. Which are the factors behind the decline in this ratio? Can these background factors be influenced by bank behaviour? We shall be looking at the determinants of bank deposits and bank loans held by the domestic non-financial sector (exclusive of the central government). This sector consists of households, non-profit organisations, non-financial companies and the local governments. These groups are the core customers that the banking sector should serve in an economy.

There is a large literature on the determinants of lending volume. A typical relationship for credit growth includes GDP growth, the loan rate, the disposable household income and house prices; see Hammersland and Træe (2011) for a Norwegian version. There is on the other hand very little research on how bank deposit volumes are determined. Cohen and Kaufman (1965) found that differences in deposit volumes between US states were mainly determined

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<sup>1</sup> Helpful comments from Henrik Andersen, Arild Lund and Ingvild Svendsen are gratefully acknowledged.

by household disposable income. Edminister and Merriken (1989) looked at the interest rate sensitivity of customer deposits in the years following the removal of interest rate regulations (Regulation Q) in the US. They essentially found that macroeconomic variables were much more important determinants than interest rate changes, with varying levels of interest rate sensitivity in different market environments. We are not aware of any more recent research contributions.

We shall consider the factors determining bank deposits and bank loans at Norwegian banks, both in the short and long term. A simple but superficial explanation is that bank loans have become more attractive both for borrowers and lenders, and that this has made it worthwhile for banks to fund the lending increases by borrowing from outside sectors, and in particular the foreign sector. That is to say that the decline in the deposit to loan ratio is fully explained by the denominator, while the deposit volume in the numerator has followed some (close to) independent path.

A more sophisticated rephrasing of this standard argument would be to assume that both loans and deposits are determined by the non-financial sector's optimisation of its balance sheet. Bank deposits are a form of financial investments that customers in the non-financial sector make out of their total gross financial assets. The size of these assets, as well as the return on alternative investments, should thus be important for explaining the size of bank deposits within a standard Markowitz portfolio construction framework. Gross financial assets can be accumulated either through savings or through borrowing, and can take many different forms. Bank deposits represent only one kind of financial asset, and the non-financial sector is likely to invest in alternative financial assets when these become more attractive.

But there may be more to the story than this. A financial flows model makes it clear that there is a very basic relationship between bank loans and bank deposits. Whenever a loan is provided, the money will be moved to a deposit account. When the money is used as payment for buying goods or services, the payment will generally be made by transferring money from one deposit account to another. If deposits are withdrawn to make payments in cash, the receiver will very likely deposit it with a bank. In short, bank loans tend to create bank deposits of the same size.

Loans from non-bank financial institutions are also likely to create new bank deposits. There are on the other hand leakages to the chain of deposits when payments are made to an entity outside the domestic non-financial sector. This could be payments to the central government, to the financial sector or to the foreign sector. Notice that alternative financial investments in the portfolio model above will in many cases involve a payment to the financial sector and thus represent a leakage in the loan-deposit chain. As noted by Disyatat (2011), "for the system as a whole, a substantial change in the aggregate amount of deposits suggests an overall shift in the structure of the money market", meaning that bank deposits are replaced by other financial assets.

We thus propose two lines of reasoning for explaining the decline in the deposit-to-loan ratio. One line holds that loans have become more attractive and/or that bank deposits have become less attractive to the agents in the non-financial sector. The other line claims that structural

changes in the financial markets have redirected some financial flows affecting deposits and/or loans. A combination of these two lines of argument is perhaps the most plausible model, but below we shall at first explore them separately.

This paper will be limited to exploring the Norwegian experience by trying to identify the factors behind the decline of the deposit-to-loan ratio at Norwegian banks. But declines in the deposit-to-loan ratio have also taken place in many other countries, and the empirical analysis below may thus be of some interest for their experiences as well.

In section 2 we shall have a brief look at the aggregate balance sheet of the Norwegian banking sector, and in particular the developments in the deposit-to-loan ratio. Both deposit and loan volumes depend mainly on decisions made by bank customers, and in section 3 we explore the portfolio model by looking at how attractive bank loans and bank deposits have been relative to alternatives. In section 4 we explore the financial flows model by looking into the detailed financial accounts of the non-financial sector. Section 5 concludes.

## ***2. The Deposit-to-Loan Ratio for Norwegian banks***

Our empirical analysis will be using data for the Norwegian banking industry from 1975 to 2011. In the Norwegian context a meaningful time series of bank loans will have to include loans from mortgage companies. We include both companies specialising on corporate loans and companies specialising on housing and property loans. The mortgage companies have always been important to the corporate sector, but they have also emerged as important lenders to the household sector since covered bonds were introduced in Norway in 2007. The mortgage companies are in general owned by banks and are integral parts of bank groups. Banks have been transferring an increasingly large portion of their mortgage loans to their subsidiary mortgage companies in order to use these loans as a basis for issuing covered bonds. Covered bond issuance now funds the major part of mortgage loans, loans that previously had to be funded by bank deposits or banks' non-secured borrowing.

Chart 1 depicts the ratio between bank deposits and banking sector loans (including the loans from the mortgage companies) held by the non-financial sector (the green line). The ratio declined from nearly 100 per cent to around 60 per cent in the run-up to the Norwegian banking crisis of 1990-92 when loan volumes increased rapidly. After the crisis period there was an upswing to nearly 80 per cent coverage, until a new decline in the ratio started in 1995 and brought it down to about 50 per cent today. The only periods with an increasing ratio have been 1976-80 and 1989-95.

In the analysis below we shall look separately at the households sector (including non-profit organisations) and the non-financial corporate sector (including local governments), who together constitute the domestic non-financial sector. Chart 1 includes separate deposit-to-loan ratios for these two subsectors. There is a declining trend in the ratio is for the households sector, while there are swings, but no clear downward trend, for the non-financial companies. The ratio has for most of the period been lower for the corporate sector, but that

difference has lately disappeared and been reversed. The chart seems to indicate that the long term downward trend has mainly to do with household behaviour.

