Monetary Policy and Household Debt

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Debt and House Prices in Nordic Countries

(a) Debt relative to income

(b) House prices relative to income

Source: OECD.
Questions

1. Is household debt a relevant concern for monetary policy?

   ▶ ... out of the many potential concerns that exist, why household debt?

2. How can/does monetary policy affect household debt?

With a solid answer to question 2 we can address:

   ▶ What characterizes a monetary policy that stabilizes households’ debt burdens?

Note! We cannot trust answers to this question without evidence on question 2.
Illustration: Why we need to answer question 2

Gelain, Lansing, and Natvik, 2018: Optimal debt targeting implies *looser* policy when debt is “high” and *tighter* policy when debt is “low”.

**Figure:** Targeting Policy w. Long-Term Debt (Gelain, Lansing, and Natvik, 2018)

**Notes:** Impulse responses under optimal policy aiming to stabilize inflation ($\Gamma = 0$) or debt ($\Gamma = 1$), and when the interest rate follows the estimated simple rule.
This talk (and paper)

- Draw some lessons from the literature what we think are particularly useful for the 2 questions at hand
  - **Take-away 1**: household debt matters for macroeconomic stability
  - **Take-away 2**: macro-level evidence and simple models question how/if interest rate changes affect household debt burdens
  - **Take-away 3**: modern approach to studying monetary policy (MP) transmission emphasizes more than intertemporal substitution – likely to be important for MP and debt as well
  - **Take-away 4**: recent micro-level evidence on MP highlights cash flows – household debt a key ingredient in this transmission channel

- Use Norwegian evidence to look into how monetary policy (MP) affects cash flows and debt
From the literature 1: Does household debt matter for macroeconomic stability?

Historical evidence (17 countries since 1870) from Jordá, Schularick and Taylor (2013, 2015, 2016, ...):

- Rapid increases in household debt come with
  - increased risk of financial crises
  - worse recessions once they occur
- Asset price bubbles are more costly if accompanied by steep growth in household debt
- Mortgage credit seems the main culprit
From the literature 1: Does household debt matter for macroeconomic stability?

![Real GDP per capita (% deviation by year)](image)

**Normal recessions (conditional):**
Average & excess credit = +1,2,3 %GDP/year

**Financial recessions (conditional):**
Average & excess credit = +1,2,3 %GDP/year

Fig. 2. Conditional Paths, Continuous Excess Credit Treatment.

Source: Jordá, Schularick and Taylor (JMCB, 2013)
From the literature 1: Does household debt matter for macroeconomic stability?

Event studies of the 2007-09 financial crisis across US states by Mian and Sufi (QJE 2013, ...):

▶ In zip code areas where leverage was higher before the crisis, consumption fell more strongly when house prices collapsed.
  ▶ debt propagates the consumption responses to wealth changes

Micro evidence from households in the US by Baker (JPE 2018), Dynan (Brookings 2012):

▶ Households with greater debt have higher marginal propensities to consume out of regular income shocks
  ▶ debt propagates the consumption responses to income changes
From the literature 2: Data and models on MP and debt

Panel-VAR on MP shocks in 18 countries over 1975–2014 by Bauer and Granziera (IJCB, 2017):

Figure 5. Responses to a Monetary Policy Shock

Notes:
Impulse response functions after a 100 basis point contractionary monetary policy shock. Dashed lines indicate the average response; shaded areas indicate 68 percent confidence set obtained with the frequentist procedure in Moon, Schorfheide, and Granziera (2013).

and Gelain, Lansing, and Natvik (2015), the stock of nominal debt exhibits considerable inertia, as agents find it difficult to change existing contracts. Given that the fall in inflation is larger than the reduction in nominal debt, after a monetary policy shock real debt rises on impact. As nominal debt further decreases and inflation quickly rebounds, real debt falls below trend from the first quarter after the shock.

As output shrinks on impact, the debt-to-GDP ratio rises by about 0.85 percent (figure 5). However, starting from the first
From the literature 2: Data and models on MP and debt

Time-series (VAR) evidence on contractive MP shocks:

▶ Bauer and Granziera (2017): debt-to-income *up* in the short run, down in the short run.
▶ Robstad (2018): real debt *down* a little bit

Historical (1929-2011) decomposition of US household debt-to-income by Mason and Jayadev (AEJ 2014):

▶ Debt-to-income fluctuations largely driven by variation in income, interest expenses and inflation
▶ ... *not* by borrowing

Micro-level evidence on interest rate reductions by DiMaggio et.al (AER 2018):

▶ When households experience reduced interest rates on outstanding debt (due to ARM resets)
  ▶ On average 10% of the cash flow is used to repay debt
From the literature 2: Data and models on MP and debt

DSGE model on MP and household debt by Gelain, Lansing, and Natvik (2018):

- When debt is only infrequently re-financed, non-indexed, and gradually amortized
  - Debt-to-income responds little and likely positively to interest hikes
  - Simple rules to increase interest rates when debt is high are detrimental
  - Debt targeting implies *expansionary* MP when debt is *high*

Cost-benefit analysis of leaning against the wind by Svensson (JME 2017,...):

- Cost most likely exceeds the benefits because
  - Weaker economy if no crisis
  - ... and weaker economy once a crisis occurs
  - Only gain is crisis probability
  - ... need implausibly strong effects on probability to outweigh costs
From the literature 3: MP transmission beyond intertemporal substitution

MP transmission in heterogeneous agent models w. nominal rigidity (HANK) (Kaplan, Moll and Violante AER 2018; Auclert AER 2019; Luetticke 2019; ...):

▶ If model-implied distributions of wealth, liquidity and MPCs are “realistic”:
  ▶ Effects via disposable income are the main transmission channel
  ▶ ... not intertemporal substitution.

