Household micro data in stress testing and macroprudential policy at Norges Bank

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Workshop at Norges Bank 24 March 2015

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Introduction
Stress testing households with micro data
Credit risk
Consumption risk (Work in progress)
What have we learned?

Motivation of the micro data based analysis

- Evaluate households vulnerability based on micro data
- Direct credit risk
- Demand risk
Household micro data. Why bother?

- There is a link between excessive credit growth and financial crises.
- What is excessive credit growth?
  - Households are heterogeneous. Aggregates hides important information.
  - What characterize households with excessive credit?
  - Credit risk vs risk of fall in consumption?
- Administrative register data compiled by Statistics Norway
  - Tax-return, all Norwegian residents, same dwelling.
  - Household characteristics, income, total debt, housing, tax-values wealth.
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The starting point

The balance sheet of Norwegian households. 2012

Sources: Statistics Norway and Norges Bank

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Household micro data in stress testing
Debt increase by housing market affiliation

Sources: Statistics Norway and Norges Bank
Debt by age groups

Sources: Statistics Norway and Norges Bank
Debt by income groups

Sources: Statistics Norway and Norges Bank
Debt-to-disposable income ratio. Cohort analysis (Video)

Debt-to-disposable income ratio. Cohort analysis (Static)

Source: Statistics Norway and Norges Bank
Debt to disposable income and default rates

Sources: Statistics Norway and Norges Bank
Debt in high risk households

- Three criteria that define households with high credit risk
  1. High debt to income ratio (DTI)
  2. Low financial margin (MRG)
  3. High loan to value (NDV)

- Three risk drivers
  1. Increased debt servicing cost
  2. Fall in house value
  3. Fall in debt servicing income
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High loan to income ratio
Low margins
High loan to value
Combined criteria
Sensitivity analysis

Households with debt exceeding five times disposable income

Sources: Statistics Norway and Norges Bank
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Low margins
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Margins and debt-servicing income

Sources: Statistics Norway and Norges Bank
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Debt by size of margin

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Loan to value

Sources: Statistics Norway and Norges Bank
Net debt exceeding house value

Sources: Statistics Norway and Norges Bank
Debt in households that violates the combined criteria

Debt violating criteria 2012

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Households</th>
<th>Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTI</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>MRG</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>NDV</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>DTI + MRG</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>DTI + NDV</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>MRG + NDV</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>DTI + MRG + NDV</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Sources: Statistics Norway and Norges Bank

High loan to income ratio
Low margins
High loan to value
Combined criteria
Sensitivity analysis

Household micro data in stress testing
Debt at risk given combination criteria

Sources: Statistics Norway and Norges Bank
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Distribution of debt of households that violate the combined criteria

Age of main income earner

0-24 25-34 35-44 45-54 55-64 65-74 75-

Per cent

10
8-9
4-7
1-3

Sources: Statistics Norway and Norges Bank
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3 pp increase in interest rate 30% fall in house prices

Sources: Statistics Norway and Norges Bank
Effect on "consumption potential"

Sources: Statistics Norway and Norges Bank
Consumption risk (down payments)

- "Consumption potential" = Income - tax - interest - down payments
- Assumes that there exists a stable interest-to-income and loan-to-value path for the households over the life-cycle
- A permanent rise in interest rates or fall in house prices distort these stable paths
- Households reduce debt to get back to the stable path over a 10 year horizon
- Effect on first year debt and consumption potential

<table>
<thead>
<tr>
<th>Debt</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>No net debt</td>
<td>2.9</td>
</tr>
<tr>
<td>Cannot afford principal payments</td>
<td>8.7</td>
</tr>
<tr>
<td>Can afford some principal payments</td>
<td>8.3</td>
</tr>
<tr>
<td>Can afford full principal payments</td>
<td>80.1</td>
</tr>
</tbody>
</table>
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The set up
3 p.p. interest rise

Interest rate increase. An illustration

Sources: Statistics Norway and Norges Bank

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Effect on "consumption potential"

Sources: Statistics Norway and Norges Bank
Effect on "consumption potential"

Sources: Statistics Norway and Norges Bank
What have we learned?

- Macro data masks important information on household heterogeneity.
- Using micro data in macro-stress testing is demanding, but can provide important information.
- Macro shocks affect different household groups differently.
- The households have used the benign economic environment, low interest rate, low cost of living and good income development to increase their debt.
- The share of risky debt is small, but the share may increase if interest rates climb or house prices fall.
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References

- Measures of household credit risk Haakon Solheim and Bjørn H. Vatne, Economic Commentaries 8/2013 Norges Bank
- On the risk of a fall in household consumption in Norway Bjørn H. Vatne, Staff Memo 16/2014 Norges Bank
- Unemployment benefits and household credit risk Kjersti Gro Lindquist and Bjørn H. Vatne, Staff Memo 17/2014