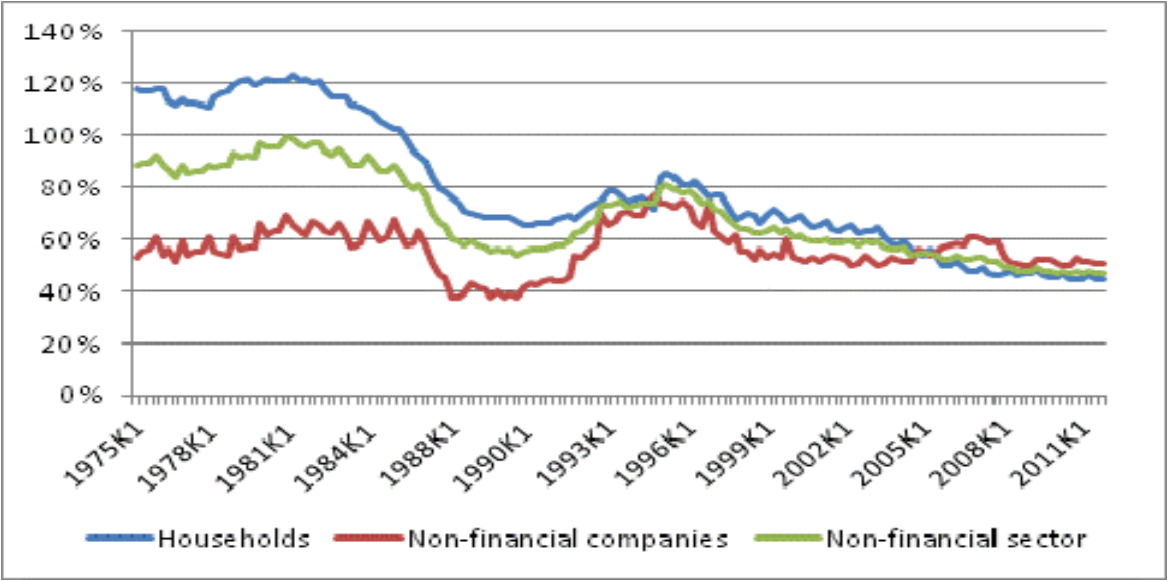


Chart 1: Bank deposits of the domestic non-financial sector as a ratio of its loans from banks and mortgage companies. Source: Financial Accounts, Statistics Norway.

Deposits from and loans to the non-financial sector are important components of Norwegian banking sector’s (banks and mortgage companies) balance sheets. Simplified balance sheets at end 1975 and end 2011 are depicted in Chart 2. The left hand panel shows banks’ assets. Loans to the domestic non-financial sector constitute about 60 per cent of banking sector total assets both in 1975 and 2011. These numbers clearly illustrate that loans to the domestic non-financial sector remains the core activity of the banking sector. The remaining 40 per cent of the total assets consist in 2011 of claims on other financial institutions (20 per cent), tradable financial instruments (10 per cent) and other assets (10 per cent).

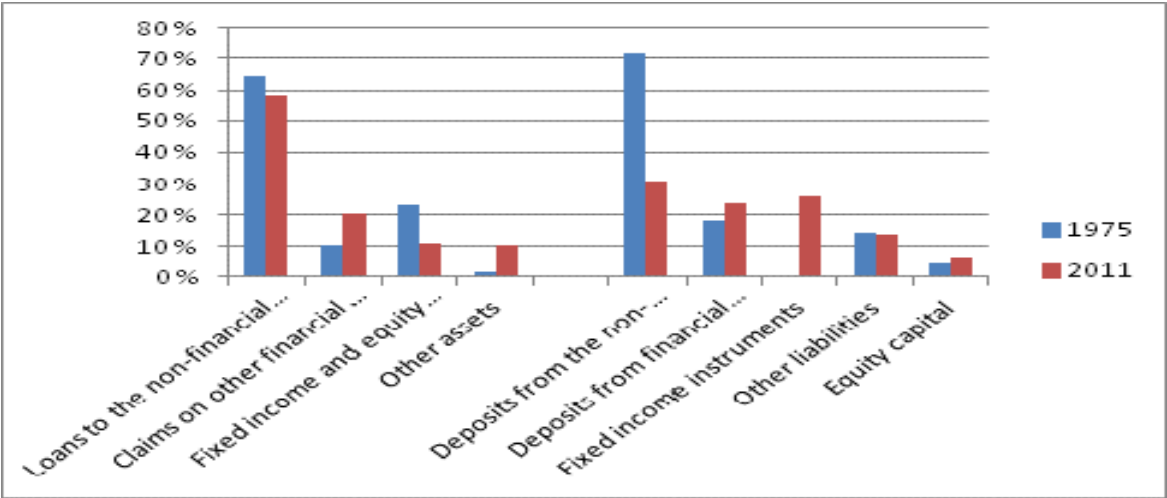


Chart 2: Aggregate assets (left) and liabilities (right) of all banks by end 1975 and all banks and mortgage companies by end 2011. Source: Banking Statistics, Statistics Norway.

The right hand panel in Chart 2 shows the liabilities. In 2011 deposits from the domestic non-financial sector makes for 31 per cent of total liabilities in banks and mortgage companies, down from 70 per cent in 1975. A little more than half of those deposits are guaranteed by the deposit insurance scheme. Around 20 per cent are deposits from other financial institutions and the central government, a little more in 2011 than in 1975. Equity capital represents 5-6 per cent. The remaining 40 per cent are in 2011 bills and bonds and other forms of borrowing from the markets or from the central bank. This is in contrast to 1975 when government regulation of credit volumes was extensive, and market funding was hardly used. The shift that has taken place on the liability side of the balance sheet is a quite dramatic decline in the importance of customer deposits.

**3. Optimising the balance sheet of the non-financial sector**

The bank deposit volume held by the domestic non-financial sector is determined by decisions made by the agents in that sector. The volume of bank loan taken by the non-financial sector depends heavily on decisions made by the same set of agents, even if banks’ credit evaluation standards will also be important. Our first line of reasoning for explaining the deposit-to-loan ratio holds that the deposit-to-loan ratio is determined by optimising agents in the non-financial sector. We thus need to look more closely at the balance sheet of that sector.

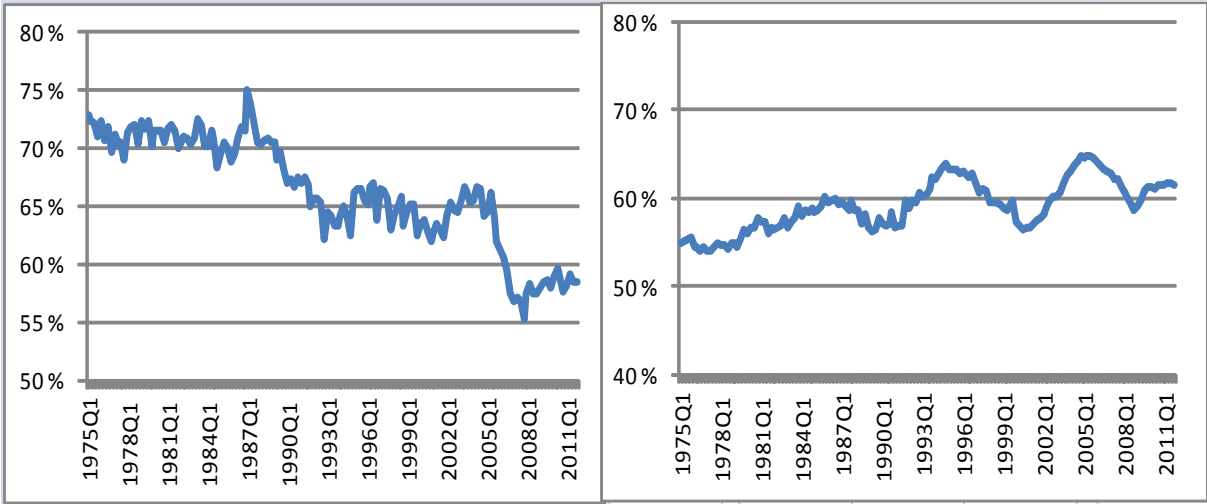


Chart 3: The share of non-financial sector deposits (left hand panel) and bank loans (right hand panel) held by households and non-profit organisations. Source: Financial Sector Accounts, Statistics Norway.