▶ Cross-sectional correlation between households’ general exposure to interest rate changes and their MPCs is key to MP strength.

▶ What does a realistic MPC distribution mean?
  ▶ Evidence from micro studies (Jappelli and Pistaferri, 2014; ...)
  ▶ Consumption response out of transitory income shocks way bigger than in permanent income hypothesis – say 0.25 at a quarterly frequency.
  ▶ Correlation with liquidity - “wealthy hand-to-mouth” behavior
From the literature 4: MP and household cash flows

Note:

- HANK literature has so far largely ignored the direct effect of MP on households’ interest expenditure – the “cash flow channel”

- Surge of recent empirical papers estimating the strength of the cash-flow channel
From the literature 4: MP and household cash flows

Micro evidence on the cash flow channel in Sweden by Flodén, Kilström, Sigurdsson and Vestman (2018):
▶ Comparing high and low leveraged households’ response to interest rate changes:
  ▶ Out of interest expenditure, average MPC around one-half

Micro evidence on the cash flow channel in Australia by La Cava, Hughson and Kaplan (2016):
▶ Comparing households with fixed vs adjustable rate mortgages after interest rate changes:
  ▶ Consumption responds more for ARM holders

Micro evidence on the cash flow channel in the US by Di Maggio et al. (2017):
▶ When households experience reduced interest rates on outstanding debt (due to ARM resets)
  ▶ They increase durable consumption by 35%.
Summing up: Likely transmission mechanism from MP to household debt

How should we expect an increase in the interest rate to affect household debt accumulation?

3 channels:
1. Incentivize saving - intertemporal substitution
   - “conventional logic”, but likely to be rather unimportant
2. Reduce cash flows of indebted households - a la negative transitory income shock
3. Deflate real debt via inflation - “Fisherian debt deflation”

Caveat: Maybe house prices are a separate, fourth channel.

We will look into 2 and 3 using Norwegian micro data.
The Norwegian data

  - Household level
  - Besides income tax, Norway also issues a wealth tax
    - High-quality balance sheet data
  - Observables: assets, liabilities, income, household characteristics

- All assets except non-listed stocks and housing are reported at market value
  - Assessed value $\approx$ book value for privately held businesses
  - Transaction level data on housing used to construct local house price indices (Fagereng, Holm & Torstensen, 2018)

- Third-party reporting: limited scope for tax evasion
Income components over time

- Mean Interest Income (left axis)
- Mean Interest Expenses (left axis)
- Mean Income excl. Interest (right axis)
The distribution of debt-to-income over time.
## Summary statistics

**Table:** Summary statistics of key variables, Movers and Stayers, High and Low DTI.

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<th>Stayers</th>
<th>Movers</th>
<th>High DTI</th>
<th>Low DTI</th>
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</table>

*Notes: Mean by group across years (1993-2015). High and Low Debt-to-Income (DTI) refers to households in the 84 to 86 and 14 to 16 percentiles of the sample with NOK 50,000 < real debt < NOK 5 million, DTI < 10.*
Cash flows and nominal interest rates.

How do the components of disposable income – households’ cash flows – co-move with the nominal interest rate?

- We look at the mean real cash flows and the nominal interest rate over time
- First-differenced levels

(a) Total income

(b) Income excl. interest

(c) Interest income

(d) Interest expenses
Cash flows and nominal interest rates

How do the components of disposable income – households’ cash flows – co-move with the nominal interest rate?

- Reasonable concern: Omitted variables driving both

- Simple solution: Compare households with high and low debt-to-income (DTI)
  - Diff-in-diff: p85 minus p15 households in the DTI distribution
  - Why? Because p85 cash-flows should be more sensitive to interest rate changes than p15.
Diff-in-diff cash flows, high vs. low DTI households.

(e) Total income

(f) Income excl. interest

(g) Interest income

(h) Interest expenses
From cash flows to debt growth

How do the components of disposable income – households’ cash flows – co-move with the nominal interest rate?

- Distinct effects on deposit income and debt expenditure (not surprising)
- ... but these are insufficient to dominate total income
- Hence: Unlikely to have big effects on debt accumulation

Next: How does debt growth co-move with interest and inflation?

- We look at mean real debt growth (level change), interest rates and inflation over time
- First-differenced
Debt growth and interest rates

(i) Debt growth and nominal policy interest rate, first differences

- