

How large are the financial margins of Norwegian households? An analysis of micro data for the period 1987–2004

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In this article, financial margins in Norwegian households are calculated using micro data for the period 1987 – 2004. Financial margins are defined as household liquid assets after borrowing costs and ordinary living expenses. This is an indicator of the resilience of household finances to changes in economic conditions such as an increase in interest rates or a reduction in income. Hence, margins can provide information about the risk of losses on bank loans to the household sector. Overall household margins increased substantially from the end of the 1980s to 2004 due to strong income growth coupled with a reduction in the share of income used to cover ordinary living expenses and borrowing costs. Most households have solid margins, although some households have small or negative margins. The share of households with negative margins has decreased over the period analysed.

173

1 Introduction

In assessing the risk associated with loans from financial institutions, it is important to monitor household debt for two reasons. First, a substantial reduction in households' debt-servicing capacity may increase losses on financial institutions' loans to the household sector. Second, households in financial distress may substantially reduce spending on goods and services. This, in turn, may affect corporate earnings and contribute to increasing losses on bank loans to the business sector.

Financial margins, which are defined as liquid assets after ordinary living expenses and borrowing costs, may shed light on these questions. In this article, micro data are used to calculate the margin of individual households. In Section 2, we present the data and consider the relationship between banks' non-performing loans and household margins. In Section 3, we calculate the total value of households' positive margins to investigate developments in household liquid assets, i.e. assets for consumption in excess of ordinary living expenses and for saving in excess of loan repayments. In Section 4, we look more closely at the portion of debt held by households with negative margins and the characteristics of these households. In Section 5, we analyse how margins are affected by changes in the interest rate, and in Section 6, we summarise our findings.

2 Background

Why study the financial margin in individual households?

Norges Bank monitors household debt as part of its surveillance of financial market risk. Total household debt as a percentage of total disposable income is often

used to measure this risk (see, for example, *Financial Stability* 1/06). This indicator has some limitations, however, because it is an aggregated variable. First, this income also includes income from debt-free households. Second, the indicator does not take into account income levels. Households with high income can service relatively more debt than low-income households. Third, the indicator does not take into account fundamental differences between households, such as age, number of household members and number employed.

Access to data at the household level allows us to calculate household financial margins which reflect the financial situation of households. The calculations are similar to the calculations made by banks when they assess household loan applications.

Banks base their assessments on household income. Ordinary living expenses calculated on the basis of household composition are then deducted. On the basis of the resulting disposable income, banks calculate the maximum loan level based on assumptions concerning interest rates and repayment profiles. However, future debt-servicing capacity is uncertain. Interest and principal payments must be paid over the entire life of the loan, whereas various factors such as changes in income and interest rates or changes in household composition affect the financial situation of households.

The data allow us to identify households with a negative margin. We assume that the financial situation of these households is strained. This household debt is particularly vulnerable to default and will hereafter be referred to as exposed debt. Exposed debt as a share of total debt may be an indicator of the direct risk associated with bank loans to the household sector. Total margins are defined as the sum of margins in households with a positive margin. We consider total margins to be

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Financial margins – definitions and data

In Table 1, different types of margins are defined on the basis of the components included. *Margin after consumption* is defined as annual income after tax less ordinary living expenses. If we in addition deduct interest expenses, we obtain *margin after interest*. *Margin after principal*, which is household liquid assets after interest, estimated principal payments over a 20-year period and ordinary living expenses, is the basis for banks' assessment of loan applications. *Margin with bank deposits* is margin after principal payments plus bank deposits, while *margin with financial assets* includes total household financial assets. Real household wealth, including dwellings, is not considered in this analysis.

Self-employed persons are excluded because it is difficult to differentiate between business activity and private finances. Students are also excluded. Student loans are reported as debt but are used largely to cover ordinary living expenses.