We shall look separately at the household sector (including non-profit organisations) and the non-financial corporate sector (including local governments). Their balance sheets can be extracted from the quarterly Financial Accounts, published by Statistics Norway. We start by looking at the relative importance of the two sectors. Chart 3 shows the households’ share of the total bank deposits and the total bank loans held by the non-financial sector. Households’ share of deposits has been declining since the late 1980’s and is currently below 60 per cent, whereas the households’ share of bank loans has been around 60 per cent for the entire period,



with a slight upward trend. This chart provides a further indication that the declining deposit-to-loan ratio has a lot to do with household behaviour.

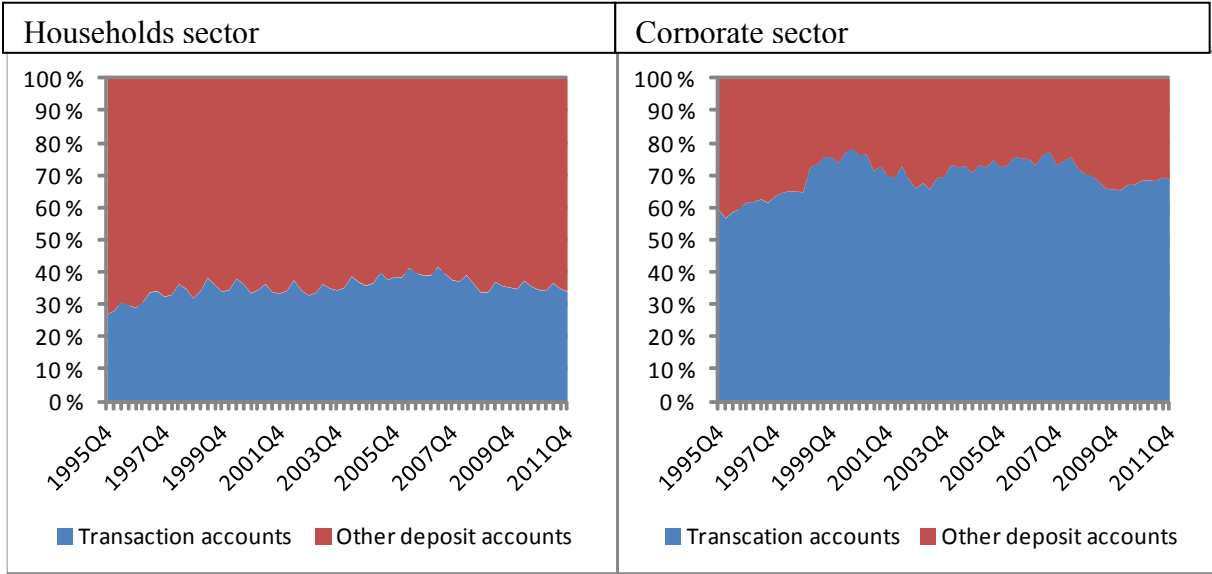


Chart 4: The portion of bank deposits held in transaction accounts. Source: Financial Sector Accounts, Statistics Norway.

The composition of bank deposits by type of account is available from 1995 only. Chart 4 shows that households have had only 30-35 per cent of their deposits in transaction accounts, whereas the corresponding ratio for non-financial companies has remained above 60 per cent and is currently nearly 70 per cent. This may indicate that bank deposits are mainly investment instruments for households, whereas non-financial companies have deposits mostly for transaction purposes.

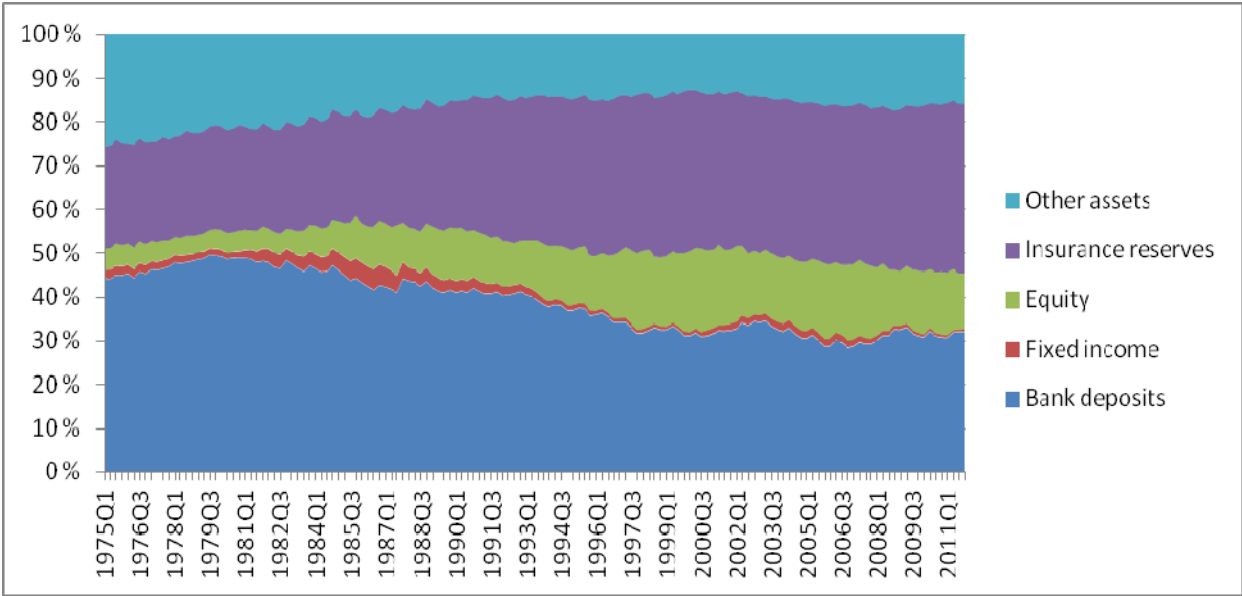


Chart 5: The gross financial assets of households and non-profit organisations by instrument. Source: Financial Accounts, Statistics Norway.

The composition of households' gross financial assets is presented in Chart 5. The share of bank deposits has declined from 44 per cent in 1975 to 32 per cent at end 2011. The decline started after bank loan markets had been deregulated in the mid 1980s. Prior to that loans were effectively rationed, and households would have to save in bank deposits in order to qualify for a loan from that bank. The alternative investments whose share of total assets has been increasing are mainly insurance reserves and equity investments. Equity holdings have increased from 5 per cent of households' financial assets in 1975 to 13 per cent in 2011, and the share of insurance reserves from 23 to 38 per cent.

