Who is borrowing – for what – and can they afford it? A study of comprehensive micro data for Norwegian households trough 2006

Bjørn Helge Vatne, special adviser, Financial Markets Department and Research Department[1]

New micro data enable us to analyse household debt behaviour through 2006. We can identify households that borrow net and households that repay debt. Even though we only follow households over one year, the information on the distribution of borrowing and repayments across households sheds new light on important questions in the assessment of household credit risk.

Half the households increased their debt in 2006. Most new loans were small, but gross debt growth is dominated by a relatively small number of large loans. Loans are mainly given to households with sufficient debt-servicing ability. Many households take on as much debt as they can bear. The total debt to disposable income ratio has increased. An increasing percentage of debt is found among households with a high debt to income ratio. If we adjust income for basic living expenses, the analysis shows essentially unchanged credit risk. The data indicate that young first-time homebuyers do not have a larger probability of default than other groups.

1 Introduction

Household debt behaviour is important when assessing the risk of the loan portfolios of financial institutions. First, a widespread failure in the ability of households to service their debt will increase financial institutions' losses on loans to households. Second, households in financial distress will tend to reduce their demand for goods and services from the corporate sector. In turn, this will reduce corporate earnings and increase the probability of default on corporate loans.

Household debt-servicing capacity is primarily dependent on household income.

We assume that households prioritise basic consumption such as food and clothing before they service their debt. The level of basic consumption will vary across households depending on their size and composition as well as individual preferences. Liquid financial assets may increase household debt capacity in the short run.

Total debt growth in the household sector is driven by demand for loans and the willingness of financial institutions to grant loans. Debt-servicing capacity is the primary criterion when a loan application is considered. The size of the loan, the lending rate and other lending terms are often determined by the quality of the collateral.

Credit risk is influenced by developments in vulnerable groups of households. We are especially interested in households that increase their debt. We assume that households that are able to pay both interest and principal on their loans are less likely to default. Credit risk can be analysed further by dividing households into age and income groups. Distribution over age groups gives information about the life-cycle considerations of the households. It is commonly assumed that households use the credit market to smooth consumption over the life cycle. Investments in housing are the main reason for taking on debt. Households commonly buy their first home early in their working life. Distribution over income gives insight into debt-servicing capacity. Households with higher income can, all other things equal, service more debt than households in low-income groups.

In Section 2, we describe and motivate the use of micro data. In Section 3, we look at debt behaviour by age and household income. Section 4 explores the connection between debt behaviour and changes in capital assets such as houses and cars. We focus on debt-servicing capacity in Section 5 and identify households that take

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on debt that seems to exceed their capacity. In particular, we look at the situation of homebuyers. The results are used to assess the development in credit risk in relation to the increase in debt in the household sector. Section 6 provides a summary.

2 Background

Why study debt behaviour at the household level?

The analysis of micro data is demanding. Considerable work is required to understand the definitions and construct the data set. In addition, micro data are not up-to-date. Production of the statistics often takes more than a year. So why bother?

The behaviour of the household sector is important for financial stability. Households account for an increasing percentage of total loans. Households are heterogeneous, as is their financial situation. Not every household has debt. Most households have few problems servicing their debt. Thus, potential credit risk is concentrated on a limited number of households in a distressed financial situation with large amounts of debt. A thorough analysis on large micro data sets can be used to identify these pockets of credit risk. Identifying these households and understanding their financial situation is the key to understanding the development of credit risk in the financial sector.

Many central banks are now using micro data to analyse risk in the household sector. Most micro data are survey data based on interviews. Some examples of such surveys are the British Household Panel Study, see Redwood and Tudela (2004) and the Household, Income and Labour Dynamics in Australia Survey (see Rochelle Belkar and Edwards (2007)). In recent years, register-based data sets from sources such as tax returns have been made available for analysis. Especially in the Nordic countries, these data have become an important tool for understanding the household debt situation (see Johansson and Persson (2006), Riiser and Vatne (2006) and Herrala and Kauko (2007)). Micro data information has become an important part of the financial stability reports of central banks (see Norges Bank (2006)).

Stress tests and sensitivity analyses are currently important tools in assessing financial stability. Some important issues are how debt growth is distributed across households, and how sensitive households are to changes in the economic environment such as interest rate changes. To answer these questions, we need to understand economic developments at the household level.