The sample includes 84 per cent of the observations in the available data set. The data set consists of approximately 3 000 households in the data for 1987 and an increasing number of households in subsequent years. In the last years, there are more than 10 000 observations. Due to the relatively small number of observations in the first years, there is greater uncertainty associated with the estimates from the end of the 1980s.

The data on income, bank deposits, interest expenses, financial assets and household composition are drawn from Statistics Norway's *Income and Property Statistics for Households 1987–2004* (see

NOS D310 (2004)). The statistics are based on material from the Income Distribution Survey, which is a representative sample survey. Income data are drawn from tax returns for all members of the sample households and data on tax-free income from a number of public registers. The micro data do not contain information on households' insurance technical reserves in connection with group insurance schemes.

Using the standard budget for households developed by the National Institute for Consumer Research (SIFO) through the period 1987–2004, we can calculate the cost of a reasonable level of consumption for an average household of varying sizes. Reasonable implies a level that is acceptable to the majority of households. This consumption level meets requirements for normal health and nutrition standards and allows household members to participate in the most common leisure activities. An assessment of what is a reasonable level of consumption will, of course, vary by geographic location. We have included living expenses other than interest and principal payments, such as electricity, because these are not included in the SIFO budgets.

The data do not include information about principal payments. Principal payments are calculated assuming linear loan repayment over 20 years (serial loan). The principal payments emerge as 1/20 of total debt. It is common, however, to negotiate a longer period of repayment as well as annuity loans.

Table 1. Financial margins. Different definitions and average size 2004. Plus and minus signs indicate which elements are included in the various definitions of margins and whether the contribution is negative or positive.

		Income after tax	Bank deposits	Other financial assets	Ordinary living expenses	Interest paid	Principal paid
	Average NOK 1000	356	239	179	170	24	28
Margin after consumption	186	+			-		
Margin after interest	163	+			-	-	
Margin after principal payments	134	+			-	-	-
Margin with bank deposits	374	+	+		-	-	-
Margin with financial assets	553	+	+	+	-	-	-

Sources: Statistics Norway, National Institute for Consumer Research (SIFO) and Norges Bank

an indicator of total household demand for goods and services from non-financial enterprises. This demand will affect corporate earnings and debt-servicing capacity.

The data comprise too few observations to determine whether there is a stable correlation between margins and loan defaults. Chart 1 indicates that there is a correlation. The bottom curve shows the default rate on all bank loans, which is defined as the value of banks' non-performing loans to households and non-financial enterprises as a share of total lending. There is a positive correlation between the share of exposed debt and default rates. The turning points of exposed debt seem to precede the turning points of default rates. A possible explanation is that households have financial assets on which they can draw for a period before defaulting on loans. There is a negative correlation between the default rate and total positive margins.

It is reasonable to assume that variables that reduce tax, such as interest payments, are reported in full in tax returns, whereas taxable variables such as income and wealth may be underreported. In isolation, the effect of this will be that actual margins are somewhat higher than indicated by the data.

The micro data allow us to analyse the distribution of margins by various types of households. By identifying which groups of households are most exposed and following developments in these groups, we can identify the causes of risk associated with loans from financial institutions at an early stage.

Other countries have conducted a number of micro-based studies of household debt (see DWP (2004) and May et al. (2004)). The analysis in this article is similar to the analyses in Sveriges Riksbank (2004, 2005) and the BIS (2006). These analyses shed light

on household vulnerability by dividing households into five income groups and then calculating margins after interest payments. On the basis of figures for 2001, Sveriges Riksbank concludes that the high level of debt in Sweden's household sector does not pose a threat to banks and therefore is not a threat to financial stability. Households are also robust to potential interest rate increases. This is because household debt in Sweden is concentrated in the highest income groups which have solid margins and the majority of financial assets. In Section 4, we compare our results with the results from Sweden.

