Household Debt and Macroeconomic Stability: An Empirical Stock-flow consistent (SFC) model for the Danish Economy

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Empirics

![Graph showing changes in financial assets, liabilities, and net wealth from 1995 to 2018.](image)

Prices (2006=index 100)

- Houses
- Flats

![Graph showing prices of houses and flats from 1995 to 2020.](image)
OECD 2016

"Danish households have large balance sheets and high levels of gross debt. Even though the high debt levels are matched by large assets, notably in form of pension savings, there are feedback loops with the housing market and households’ balance sheets contributing to macroeconomic volatility."

Nationalbanken 2018

"As a result of the high level of debt, of which a large share is at a variable rate of interest, changes in interest rates will have a stronger impact on disposable income than they did 10-20 years ago. Changes in income are of major significance to consumption, so private consumption has also become more sensitive to interest rates, which may reduce macroeconomic stability in certain situations."
"Household debt and access to credit can help boost demand and build personal wealth, but high indebtedness can also be a source of financial vulnerability. Nonetheless, even if positive in the long term, high household indebtedness can cause significant debt overhang problems when a country unexpectedly faces extreme negative shocks."

**Aim**

The aim of this paper is to investigate the macroeconomic risks associated with high household debt in a situation with:

1. an increase in the interest rate
2. a fall in house prices
Inspiration

- Godley & Zezza (DK)
- Levy-institute (US and Greece)
- Model for Italy and England

Data sources

Annual data from 1995-2016, mainly from EUROSTAT

Econometric

ARDL and OLS
Assumptions

- Small open economy with fixed exchange rate
- Small economy doesn’t affect the situation in Rest of the World
- 5 sectors: Households, Non-financial corporations, Financial corporations, Government and Rest of the World
- Only three financial assets (IBA, Equities and Pension)
- Fixed capital (including stock of housing and stock of capital)
- Only three interest rates
Balance sheet

<table>
<thead>
<tr>
<th>Year</th>
<th>Interest-bearing asset</th>
<th>Interest-bearing liabilities</th>
<th>Equities(asset)</th>
<th>Pension</th>
<th>Fixed capital</th>
<th>Financial net wealth</th>
<th>Total net wealth</th>
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<td>2015</td>
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</table>

1995-2015
Real side - Household

Income:

\[ Y_t^H = WB_t^H + B_{2t}^H + r_{A_{t-1}}^H (IBA_{t-1}^H) - r_{L_{t-1}}^H (IBL_{t-1}^H) \]
\[ + \chi_t^H (EQA_{t-1}^H) + \psi_t^H (PENA_{t-1}^H) + STR_t^H + \epsilon_t^H \]

Consumption:

\[ \ln(c_t) = \beta_8 + \beta_9 \ln(c_{t-1}) + \beta_{10} \ln(yd_t^H) + \beta_{11} \ln(nw_{t-1}^H) \]

Investment:

\[ \ln(i_t^H) = \beta_i + \beta_i \ln(i_{t-i}^H) + \beta_i \ln \left( \frac{P_t^{H_i}}{P_{t-i}^i} \right) + \beta_i \ln(yd_{t-i}^H) \]

Net lending:

\[ NL_t^H = S_t^H - I_t^H - NP_t^H + KTR_t^H \]
Financial side - Household

Accumulation of Equities:

\[ EQATR_t = \beta_{20} + \beta_{21}(\chi_t) + \beta_{22}(r^H_{Lt-1}) + \beta_{23}IBLTR^H_t \]

Accumulation of Pension:

\[ \ln(PENATR^H_t) = \beta_{24} + \beta_{25}(\psi_t) + \beta_{26}\ln(yd^H_t) \]

Accumulation of Loans:

\[ IBLTR^H_t = \beta_{28}(I^H_t) + \beta_{29}(IBL^H_{t-i}) + \beta_{30}(FATR^H_t) + \beta_{31}(r^H_{Lt-1}) \]

Accumulation of Interest bearing assets:

\[ IBATR^H_t = NL^H + IBLTR^H_t - EQATR^H_t - PENATR^H_t \]
DATA vs. Model

- **Real Output**: Actual data and model predictions from 1995 to 2015.
- **Real Consumption**: Actual data and model predictions from 1995 to 2015.
- **Financial Balance**: Actual data and model predictions from 1995 to 2015.
- **New Loans**: Actual data and model predictions from 1995 to 2015.

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Baseline
- Simple forecast until 2025
- no capital gains - low real growth rates in baseline

Shocks
- Increase in the level of interest rate (1%-point 2017-2025)
- Fall in the house prices (−5% 2017)
Increase in interest rate

Financial balances

Effect on consumption and investment

Effect on financial stocks
Fall in house prices

**Financial balances**

- H: Real GDP
- NFC: Real consumption
- G: Real investment
- FC: Real export
- ROW: Real import

**Deviation from baseline as % of GDP**

- 2010
- 2015
- 2020
- 2025

**Housing wealth**

- 2010
- 2015
- 2020
- 2025

**Effect on financial stocks**

- interest-bearing assets
- interest-bearing liabilities
- Pension
- Equities
- Financial net wealth

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Is household debt a risk to the macroeconomic stability?

- The overall results of our model indicate that higher household debt can magnify the effects of negative shocks.
- Economic growth in response to these shocks will slightly slow down but will not turn negative.
- Domestic shocks to the economy may not pose a serious risk to macroeconomic stability.

Why is this time different?

- A reduction in global output in combination with a rise in interest rate and a fall in house prices leads to a serious recession in the Danish economy mimicking the situation in 2009.
- Being a small open economy, the Danish economy is highly affected by global shocks.
Conclusion

- The two shocks to the economy affect the macroeconomic output negatively (but through different channels)
- In the absence of global shocks, domestic shocks to the economy may not pose a serious risk to macroeconomic stability
- Is household debt a risk to the financial stability?