The data set

The primary data source used in this analysis is Statistics Norway's Income Statistics for Households Statistics Norway (2008). The data include all persons registered in the national register. In the analysis we follow the debt behaviour in private households between 31 December 2005 and 31 December 2006.

We have made the following extract for this analysis:

- All persons registered in the national register both at 31 December 2005 and 31 December 2006, i.e. births, deaths, immigrations and emigrations are excluded.
- Households with registered debt at 31 December 2005 and/or 31 December 2006.
- Private households, i.e. self employed are excluded (since it is hard to distinguish private economy from the economy of the firm).
- Households with positive after-tax income.

Each person is connected to a household. A household is mainly persons registered at the same address at 31 December 2006. On average, a household consists of 2.1 persons. Table 1 gives an overview of the data set. 81 % of the private households reported debt at 31 December 2006.

Table 1 Number of households and debt in sample and in total data set

		Debt	
	Households (1000)	Mean (NOK 1000)	Total (NOK billions)
All households at 31 December 2006	2 191	735	1 610
Private households at 31 December 2006	2 096	697	1 461
Private households with debt at 31 December2006	1 696	861	1 461
Private households with debt at 31 December 2005 and/or 31 December 2006 and with positive income	1 733	836	1 450

Sources: Statistics Norway and Norges Bank

The data on income, bank deposits, interest expenses and financial assets have been drawn from tax returns for all members of the sample households. The age of the households is given in the data as the age of the main income earner. Data on tax-free income have been obtained from a number of public registers. Using the standard budget for households developed by the National Institute for Consumer Research, SIFO (2008), we can calculate the cost of a reasonable level of consumption for an average household of varying size; 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. We have included home-related living expenses other than interest and principal payments, such as electricity and maintenance, as these are not included in the SIFO budgets.

3 Household borrowing and loan repayment

Half of the households increased their debt. Debt growth is dominated by a relatively small number of large loans

We divide the households in the data sample into two groups:

1. Borrowers: households with a net increase in debt in 2006
2. Repayers: households with a net reduction in debt (or constant)

Half of the households that reported debt were net borrowers (see Table 2). At the beginning of 2006, the borrowers had an average debt of NOK 702 000 and an average debt increase of NOK 320 000. This results in a debt growth of 46% for borrowing households. The average disposable income of this group was NOK 370 000.

The other half of the households makes loan repayments, on average 16% of existing debt. If we assume linear repayment this corresponds to a repayment time of 6.25 years on existing loans and about 12.5 years on new loans. This is a faster repayment rate than we had expected given that the mean term of loans has increased considerably over in recent years and is now over 20 years (see the Financial Supervisory Authority of Norway (2008)). About 90% of loans to private households are mortgage loans.

According to the micro data, overall debt growth in 2006 was 13% (see Table 2).

Borrowing is often connected to investments in larger purchases such as housing and cars. Thus, we expect that total debt growth is driven by a limited number of households taking on large loans. This hypothesis is confirmed by the data (see Chart 1). Loans of more than NOK 1 000 000 000 account for more than half the total debt growth. However, only 10% of the loans are this large. More than one third of the new loans were less than NOK 50 000.

The credit risk of debt growth depends on which groups of households take on debt. In the following, we divide the households into groups according to age and income at 31 December 2006. We study life-cycle behaviour through the age groups. The households are divided into five equal-sized groups by rising after-tax income.

Debt growth is highest among young households and households with low income

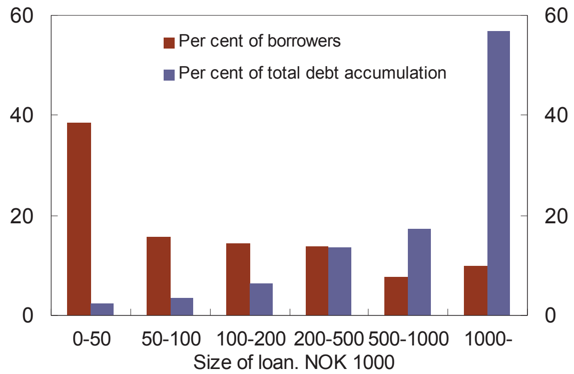
Growth in total debt for younger households and households with middle to low income is higher than for the