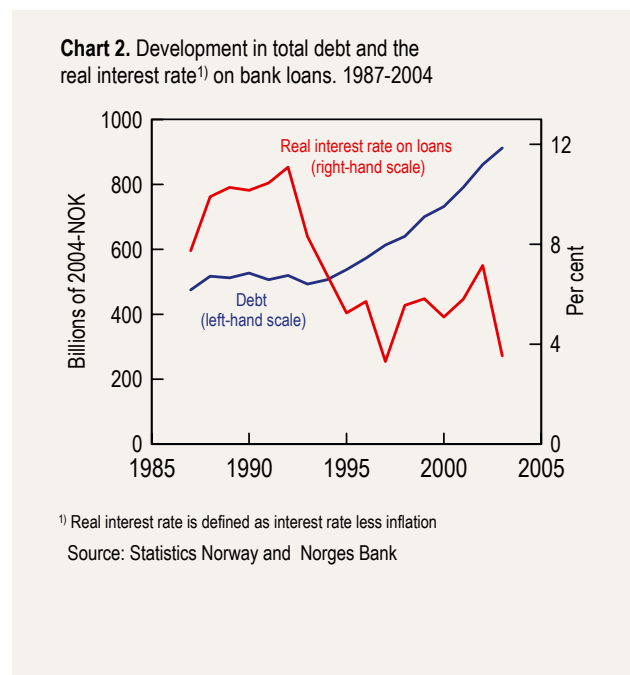
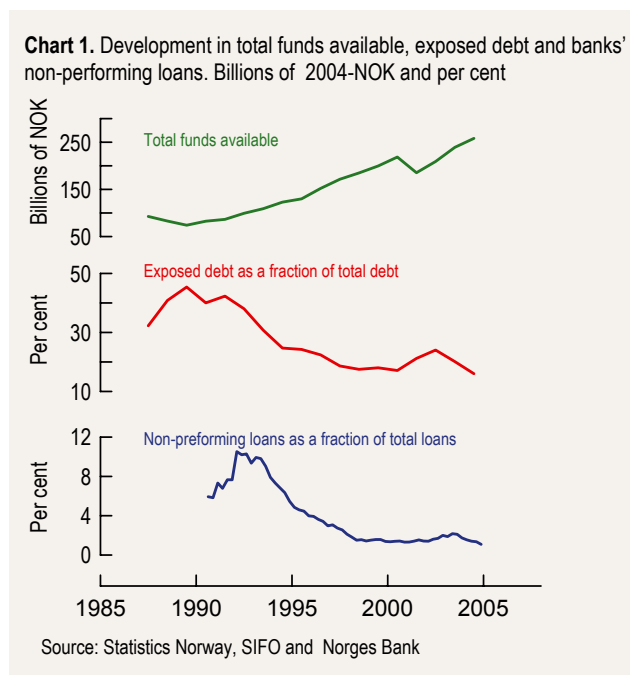
The register-based data for Norway is considered satisfactory compared with the data in other countries' surveys. With the exception of Sveriges Riksbank's surveys, the micro analyses of the financial situation of households in other countries are largely based on interviews (see e.g. Redwood et al. (2004)).

3 Household margins

Total household margins have increased during the period analysed

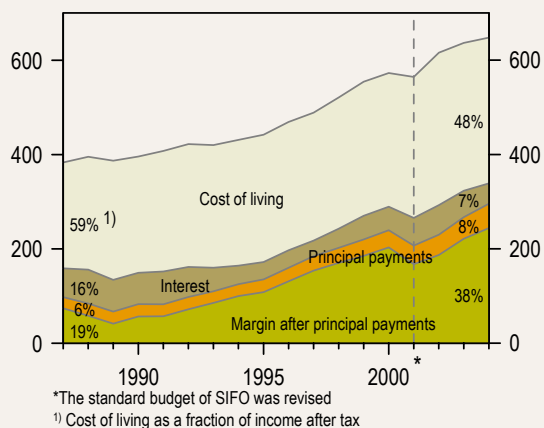
Household debt more than doubled in the period 1987–2004.² The interest rate level, measured as banks' average real interest rate for households, has fallen by more than 6 percentage points from the peak level in the period analysed (see Chart 2). In 2004, the interest rate on bank loans to the household sector averaged 4.1 per cent, or a real interest rate of 3.7 per cent.

Total household income after tax, measured in 2004-NOK, rose by 69 per cent in the period 1987–2004. In 1987, household liquid assets after ordinary living expenses and borrowing costs represented 19 per cent



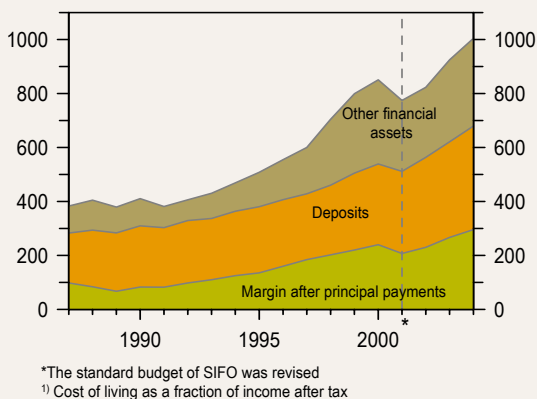
² See *Financial Stability* 1/06 and Riiser and Vatne (2006) for a general description of the financial situation in the household sector.

Chart 3. Income after tax broken down by expenses and margin after principal payments. Billions of 2004-NOK and percentage of income. 1987-2004



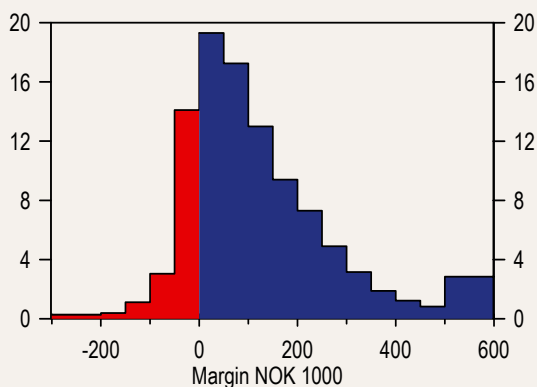
Source: Statistics Norway, SIFO and Norges Bank

Chart 4. Total funds available including financial assets. Billions of 2004-NOK. 1987-2004



Source: Statistics Norway, SIFO and Norges Bank

Chart 5. Distribution of households by margin after principal payments. Per cent. 2004



Source: Statistics Norway, SIFO and Norges Bank

of income (see Chart 3). In 2004, the share increased to 38 per cent. Households are using less income to cover living expenses and to service debt. The share of income used to cover ordinary living expenses declined from 59 per cent to 48 per cent, whereas the share used to service debt declined from 22 per cent to 15 per cent. On the whole, margins after principal payments increased from 74 billion to 244 billion in 2004-NOK.

Financial assets comprise two components, i.e. bank deposits and other financial assets. In 2004, bank deposits accounted for less than half of household financial assets, excluding insurance reserves. Growth in total bank deposits has been considerably weaker than growth in debt. Therefore, overall debt was secured by deposits to a lesser degree in 2004 than in 1987. The assessed value of other financial assets has increased strongly and more sharply than debt in the period under review. Of other financial assets, approximately 60 per cent consists of unlisted equities and other outstanding claims.

Chart 4 illustrates developments in total liquid assets in the household sector when financial assets are included. If we include all financial assets, liquid assets more than doubled through the period analysed. Financial assets' share of total liquid assets was reduced from 81 to 76 per cent. Bank deposits' share of total margins was reduced in favour of securities which are less liquid and can fluctuate considerably in value. Therefore, it is difficult to assess whether financial assets will provide a buffer in the event of debt-servicing problems.