Insurance reserves are essentially the customer portfolios in pension funds and life insurance companies. These portfolios are predominantly invested in fixed income (about 70 per cent in 2011) and equity instruments (about 20 per cent in 2011). Households thus hold about 50 per cent of their financial assets as capital market investments, as compared to 30 per cent in 1975. This shift out of bank deposits and into market instruments may partly be because higher income levels have stimulated long term saving for retirement or because returns have become more attractive. But to a very large extent it reflects structural changes whereby less of the long term saving desired by households has been provided through government non-funded pension schemes and more from privately funded schemes. Finally, new financial instruments introduced and sold by the banking sector may have tempted customers out of bank deposits.

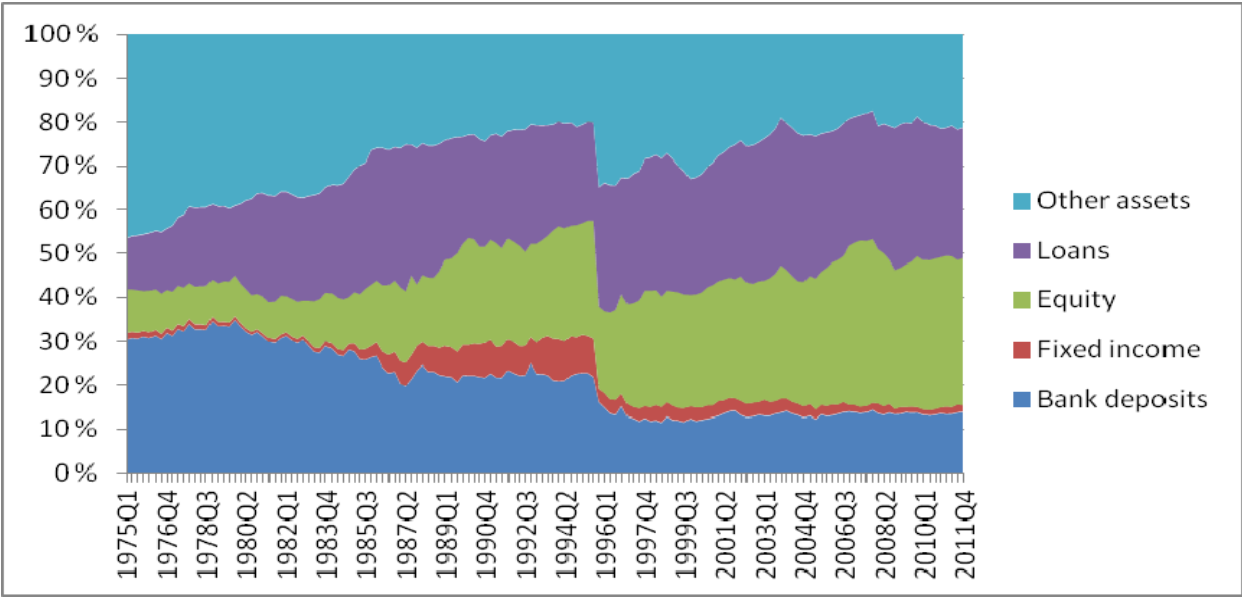


Chart 6: The gross financial assets of non-financial companies and local government by instrument. Source: Financial Accounts, Statistics Norway.

Chart 6 similarly depicts the asset composition of non-financial companies. These time series have a break in 1995Q4 when new definitions were introduced.<sup>2</sup> But we can still see a clear pattern: The share of bank deposits declined by 8 percentage points from 1975 to 1995, and by another 2 percentage points after 1995. The bank deposit share is currently 14 % of total

<sup>2</sup> The main change was that loans from one non-financial company to another were included on both sides of the balance sheet, thus blowing up both total assets and total liabilities.

assets. Equity holdings did on the other hand increase by 17 percentage points between 1975 and 1995, and by a further 15 percentage points after 1995. At end 2011 the equity share is 33 per cent of total assets.

Comparing charts 5 and 6 above, we notice that bank deposits have consistently been a much larger share of total financial assets in the households sector than in the non-financial companies. This would indicate that the sector allocation of gross financial assets in the non-financial sector may have had an effect on the aggregate share of financial assets held as bank deposits.

On the liability side of the balance sheet, bank loans are very important for the households sector, with nearly 80 per cent of their total liabilities. Chart 7 shows that the increased reliance on loans from private banks has a counterpart in less reliance on loans from government sector lenders. The sum of loans from these two types of lenders has increased slightly, from 84 to 92 per cent of households' total liabilities.

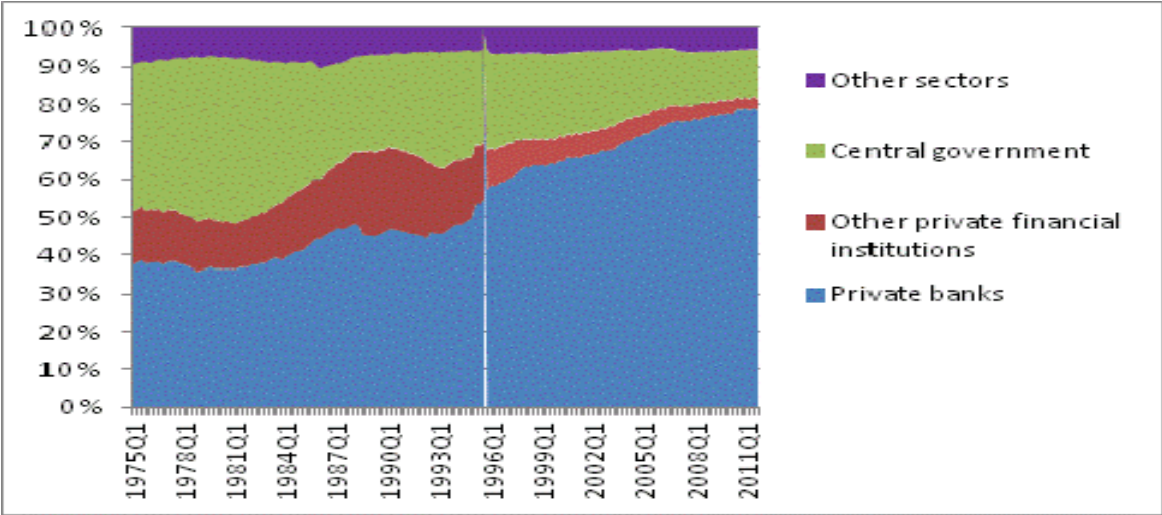


Chart 7: The liabilities of households and non-profit organisations by creditor. Source: Financial Accounts, Statistics Norway.

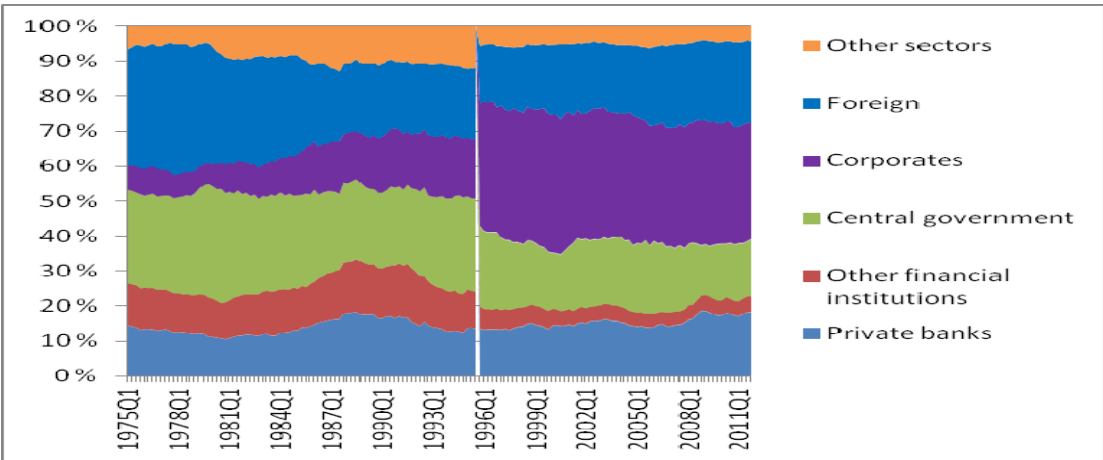


Chart 8: The liabilities of non-financial companies and local government by creditor. Source: Financial Accounts, Statistics Norway.

Chart 8 shows the liabilities of the corporate sector. The break in the time series from 1995 reflects changes in definitions, the main implication being that more loans between companies are included in the numbers (footnote 1). We notice that there have been only small changes in the importance of loans from private sector banks, but a clear decline in the importance of government lending.

The increased importance of bank loans to the non-financial sector thus partly reflects a reduction in lending from the central government sector. Government lenders have reduced their loans to both households and companies, and the private banks have been providing most of these loans instead. The public sector share of lending to households and companies have been steadily decreasing since 1981-82. This structural change in the Norwegian credit market was a consequence of government policies to reduce the importance of lending through government agencies. Notice that government lenders mostly did not take deposits. This structural change in the loan market may thus be an important factor behind the decline in the deposit-to-loan ratio at private banks.

We go on to consider how changes in the return of different investments may have changed the incentives to make deposits or take loans. Government bond returns are available from 1990. Chart 9 shows that they have followed bank deposit rates closely since then, but with the return differential tending towards zero. The returns on equity investments have been very volatile, but for most of the period since 1984 well above the returns on fixed income investments. There have been incentives to move funds into the stock market. Notice also that the period 1989-95, when the deposit-to-loan ratio were increasing, had high real returns on bank deposits and weak returns on the Oslo Stock Exchange.

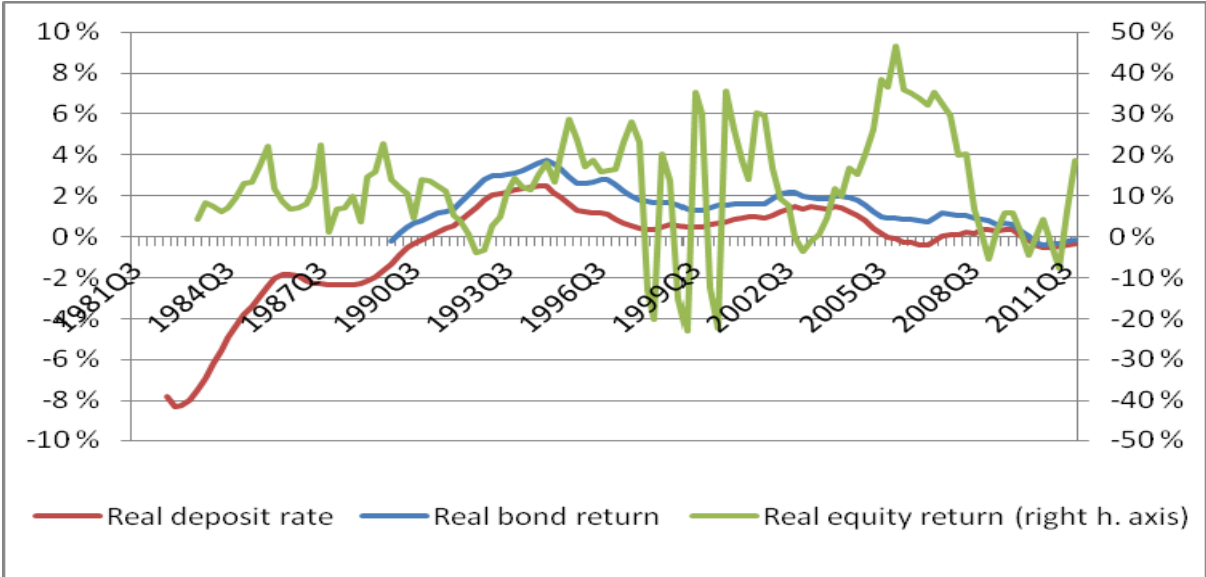


Chart 9: Real post-tax returns (deflated by the CPI) on bank deposits, government bonds and stocks listed on the Oslo Stock Exchange. Three years moving averages. Source: Statistics Norway, Norges Bank and Oslo Stock Exchange.

On the liability side we first notice that the real borrowing costs of the non-financial sector were high when the deposit-to-loan ratio was declining in 1989-95. The value of interest

payment tax deductibility was reduced from up to 50% down to a flat 28 per cent by the 1992 tax reform, but pre-tax interest rates have also been reduced. Chart 10 shows that the tax and inflation adjusted cost of taking out a bank loan is currently less than 2 per cent. This is very low by most standards. Notice, however, that the real cost of borrowing was negative in the run-up to the 1988-92 banking crisis.

Households mostly borrow for buying homes. The profitability of borrowing to invest depends on the house price inflation relative to the borrowing costs. Chart 10 does not take maintenance costs into account, but the chart still strongly indicates that housing investments have been profitable for most of the period after 1993. This followed a period during the banking crisis of 1988-92 when these investments had been highly unprofitable.