Table 2 Key statistics, borrowers and repayers in 2006

	Borrow	Repay	Total
Number of households (1000)	861	873	1 733
Per cent of households	50%	50%	100%
Total debt at 31 December 2005 (NOK billions)	677	604	1 281
Debt at 31 December 2005, mean (NOK 1000)	702	775	739
Debt change from 31 December 2005 to 31 December 2006, mean (NOK 1000)	320	–122	97
Debt change from 31 December 2005 to 31 December 2006, per cent	46%	–16%	13%
Disposable income at 31 December 2005, mean (NOK 1000)	370	396	383
Change in debt as percentage of disposable income , mean	86%	–31%	25%

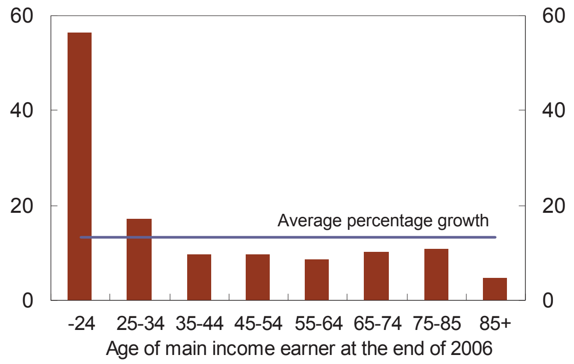
Sources: Statistics Norway and Norges Bank

Chart 1 Borrowing in 2006 by size. Per cent of borrowers (households) and per cent of total debt accumulation



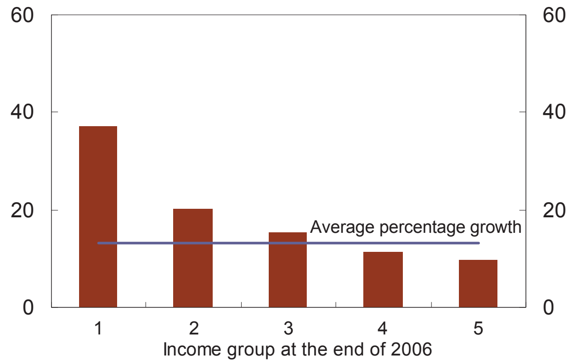
Sources: Statistics Norway and Norges Bank

Chart 2 Debt growth in 2006 across age groups. Per cent of debt in group at the beginning of the year



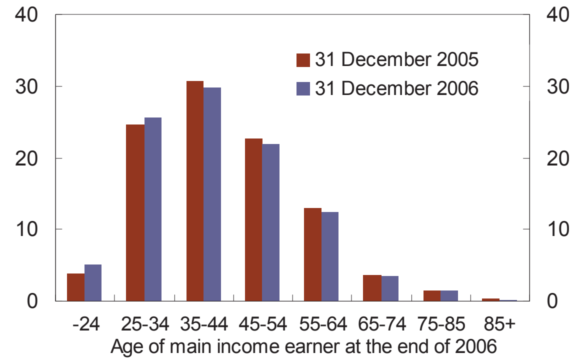
Sources: Statistics Norway and Norges Bank

Chart 3 Debt growth in 2006 across income groups. Per cent of debt in group at the beginning of the year



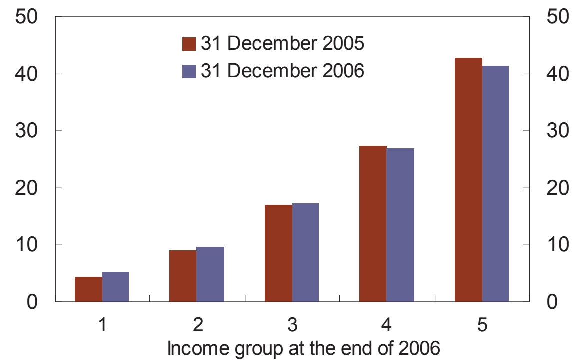
Sources: Statistics Norway and Norges Bank

Chart 4 Percentage of total debt across age groups at the end of 2005 and 2006



Sources: Statistics Norway and Norges Bank

Chart 5 Percentage of total debt across income groups at the end of 2005 and 2006