Distribution of financial margins

In general, the financial situation in the household sector is solid. In 2004, 45 per cent of households had a margin after principal payments of more than NOK 100 000 (see Chart 5). 19 per cent had a margin between 0 and NOK 50 000, while 19 per cent had a negative margin. Households with low and negative margins are vulnerable to increases in interest rates and reductions in income.

4 Debt held by households with a negative margin

One-sixth of total debt was held by households with a negative margin after principal payments

The size of margins is an indicator of the resilience of households to unforeseen events. Chart 6 shows the share of households with a negative margin, measured by the different margin definitions, and the share of total debt held by these households in 2004. Less than 3 per cent of a total debt of about NOK 1 030 billion is

held by households without sufficient income to cover ordinary living expenses. The share increases to 5.2 per cent if interest expenses are included. Households with a negative margin after principal payments held 16 per cent of total debt in 2004. If we include financial assets in the margin, the share of debt held by households with a negative margin declines considerably.

In the rest of the analysis, we focus on margins after principal payments. In the following, the term *exposed debt* refers to debt held by households with a negative margin.

Households with a negative margin after principal payments have several options to avoid defaulting on loans. They can negotiate an interest-only period or extend the life of the loan, reduce consumption or draw on their financial assets. Thus, negative margins after principal payments do not necessarily increase the risk of default.

Table 2. Margin components . Average. 2004. In thousands of NOK

	Income	Living expenses	Estimated principal	Interest	Margin
Positive margin after principal payments	405	175	29	25	175
Negative margin after principal payments	150	147	24	24	-40
Difference	254	29	5	1	216

Sources: Statistics Norway, National Institute for Consumer Research (SIFO) and Norges Bank

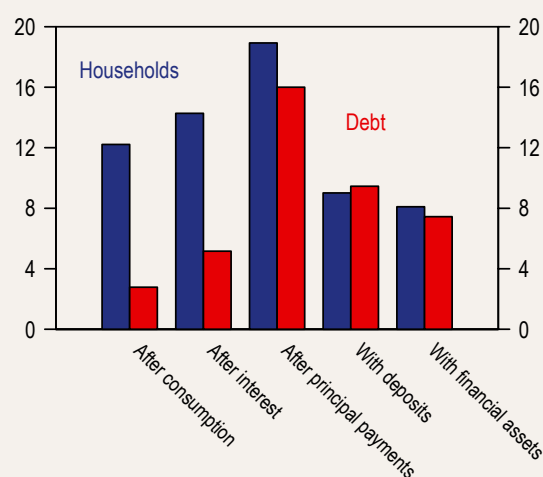
The main difference between households with a positive and negative margin after principal payments is average income level. Differences on the expense side are less pronounced (see Table 2). Roughly speaking, negative margins are largely a result of low income rather than high interest and principal payments.

Low and middle-income households hold most of the exposed debt and are increasing their share of exposed debt

The share of exposed debt relative to total debt is highest for low-income groups (see Chart 7). The 20 per cent of households with the highest income hold 43 per cent of total debt, but only 12 per cent of exposed debt. The two lowest income groups hold 14 per cent of total debt, but 51 per cent of exposed debt. In the lowest income group, nearly all debt is exposed debt.

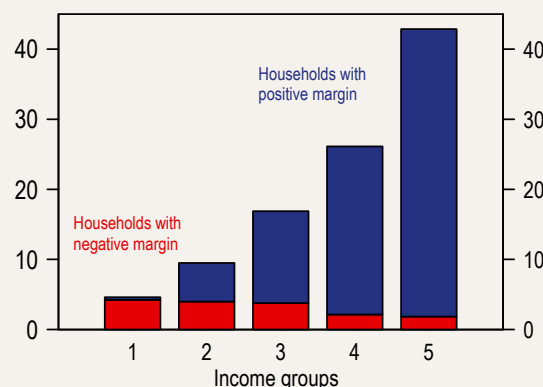
The two highest income groups have reduced their share of exposed debt (see Chart 8). There are two possible reasons for this. First, high-income groups have acquired a larger share of total income through the period analysed at the same time as the groups' share of total debt has declined. In addition, a change in the