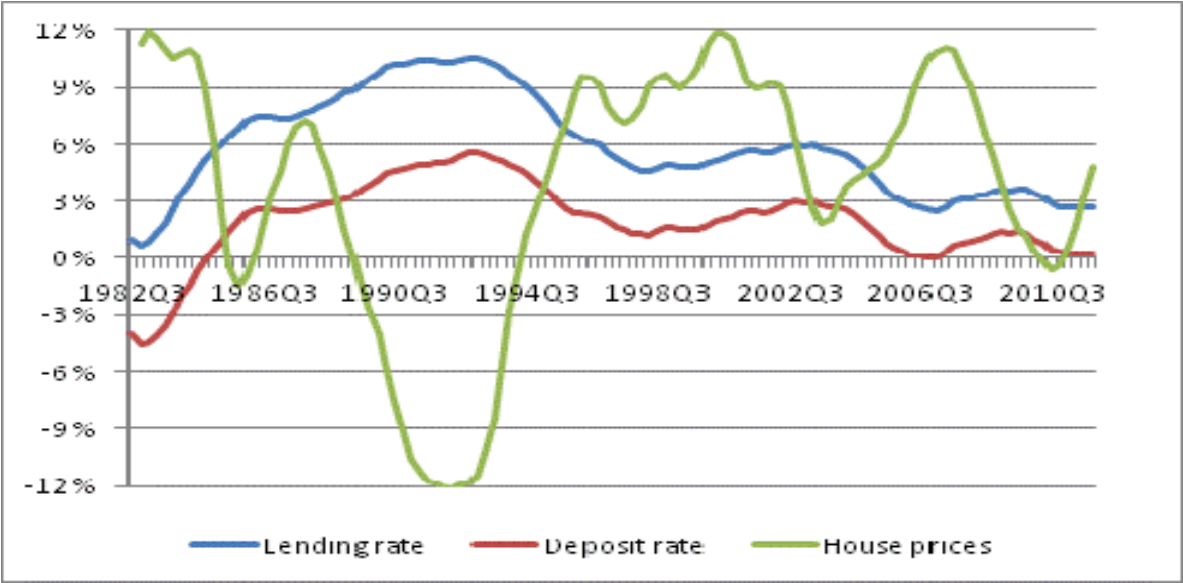


Chart 10: Real post-tax costs of bank loans and real house price inflation (deflated by the CPI). Three years moving averages. Source: Statistics Norway

The economic incentives to increased borrowing have thus been evident for the households' sector during the past 20 years. Above we saw that incentives to hold bank deposits had been weakened. In the period 1989-95 when the deposit-to-loan ratio increased, the economic incentives to make deposits were temporarily stronger and the incentives to borrow weaker. Eyeball econometrics seem to indicate that the portfolio model has some explanatory power.

**4. Financial flows analysis**

The gross financial assets of the non-financial sector can essentially be accumulated in three different ways; by financial saving, by borrowing and by revaluation of existing assets. Chart 11 provides convincing evidence that asset accumulation in the non-financial sector mainly comes from borrowing. The levels of total financial assets and total debt of the non-financial sector move in parallel in the upper panel. In the lower panel we can observe the very tight co-variation of changes in these two variables.

However, if we look at the households and non-financial company sectors separately, the co-variation is less close, see Chart 12. This is in particular true for the households sector. Their financial assets increased much faster than their debts during the 1990s, probably because savings became important for consolidating their balance sheets after the banking crisis. The opposite happened during most of the 2000s, when debt grew faster than assets.

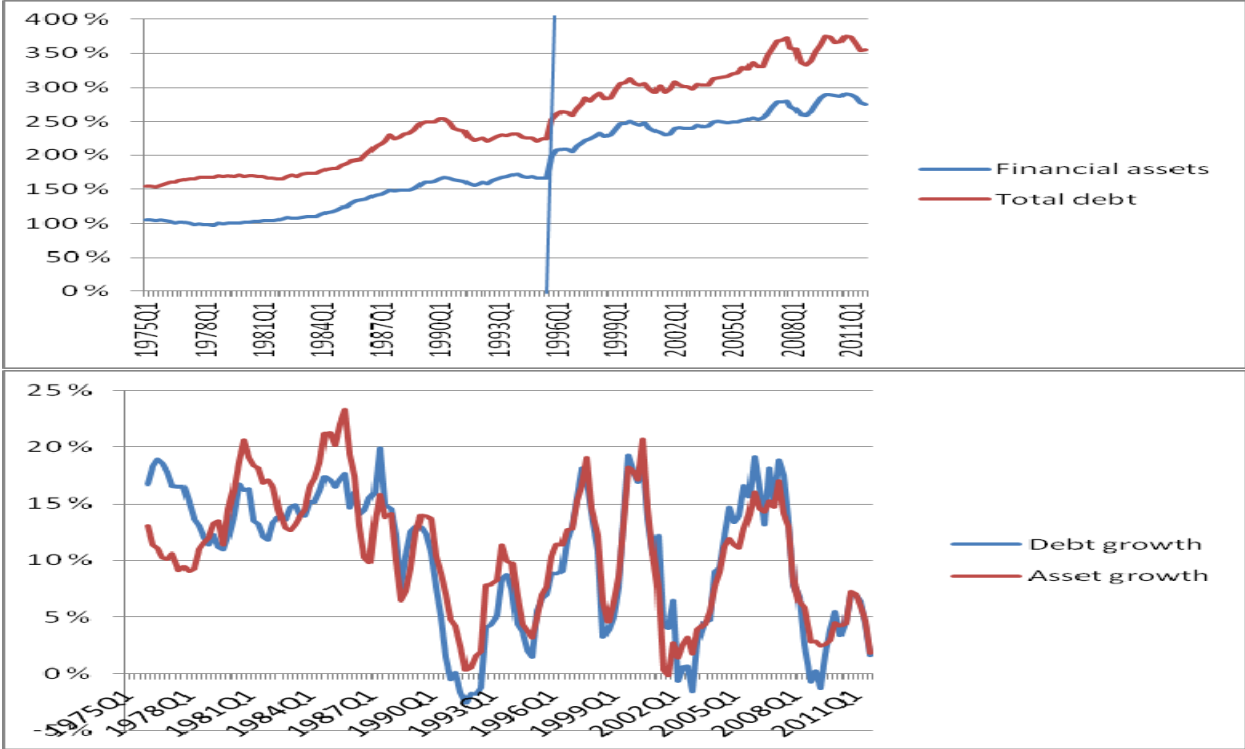


Chart 11: Gross financial assets and total debt of the non-financial sector in per cent of GDP. Levels in the upper panel and 4 quarter changes in the lower panel. Source: Financial accounts, Statistics Norway.