Sources: Statistics Norway and Norges Bank

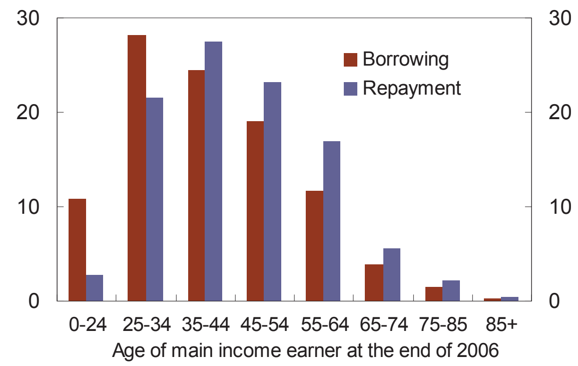
average household (see Charts 2 and 3). Overall, the distribution of debt is shifted towards younger households and households with lower income through 2006 (see Charts 4 and 5). In isolation, this is a sign of increased credit risk on loans to households. However, the favourable development in income and cost of living may have improved the debt-servicing ability of these groups. We look more closely at debt-servicing ability in Section 5.

The age group 25–34 years accounts for a large share of borrowing. Many households in this group borrow and the amounts are high

We assume that the group of household that takes on new debt is especially important for the development of credit risk. Total debt growth can be decomposed into the number of households in each group that increases debt multiplied by average borrowing in the group.

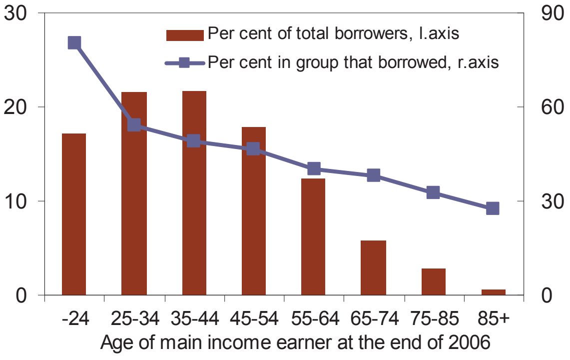
It is common to assume that households use the credit market to smooth their consumption over the life-cycle. The income of the household often increases through working life and decreases towards retirement, i.e. young households take on debt in early years and repay later in life. Investment in housing is a main reason why households incur debt. We expect high debt growth in age groups where households normally buy their first home or upgrade to larger houses. Chart 6 confirms that the age group 25–44 accounts for the larges share

Chart 6 Borrowing and repayment in 2006 across age groups. Per cent of total debt accumulation and total repayment



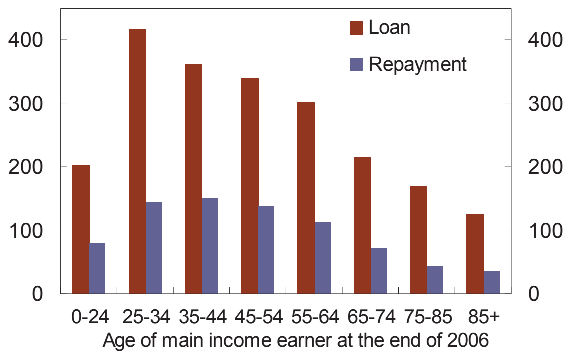
Sources: Statistics Norway and Norges Bank

Chart 7 Borrowers in 2006 across age groups. Per cent of all borrowers across groups and per cent in group that borrowed



Sources: Statistics Norway and Norges Bank

Chart 8 Average loan size and repayment in 2006 across age groups. NOK 1000



Sources: Statistics Norway and Norges Bank

of borrowing (53% of total volume). More than 40% of households that borrow are in this group (see Chart 7).

The percentage of households that borrows decreases, as expected, by age. In the youngest age groups, 80% of the households in the sample borrow. Many households in this group are new households and many are students. Student loans have more favourable lending terms than regular loans. The average loan size is highest in the age group 25–34 years at NOK 420 000 (see Chart 8). The average loan size decreases with age, but not as fast as we expected. Note that there are many households that reported no debt in the analysis period and are thus not included in the sample. Households older than 55 years account for 17% of total borrowing. A reason for this may be that banks have marketed new products, such as credit lines secured on dwellings with low loan-to-value ratios, to these age groups.

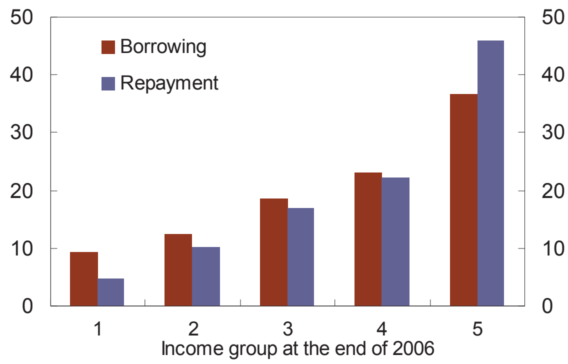
Repayments peak in the age group 35–44 years. Younger households account for a substantial share of repayment.