Chart 6. Percentage of households with negative margin and percentage of total debt under different margin definitions. 2004



Source: Statistics Norway, SIFO and Norges Bank

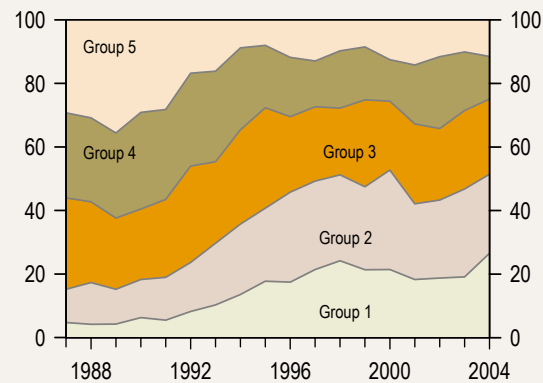
Chart 7. Percentage of total debt by income group¹⁾ and divided into households with negative and positive margin after principal payments. 2004



¹⁾ Households are divided into five equal-sized groups by increasing income after tax

Source: Statistics Norway, SIFO and Norges Bank

Chart 8. Debt held by households with negative margin by income group¹⁾. Per cent. 1987-2004



¹⁾ Households are divided into five equal-sized groups by increasing income after tax

Source: Statistics Norway, SIFO and Norges Bank

tax rules in the 1990s made it less attractive for high-income groups to hold debt.

Exposed debt is distributed across the age groups over 25. The share of exposed debt is increasing in households over the age of 45

In this section, we divide households into age groups by the age of the household's main income earner and look at the distribution of total debt and exposed debt. Exposed debt is relatively evenly distributed across all age groups over 25 (see Chart 9). The age group 25–34 holds less than 24 per cent of total debt, but 26 per cent of exposed debt. Households over 55 also hold a relatively large share of exposed debt, 18 per cent of total debt and 22 per cent of exposed debt. There are many

pensioners with low income in this age group, but the group also has considerable financial and real assets.

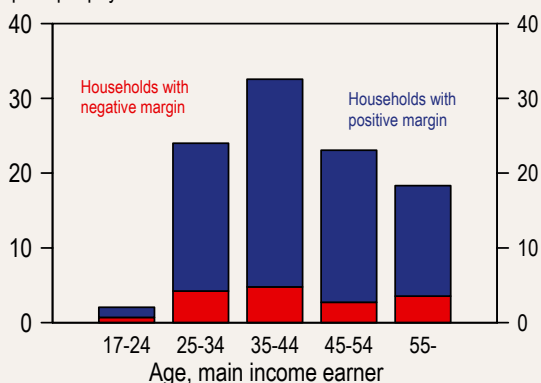
We find the largest increase in the share of exposed debt in the age group over 45. In 1990, this group held about 20 per cent of exposed debt. During the period analysed, the share of exposed debt has doubled for this group (see Chart 10) as a result of strong growth in debt. At the beginning of the period, households over the age of 45 held 24 per cent of debt, while in 2004 the share was 41 per cent. The relative number of households in this age group has also increased due to demographic developments (see Riiser and Vatne (2006)). On the other hand, households under the age of 45 have reduced their share of exposed debt. The age group 25–34 reduced its share of exposed debt from more than 40 per cent to less than 30 per cent during the period under review.

Is the risk associated with household borrowing higher in Norway than in Sweden?

Sveriges Riksbank (2004) concludes in its analysis of margins after interest that the risk associated with loans to Swedish households is limited. Households in the high-income groups hold the majority of debt, but also have the highest margins owing to high income and substantial financial assets. They found that the three highest income categories held 94 per cent of the debt in 2001 and that a small share (1.2 per cent) of these households had a negative margin after interest.