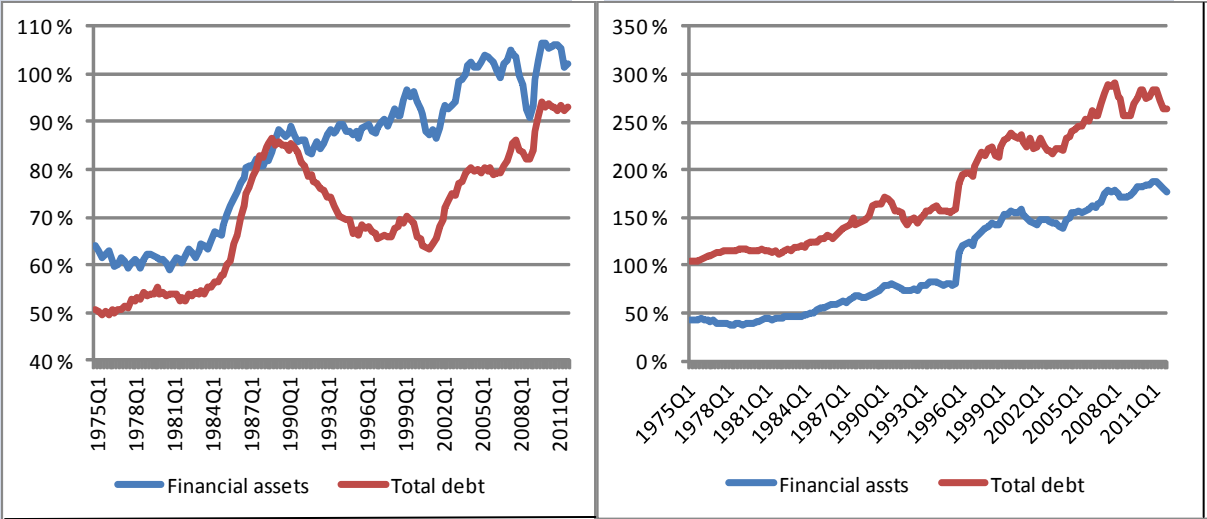


Chart 12: Gross financial assets and total debt of the households sector (left hand panel) and the non-financial corporate sector (right hand panel) in per cent of GDP. Source: Financial accounts and national accounts, Statistics Norway.



Chart 12 shows the debt and assets data in per cent of GDP. We can see that the non-financial corporate sector has much more debt and also more financial assets than the households. The households have now about 100 per cent of GDP on both sides of their balance sheet, with net assets of around 10 per cent of GDP. The corporate sector has gross debts above 260 per cent and assets above 170 per cent of GDP, with net debts at 80-90 per cent of GDP. Furthermore, the households' share of total assets in the non-financial sector has been declining from around 55 per cent in 1975 to less than 40 per cent in 2011. That shift alone contributes to a smaller fraction of assets in the non-financial sector being invested as bank deposits, confer Chart 3.

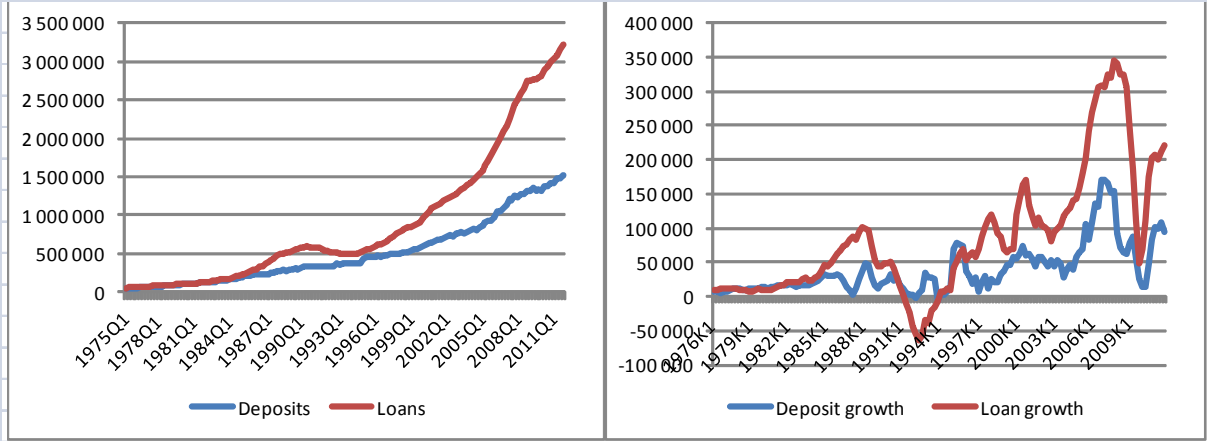


Chart 13: The levels (left hand panel) and four quarter changes (right hand panel) of bank deposits and bank loans to the non-financial sector. Millions NOK. Source: Statistics Norway.

We have seen that debt creates financial assets. Similarly, bank loans create bank deposits. A bank loan is given by making a deposit in the name of the borrower. The borrower normally spends or invests the proceeds by transferring it to another deposit account and so on. But as demonstrated in Chart 13 there is correlation, but not close co-variation of the two data series, neither in levels nor in differences.

There are two reasons for these deviations, as illustrated in the financial flows diagram (Chart 14). First, the bank deposit chain has leakages whenever payments are made from the non-financial sector to any outside sector. These outside sectors are the financial sector, the central government and the foreign sector. Any investments of the non-financial sector in financial instruments other than bank deposits will involve payments to the financial sector. The increased equity investment and insurance reserves shown in charts 5 and 6 represent such leakages. These increased leakages have contributed to the decline of the deposit-to-loan ratio.

Second, transfers to the non-financial sector from the outside sectors has helped increase bank deposits, but these transfers are not correlated with bank loan volumes. Looking more closely on these transfers we notice that borrowing from the central government has been declining, see charts 5 and 6, thus gradually contributing less to deposit growth. Borrowing from abroad to the non-financial sector has increased, however, which is a net contribution to

domestic bank deposits. But borrowing from abroad is nearly exclusively to the corporate sector, whose bank deposits are only a small portion of total financial assets.

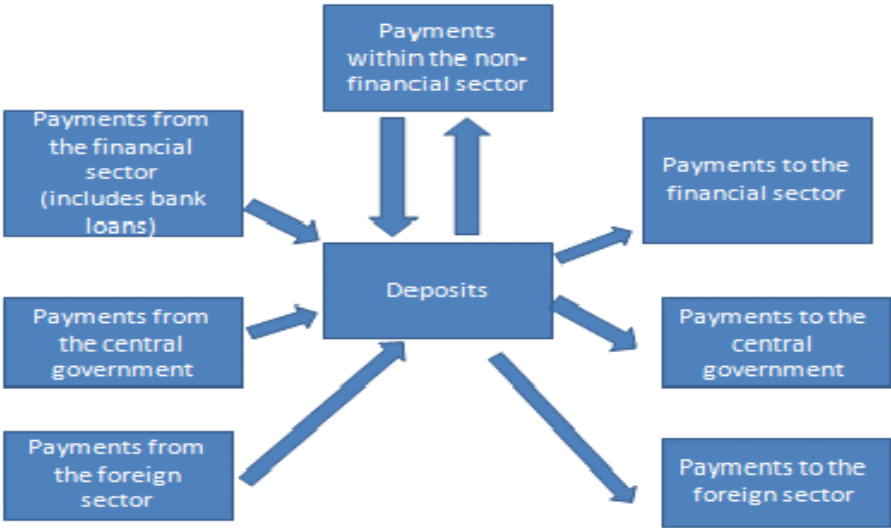


Chart 14: Deposits in the financial flows diagram

Charts 7 and 8 above illustrated the importance of bank loans as a share of total debt of the non-financial sector. Bank loans have become very important for the households sector where they constitute nearly 80 per cent of total debt in 2011. But they are much less important for the corporate sector, where the share is only 18 per cent.