The percentage of households that borrow is almost constant across income groups. High income households take on larger loans

The debt-servicing capacity of a household is dependent on income growth over the term of the loan. Young households on average have lower income than older households. We expect to find high debt growth among households with high income. On the other hand, high income groups might repay their loan faster.

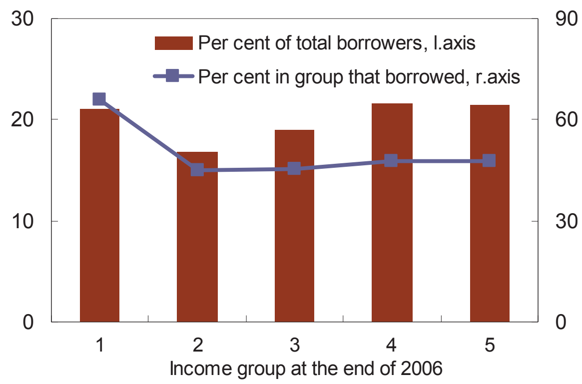
Chart 9 shows that both borrowing and repayment increase with income. The households are divided into five equal-sized groups by income after tax. One third of the debt increase is found in the group with the highest income. The same group accounts for almost half of total repayment. Repayment is more income-dependent than the increase in debt. An explanation can be that households often are in a higher income group when they repay loans than when they borrow.

Chart 9 Borrowing and repayment in 2006 across income groups. Per cent of total debt accumulation and total repayment



Sources: Statistics Norway and Norges Bank

Chart 10 Borrowers in 2006 across income groups. Per cent of all borrowers across groups and per cent in group that borrowed

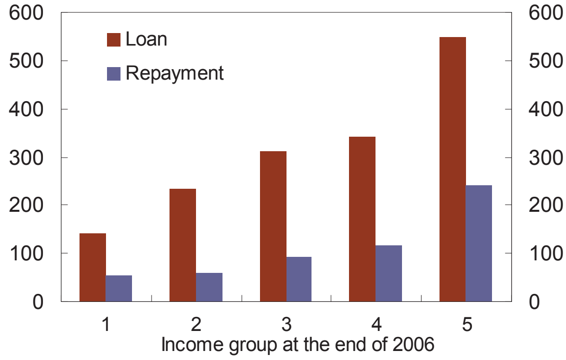


Sources: Statistics Norway and Norges Bank

Except for the lowest income groups the proportion of households that borrows is fairly constant across income groups (see Chart 10). About 45% of the households in these groups borrow. This suggests that all income groups have good access to the credit market. The high rate of borrowing in the lowest income group can be explained by student loans. The average size of loans increases significantly by income group (see Chart 11). The loans of the highest income groups are on average four times as large as in the lowest income groups. There is a clear correlation between the size of the loans and debt-servicing ability.

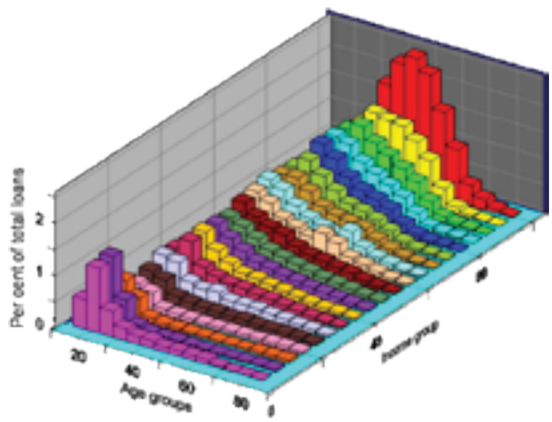
Chart 12 shows borrowing across age (5-year intervals) and income levels (20 groups) simultaneously. As previously observed, borrowing increases with income. However, we can see that the age profile differs across income groups. In the highest income groups, the distribution of borrowing is more bell-shaped. This might reflect lower investment in housing among high-income groups than among lower income groups. As mentioned there are more wealthy households in older age groups. In middle-income groups we observe an increase in borrowing in the age group over 50 years. These households may raise debt secured on dwellings with a low debt-to-value ratio. The distribution of the lowest income group is an outlier. There may be two explanations. First, this group may include some wealthy households with low income due to tax planning. Second, this group may contain young households with mortgages secured by their parents' income or dwellings.