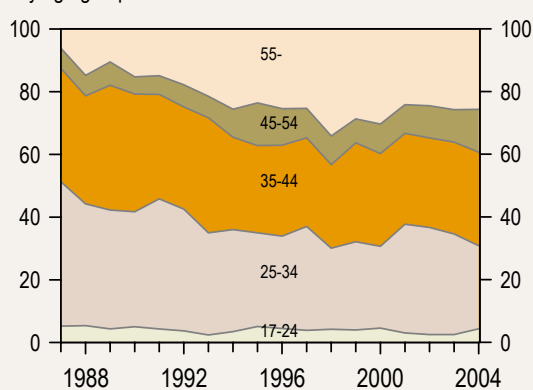
Owing to differing data samples and definitions of income, the results are not directly comparable with our findings for Norway. It appears, however, that low-income groups in Norway hold a larger share of total debt than comparable groups in Sweden. The two lowest income groups in the Norwegian data set hold nearly 20 per cent of total debt, compared with 6 per cent in

Chart 9. Percentage of total debt by age groups and divided into households with negative and positive margin after principal payments. 2004



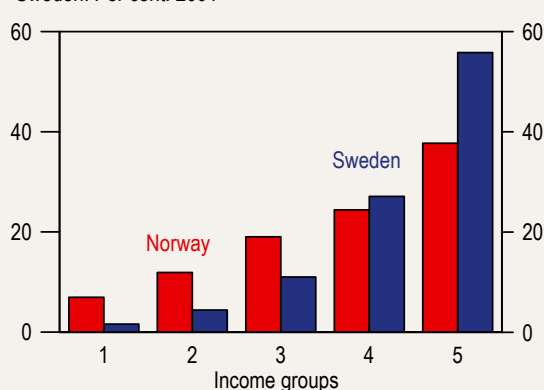
Source: Statistics Norway, SIFO and Norges Bank

Chart 10. Debt held by households with negative margin by age group. Per cent. 1987-2004



Source: Statistics Norway, SIFO and Norges Bank

Chart 11. Total debt by income group*) in Norway and Sweden. Per cent. 2001



*) Households are divided into five equal-sized groups by increasing income after tax

Source: Statistics Norway, SIFO and Norges Bank

the Swedish survey (see Chart 11). In the Norwegian groups, 6 per cent have a negative margin after interest. The finding that households in low-income groups hold a larger share of debt in Norway than in Sweden indicates, in isolation, that the risk associated with bank loans to the household sector was higher in Norway than in Sweden in 2001.

5 How do increased interest rates affect household margins?

The effect of an interest rate increase on household margins depends on the fixed-rate period of the loan. Most loans are at variable rates. For these loans, a change in the interest rate will have an almost immediate effect, whereas a fixed-rate loan will not be affected until the loan is renegotiated. Bank lending rates for household loans vary and are primarily based on the quality of the collateral. In this part of the analysis, we look at the effect of an interest rate change, assuming that the new interest rate applies immediately to all borrowers. The calculated effect thus overestimates the actual effect.

The average nominal bank interest rate on loans to households was about 4.1 per cent in 2004. The calculated effect of an increase in the lending rate from 4 to 6 per cent is that the share of households without margins increases from 18 to 21 per cent (see Chart 12). This corresponds to 49 000 additional households with a negative margin. Exposed debt increases from 16 to 22 per cent of total debt, corresponding to 65 billion in 2004-NOK. Total liquid assets in the household sector are reduced from 261 to 244 billion in 2004-NOK, i.e. a reduction of 6 per cent. The results are more or less symmetrical with a 2 percentage point reduction in the interest rate.