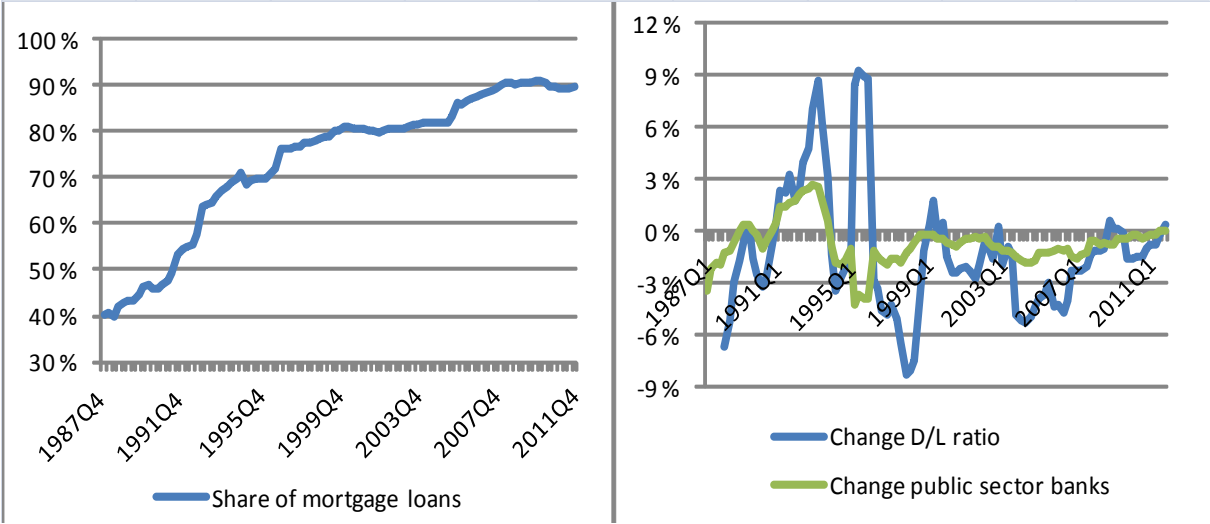


Chart 15: The share of mortgage loans to total private bank loans to the households sector (left hand panel) and changes in the deposit to loan ratio for households plotted against changes in share of loans from public sector banks in households' total liabilities (right hand panel). Source: Statistics Norway.



In parallel with this transfer of credit extension from public sector to private sector banks, the composition of the household loan book with private banks have changed. Chart 15 shows that the share of mortgage loans has increased from 40 per cent of total private bank loans to households in 1987 to 90 per cent in 2011. This naturally reflects the gradual transfer of mortgage loans from government lenders to private banks. In the last few years it also reflects the introduction of new loan products where households can use real estate as collateral for loans intended for other purposes than real estate purchases. There has also been an increasing share of mortgage loans with no repayments for extended periods.

The right hand panel of Chart 15 shows no close co-variation between the share of public sector loans and the deposit-to-loan ratio for households. This may indicate that the shift of mortgage loans from public sector lenders to private banks is not a good explanation for the year-to-year changes in the deposit-to-loan ratio. It may still be important for explaining the long term trend. Notice in particular the temporary upward shift both in the importance of government lending and the deposit-to-loan ratio at private banks in the early 1990s.

## *5. Conclusions*

We have been exploring possible explanations for the strong decline in the ratio between bank deposits held by the non-financial sector in Norway, and the bank loans taken by the same sector. We have followed two different but related lines of reasoning. First, we have been looking at the relative return on bank deposits and on the relative costs of bank loans in a portfolio model approach. Second, we have tried to follow financial flows to identify structural changes in the Norwegian markets that could have an effect on the deposit-to-loan ratio.

We did find that real deposit rates have been low during periods with strong decline in the deposit-to-loan ratio, pointing to the attraction of alternative investment opportunities in capital market instruments. This has either been done directly or through the participation in funded pension schemes. During the periods of strong declines in the ratio we also found that the real loan rate has been low. In combination with a significant house price inflation this have made borrowing quite attractive to households.

The return incentives are particularly clear for the households sector. That is also the sector where the deposit-to-loan ratio has been declining since 1995. For the corporate sector the return incentives have been less clear-cut, and the decline in the deposit-to-loan ratio has been modest.

On the structural side, we first find that funded pension schemes have become more important during the past 30 years. This has probably to do not only with return incentives, but also with the growing importance of privately funded pension schemes as a supplement to the public non-funded pension schemes. Public pension schemes have become less satisfactory both because the upper limit on benefits have become binding for more people, and recently also because the level of benefits have been curtailed.

A second structural factor is that a large part of the lending to households has been transferred from public sector agencies to private sector banks during the past 30 years. A similar development has taken place for the corporate sector, but at a much smaller scale. Since public sector lenders mostly did not take deposits, this represents an obvious factor behind the long term trend. In parallel with this development, bank loan markets were deregulated, making deposits less important as a qualifier for bank loans. But these processes have been slow and may not contribute much to explaining the year-to-year changes in the deposit-to-loan ratio.

We also find a counteracting factor in the increased reliance of the corporate sector on foreign borrowing. Such financial inflows should lead to more deposits with Norwegian banks, at least when the borrowers operate on the domestic market. But there are two reasons why this effect may be small: First, much of the foreign borrowing has probably been to the petroleum sector that to a large extent operates outside the Norwegian economy. Second, the corporate sector holds only a small share of its financial assets as bank deposits. They do that mainly for transaction purposes, and their transaction needs will not increase as a consequence of shifting from domestic to foreign borrowing.

We are often told that banks should increase their deposit funding and reduce their reliance on market funding, meaning that they should engineer a rise in the deposit-to-loan ratio. While this is clearly desirable from a financial stability point of view, it is less clear how much the banks can actually do. There is very little they can do with some of the structural changes that have taken place. The strongest return incentive for household behaviour probably stems from house price inflation, that individual banks are not able to control.

The banks can certainly bid higher deposit rates to attract deposits, but the aggregate effect on total deposits in the system may be small. Banks can restrain their sales of new financial products of the kind that have shifted investments out of deposits and into alternative financial instruments, but that must a concerted effort to make much difference at the macro level. What individual banks undoubtedly can do is to restrict lending. That will certainly also reduce deposits, but the link between loans and deposits is likely to be much weaker at the individual bank level than it is in aggregate. And if lending growth is not restricted, one contribution individual banks could make to financial stability would be to make more of their market funding long term.

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