Chart11 Average loan size and repayment in 2006 across income groups. NOK 1000



Sources: Statistics Norway and Norges Bank

Chart 12 Loans in 2005 across age and income groups. Per cent of total loans



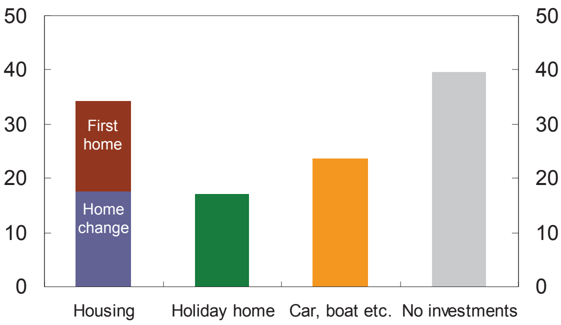
Sources: Statistics Norway and Norges Bank

4 Loans and investment in consumption capital

The data include information on the value, assessed for tax purposes, of housing, holiday homes and boats. Unfortunately, the assessed value does not correspond to the market value of the assets. However, the assessed value can be used to ascertain whether the household has bought new assets, i.e. the assessed values have increased more than the adjustments provided by the taxation authority (25% in 2006).

One third of loans are connected to housing investment

Chart 13 Loans in 2006 by investments[1)] in selected objects. Per cent of total loans



1) Increase in tax value in excess of adjustments provided by the taxation authority

Sources: Statistics Norway and Norges Bank

Housing is the most important asset when households take on debt. 34% of new loans were granted to households with dwellings whose assessed value increased (see Chart 13). This level is consistent with figures from a survey conducted by The Financial Supervisory Authority of Norway (2008). Half of the loans were first-time home loans, loans to households that had not reported the assessed value of the home before loan approval. Car and boat loans also accounted for a substantial share, i.e. 24% of the total. Holiday homes accounted for 17% of the loans. 40% of the loans relate to households with no increase in assessed value of any of these assets. This debt may have been used for other purposes such as refurbishing of existing housing, financial investments or consumption. Note that these investments are not mutually exclusive, i.e. a household can buy a house and a car in the same year. The sum of the fractions does not add up to 100.

5 Household debt raising and debt capacity

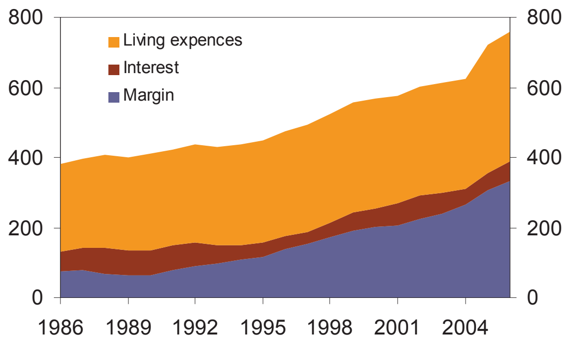
The risk of default in financial institutions' household loan portfolios is linked to the debt-servicing capacity among borrowing households. According to banks, debt capacity is the prime criterion when loan applications are considered. Collateral comes second. We use two indicators to calculate debt capacity:

1) *Debt burden*, i.e. debt in per cent of disposable income. Disposable income is income after tax less interest on loans. Debt burden can be interpreted as the number of years it takes to repay the loan given that all disposable income is used for this purpose.

A problem with using relative debt burden as a measure of credit risk is that a high income household can service more debt relative to income than a low income household given the same living expenses. Thus, we also use a measure that adjusts for the development in living expenses:

2) We define the *financial margin* of a household as income after tax, interest on loans and basic living expenses. We divide the margin by monthly after-tax income. The interpretation is how many months of income the household can loose before experiencing financial stress.

Chart 14 After tax income ex dividends , divided into living expenses, interest and margin. Total private households. Billions of 2006-NOK. 1986-2006



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

Financial margins from a historical perspective

Analyses of financial margins in micro data were first published by Sveriges Riksbank, (see Johansson and Persson (2006)). Vatne (2006) describes the development of financial margins in Norway in the period 1987–2004. Overall household margins have increased substantially in the past 20 years (see Chart 14). The reasons for this are strong income growth combined with low growth in living expenses, mainly due to cheap imports and relatively low interest rates. The share of income used to cover ordinary living expenses and borrowing costs has decreased. 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.

