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Financial Stability

Measures of household credit risk

*Haakon Solheim and Bjørn H. Vatne**

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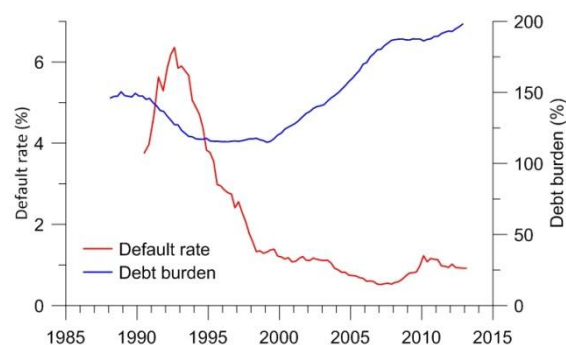
Haakon Solheim and Bjørn H. Vatne, Financial Stability, Norges Bank

The default rate on loans to households by Norwegian banks and mortgage companies fell after the banking crisis in the 1990s and has been low since the turn of the millennium. We argue that credit risk arises in households that have high debt, low debt-servicing capacity and inadequate collateral at the same time. Even though debt burdens have risen to historically high levels, the share of debt held by households with poor debt-servicing capacity and low collateral has fallen since the beginning of the 1990s. However, the size of the vulnerable group will be sensitive to shocks, such as higher interest rates, lower purchasing power or a decline in house prices.

Introduction

For the past 15 years, the default rate on loans to the retail market has remained at a low level. At the same time, household debt has grown faster than income (see Chart 1). We argue that credit risk is a function of a combination of risk elements, including debt level, payment capacity and collateral. In this article, we examine three indicators based on microdata from Statistics Norway.

Chart 1. Non-performing loans as a percentage of total retail market lending by banks and mortgage companies. Debt as a percentage of disposable income. 1988 Q1-2012 Q3.



Sources: Statistics Norway and Norges Bank

Three criteria for credit risk

A frequently used rule of thumb for the loan amount a household will be able to service is that debt should not exceed three times gross income (Finanstilsynet 2010). Norges Bank often considers debt in relation to disposable income, where disposable income is defined as income after tax less interest expenses. The limit of three times gross income is equivalent to five times disposable income.

A high-income household can service relatively higher debt than a household with lower income. Banks take this into consideration in their credit assessments by calculating households' surplus liquidity. Surplus liquidity means household income after taxes, interest expenses and ordinary living expenses. Ordinary living expenses are often estimated on the basis of the standard budget compiled by the National Institute for Consumer Research (SIFO). We assume households to be in a critical condition if surplus liquidity is less than one month's wage.

The last criteria for credit risk is based on household collateral. Most household debt is secured on housing assets, and banks normally require that the amount of a loan should not exceed 85 percent of the collateral value. At the same time, households with large bank deposits will have better collateral than households with small financial assets.

We define as vulnerable households whose net debt exceeds the market value of their dwelling. Net debt is defined as debt less bank deposits. We disregard other financial assets, such as equities etc. The value of the dwelling is based on the tax value of the dwelling multiplied by four. There may be reason to believe that this underestimates the dwelling's market value. Our requirement for collateral will therefore be stricter than if actual market value were being applied.

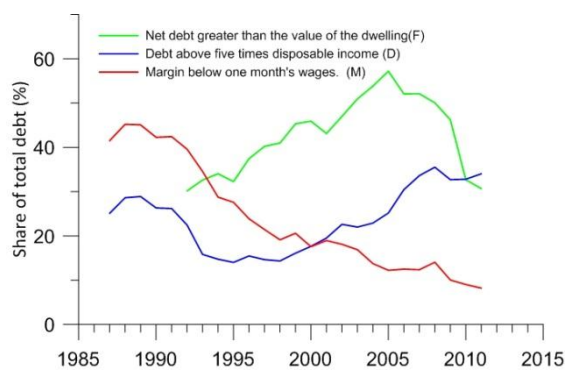
| | |
|---|---|
| D | Debt above five times disposable income |
|---|---|

| | |
|----------|---|
| <i>M</i> | <i>Margin below one month's wages. Margin is income after tax, standard living expenses and interest expenses</i> |
| <i>F</i> | <i>Net debt greater than the value of the dwelling</i> |

Share of total debt held by vulnerable households

Changes in the share of debt held by households with debt burdens above five (D) generally track changes in the overall debt burden in the economy as a whole as shown in Chart 1. This indicator has since risen; from 17 percent in 2000 to a level above 30 percent in 2011 (see Chart 2).

Chart 2. Share of debt held by vulnerable households according to three criteria. 1987-2011.



Sources: Statistics Norway, SIFO and Norges Bank.

On the other hand, changes in surplus liquidity (M) show a completely different trend. During the banking crisis in the 1990s, nearly half of overall debt was held by households with surplus liquidity below one month's wages. Since then, this share has fallen and is currently below 10 percent. Falling interest rates and low a low rate of inflation on standard consumption have been contributing factors.

The share of debt in households with net debt in excess of the value of the dwelling (F) rises until 2005 and subsequently declines. After 2005, house prices have risen faster than debt.

Combinations of criteria

There is reason to believe that both households and banks want to avoid default if at all possible. A default may force a household to

sell the dwelling and also severely constrains the household's financial freedom of manoeuvre.

For a household to default, we therefore assume that more than one criterion will have to be broken at the same time. If its debt-servicing capacity is good, but its collateral is poor, the household will be able to reduce its loan-to-asset ratio by making additional principal repayments. If its debt-servicing capacity is poor, but its collateral is good, an interest-free period or payment deferral can often be negotiated with the bank. If a household's debt is low, it is generally easier to obtain a favourable repayment arrangement than if the debt is high. For that reason, we look at the three criteria together in Chart 3.

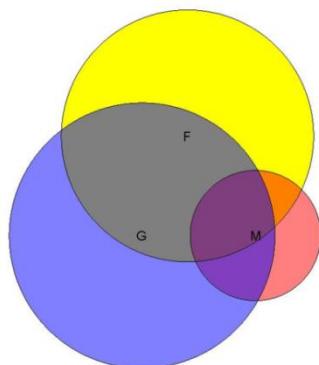
Households' debt servicing capacity is covered by criteria D and M. Criterion D, debt below five times gross income, is stricter than criterion M, a margin of one month's wages (see Table 1). Over a third of debt is held by households whose debt exceeds five times disposable income (D). Around eight percent of debt is held by households with surplus liquidity below one month's wages (M), while 5.2 percent of debt is held by households that violate both criteria (DM). This indicates that many high-debt households also are high-income households, and therefore have considerable debt-servicing capacity.

Over 30 percent of debt is held by households whose net debt exceeds the total value of the dwelling (F). We say that this debt is poorly collateralised. Of this group, approximately half also have high debt relative to income, so that they violate D and F simultaneously.

Households with low margin (M) and low collateral (F) have less possibilities to negotiate their loan contract with the bank and are thus more likely to default. We assume that households that violates the combination criteria (DMF) and (MF) are in this situation.

Four percent of debt is held by households that violate the combination of criteria for margin and collateral (MF). This indicates that a large percentage of the group that assumes risk in the form of low collateral have high incomes that provide them with good debt-servicing capacity.

Chart 3. Share of debt held by vulnerable households by combinations of three criteria¹ 2011



| D | M | F | DM | DF | MF | DMF |
|------|-----|------|-----|------|-----|-----|
| 34.0 | 8.2 | 30.8 | 5.2 | 15.4 | 4.1 | 2.4 |

- D** Debt greater than five times income
- M** Margin below one month's wages
- F** Net debt greater than value of dwelling

Sources: Statistics Norway, SIFO and Norges Bank

In all, 2.4 percent of total debt was held by households that violated all three criteria simultaneously (DMF) in 2011.

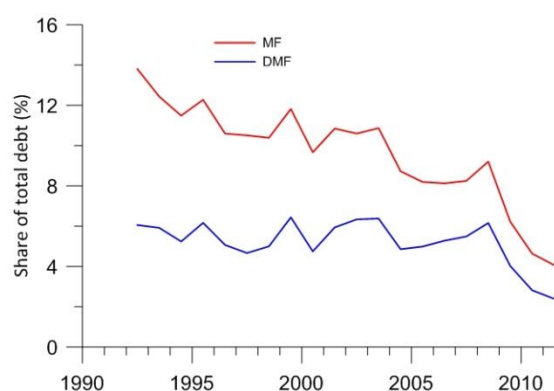
Although the share of total debt may appear small, it is important to underscore its economic importance. Even at the peak of the banking crisis, banks' total losses on household loans were under 3 percent of total lending. Losses on household loans of over 2 percent will constitute a considerable risk factor for most Norwegian banks.

MF declines from the 1990s until 2008 (see Chart 4). DMF remains more stable until 2008. The indicators also show a local peak around

¹ The algorithm for proportional Venn diagrams was developed by Jeremy Heil. <http://www.mathworks.com/matlabcentral/fileexchange/6116-proportional-venn-diagrams/content/vennX.m>

2009, followed by a decline. These developments indicate that even though debt levels have risen markedly in recent years, household credit risk has remained fairly flat, and has actually edged down since 2010. However, this should not be interpreted to mean that developments in recent years are not problematic. The most important reason for the decline after 2010 is rising house prices. If house prices were to fall, this trend will be reversed.

Chart 4. Debt held by vulnerable households that violate the combination of the margin and collateral criteria (MF). 1992-2011



Sources: Statistics Norway, SIFO and Norges Bank

How sensitive are the indicators to interest rate increases and declines in house prices?

To investigate how sensitive the indicators are to a rise in interest rates and a fall in house prices, we perform two sensitivity analyses.