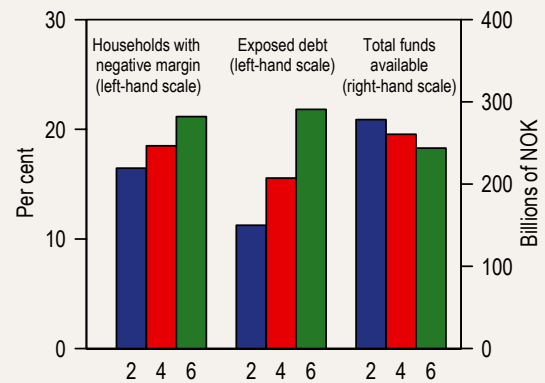
Households in the middle and upper-income groups account for the largest relative increase in exposed debt (see Chart 13). Most households whose margin becomes negative following such an interest rate increase are in income groups two and three. Exposed debt increases most in the age group 35–44, but in relative terms most in the age group 45–54 (see Chart 14).

6 Summary

Total household margins increased markedly from the end of the 1980s to 2004. This was due to solid income growth coupled with a reduction in the share of income used to cover living expenses and to service debt. An increase in financial assets has contributed to a further increase in liquid assets. The share of bank deposits has been reduced, however, in favour of less liquid assets which may fluctuate more in value.

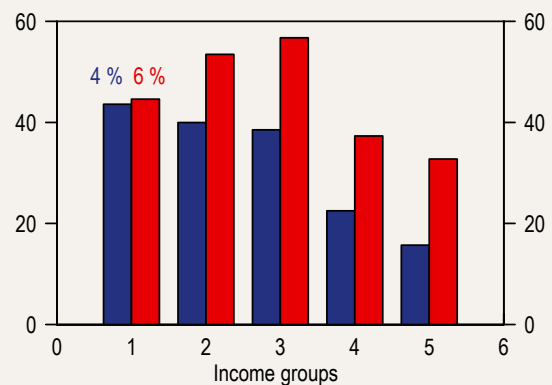
Given our model assumptions, roughly 19 per cent of households had insufficient income to cover ordi-

Chart 12. The effect of interest rate changes on margins after principal payments. Interest rate 2, 4 and 6 per cent. Per cent and billions of NOK



Source: Statistics Norway, SIFO and Norges Bank

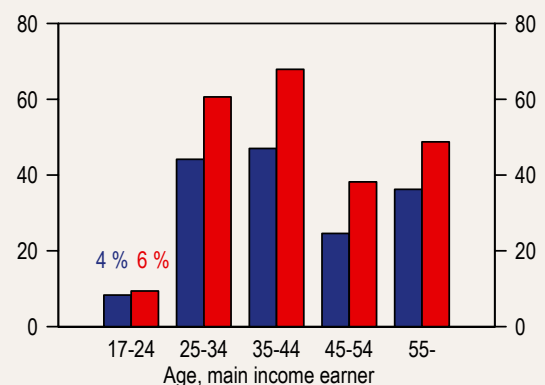
Chart 13. Exposed debt by income group*. Effect of interest rate changes. Billions of NOK. 2004



* Households are divided into five equal-sized groups by increasing income after tax

Source: Statistics Norway, SIFO and Norges Bank

Chart 14. Exposed debt by age group. Effect of interest rate changes. Billions of NOK. 2004



Source: Statistics Norway, SIFO and Norges Bank

nary living expenses and interest and principal payments in 2004. These households held 16 per cent of total debt. Income is the most significant difference between households with a negative and positive margin. Differences in the amount of interest and principal payments are limited.

The share of total debt held by households with a negative margin declined from the end of the 1980s until 2004. In isolation, this implies a reduction in credit risk associated with bank loans to the household sector. The share of exposed debt held by low-income groups and older households has increased during the period analysed. An increase in the lending rate from 4 to 6 per cent in 2004 would have resulted in an additional 49 000 households with a negative margin after interest and principal payments. The relative change is largest among households in the middle to high-income groups and households in the age group 45–54.

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