Households with good debt-servicing ability account for most of the borrowing. Many households take on as much debt as they can bear

A rule of thumb says that the debt burden should be less than three times gross income. Three times gross income roughly corresponds to 4–5 times disposable income. In 2006, more than 70% of the loans were extended to households that have debt below 3 times disposable income prior to the new loans (see Table 3). 11% of total loans were granted to households with more debt than 5 times disposable income. After loan disbursements, half of the loans can be found in households with a debt burden over 5. As a result, the distribution of debt in all private households is shifted towards a higher debt burden (see Chart 15). This indicates increased credit risk on banks' loans to households.

Table 3 Loans in 2006 by debt burden[1)] before and after loan disbursements. Per cent of total loans

	Debt burden at 31 December 2006				
Debt burden at 31 December 2005	0–1	1–3	3–5	5–	Total
0–1	4	10	11	13	37
1–3	0	10	11	14	35
3–5	0	0	6	10	16
5–	0	0	1	11	11
Total	4	20	28	48	100

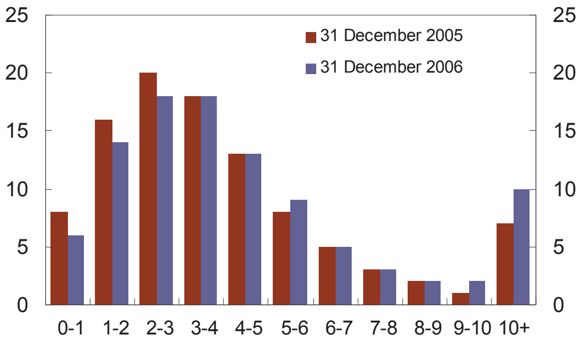
[1)] Debt as percentage of disposable income
Sources: Statistics Norway and Norges Bank

Table 4 Loans in 2006 by margin[1] before and after loan disbursements. Per cent of total loans

Margin at 31 December 2005	Margin at 31 December 2006					
	Negative	0–3	3–6	6–9	9–12	Total
Negative	5	2	2	0	0	10
0–3	1	5	4	0	0	11
3–6	1	4	27	5	0	37
6–9	0	1	8	26	1	35
9–12	1	0	1	3	2	7
Total	9	12	41	35	3	100

[1] Margin in months of after tax income
Sources: Statistics Norway, National Institute for Consumer Research and Norges Bank

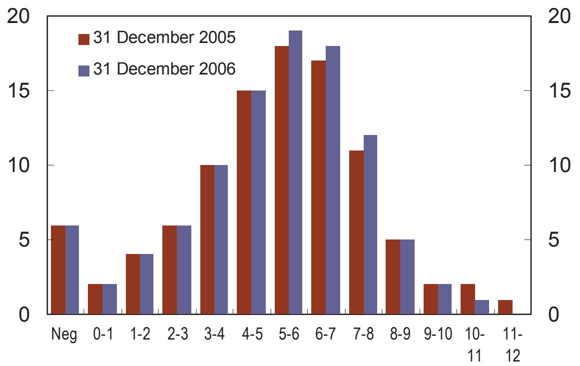
Chart 15 Total debt in 2005 and 2006 by debt burden[1]. All private households



1) Debt in per cent of disposable income
Sources: Statistics Norway and Norges Bank

On the other hand, if we consider the development in credit risk by financial margins we obtain a different picture to that provided by debt burden (see Table 4). 21% of the loans were extended to households with a margin of less than 3 months of after-tax income. After borrowing, the percentage of total debt in households with negative or small financial margins is nearly unchanged (see Chart 16). By this indicator the credit risk associated with loans to households has not increased much through 2006.

Chart 16 Total debt in 2005 and 2006 by margin. Margin in months of after tax income. All private households.



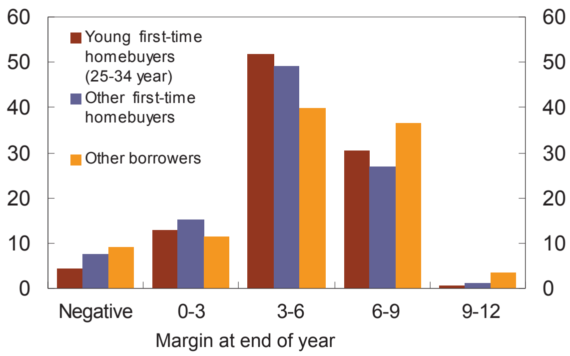
Sources: Statistics Norway, National Institute for Consumer Research and Norges Bank

Are young first-time homebuyers more financially distressed than other households?