First we increase the interest rate by 3 percentage points from the level of around 4 percent in 2011. This will affect income in the indicators D and M, since interest expenses rise for households with net debt.

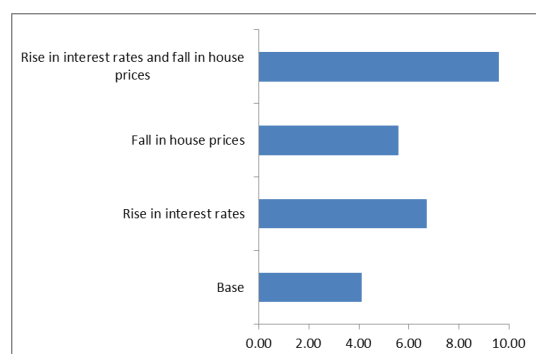
The margin criterion (M) is far more sensitive to an interest rate increase than the debt burden criterion (D). When the interest rate rises by 3 percentage points, approximately 14 percent of debt will be held by households with a margin below one month's wages (M). This is an increase of 70 percent. By comparison, the interest rate increase will only increase the debt held by households with debt greater than

five times income (D) by 17 percent. The combination criterion MF rises from 4.1 percent to 6.7 percent of household debt, and DMF increases to 2.4 to 4.3 percent.

In the second sensitivity analysis, we set the value of the dwelling relative to income after tax as it was in 1995. At that time, average dwelling values were 2.8 times income after tax. In 2011, this figure was 4.1. The sensitivity analysis assumes a fall in dwelling values of 31 percent. The decline affects household wealth. The share of total debt held by households whose debt exceeds their assets (F) increases to 54 percent, an increase of 75 percent. The share of debt held by households that violate more than one criterion simultaneously remains limited, however. In the event of such a shock, the combination criterion MF rises from 4.1 to 5.6 percent, while DMF increases from 2.4 to 3.6 percent.

A more serious situation arises if interest rates rise at the same time as house prices fall. In that case, the share of debt held by households violating the combination criterion MF will more than double to around 10 percent (see Chart 5). The share of households violating DMF increases from 2.4 to 6.8 percent.

Chart 5. Debt held by households that violate the combination of the margin and collateral criteria (MF). 2011. Sensitivity analysis.



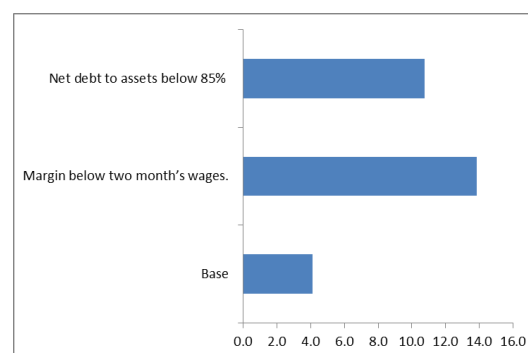
Sources: Statistics Norway, SIFO and Norges Bank

How sensitive are the results to the limits in the criteria?

How much do our conclusions change if we adjust the requirements in criteria M and F? Changing the surplus liquidity requirement from 1 to 2 months will have a relatively considerable impact. The share of total debt held by households that violate the combination criterion MF will increase from 4.1 to 13.9 percent.

If we increase the collateral requirement, reducing the loan to asset ratio from 100 to 85 percent, the share of debt violating the criterion MF rises to 10.8 percent.

Chart 6 The combination criteria MF under alternative criterion definitions. 2011.



Sources: Statistics Norway, SIFO and Norges Bank

Summary

The default rate on banks' loans to households has fallen since the banking crisis in the 1990s. In the same period, debt burdens based on macrostatistics have risen.

We propose using an indicator that takes into account debt-servicing capacity in the form of both margin and collateral, e.g. (MF). This indicator moves more in line with banks' observed default rates.

This indicator is sensitive to changes in economic fundamentals, but provides a more muted signal of household credit risk than debt burdens based on macrodata.

Table 1. Share of total debt. Criteria and alternatives. 2011

| | G | M | F | GM | GF | MF | GMF |
|---|------|------|------|------|------|------|------|
| Base | 34.0 | 8.2 | 30.8 | 5.2 | 15.4 | 4.1 | 2.4 |
| Increase in interest rates | 39.9 | 14.0 | 30.8 | 9.6 | 17.1 | 6.7 | 4.3 |
| Fall in house prices | 34.0 | 8.2 | 53.9 | 5.2 | 25.1 | 5.6 | 3.6 |
| Increase in interest rates and fall in house prices | 39.9 | 14.0 | 53.9 | 9.6 | 29.0 | 9.6 | 6.8 |
| Margin below two month's wages. | 39.9 | 20.5 | 53.9 | 14.2 | 29.0 | 13.9 | 10.1 |
| Net debt to assets 85% | 39.9 | 14.0 | 64.2 | 9.6 | 32.9 | 10.8 | 7.7 |

Sources: Statistics Norway, SIFO and Norges Bank

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