Some argue that due to the sharp rise in house prices over the past decade young households buying their first home are forced to take on higher loans than they can afford and thus constitute a pocket of risk in financial institutions' loan portfolios. To investigate this hypothesis we take a closer look at loans granted to households aged 24–35 years that bought their first home in 2006. This group accounts for 7.6% of total borrowing.

The data does not support the hypothesis that young first-time homebuyers are especially financially distressed (see Chart 17). Loans with negative or small margins occur in a smaller percentage of the loans in this group than among other homebuyers and other borrowers. Over 80 % of the borrowers in this group have a margin of 3 months after-tax income or more.

Chart 17 Loans in 2006 by margin. Margin in months of after tax income



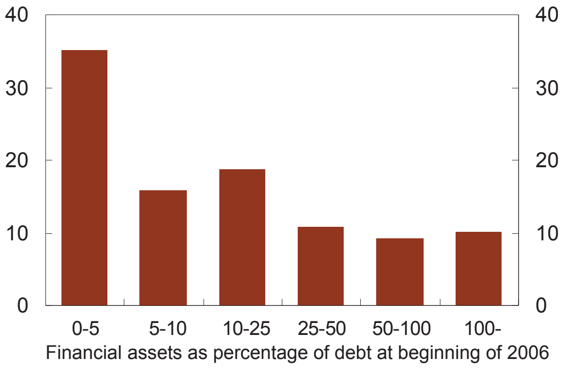
Sources: Statistics Norway, National Institute for Consumer Research and Norges Bank

There may be several reasons for this. First, first homes tend to be smaller and more affordable than second homes. Furthermore, it might be the case that the credit rating in banks is stricter for this group. Only the young households with the strongest financial position are granted loans by financial institutions. Young households have on average lower income and little security.

Is debt growth backed by financial assets?

Household financial assets, i.e. bank deposits and securities, have increased in the period of debt growth (see Norges Bank (2008)). To what extent can these assets serve as security for the debt accumulated? To answer

Chart 18 Loans i 2006 secured in financial assets. Per cent of total loan accumulation.



Sources: Statistics Norway and Norges Bank

this question, we look at the ratio of debt to the assessed value of financial assets (see Chart 18). Half the borrowing is found in households where the value of financial assets is less than 10% of the debt. Only 20% of borrowing relates to households where financial assets amount to more than half the debt. We can conclude that debt is secured on financial assets to only a limited extent. This is no surprise. It seldom pays to borrow rather than drawing on the financial assets.

6 Summing up

New comprehensive micro data on households from Statistics Norway enable us to identify households that borrow net and households that repay debt through 2006. This information can be used to identify pockets of credit risk in the financial institutions' loan portfolios. We can also observe changes in the stock of capital assets such as houses and cars. Some main results are:

- Half of the households borrowed in 2006. Most loans are small. Total debt growth is dominated by relatively few but large loans.
- The debt behaviour of the households shows a clear life-cycle profile with borrowing being highest at early ages, but older households borrow more than we expected. Both borrowing and repayments increase with income.
- Relative debt growth among young households and in households with low income is higher than average. Strong income growth combined with a low increase in basic living expenses and low interest rates might have increased the debt-servicing ability of these household groups by more than average.
- More than one third of the borrowing relates to housing investment. Half of this is related to first-time home investments. One fourth of total borrowing is used for boats and cars. 40% does not involve raising tax values of real capital. A considerable share of this is probably used for refurbishing existing homes, financial investments or consumption.
- Loans are mainly extended to households with sufficient debt-servicing ability. Many households take on as much debt as they can bear.
- Young first-time homebuyers do not seem to have a higher probability of default than other household groups.
- Household borrowing is only to a limited extent secured by financial assets.
- We are not able to conclude whether the credit risk associated with the loans to households has increased or decreased trough 2006. On the one hand, the debt to income ratio has increased. On the other hand, if we adjust income for changes in basic living expenses the analysis shows essentially unchanged credit risk. Irrespectively, we have to consider a longer period of analysis before a conclusion can be drawn.

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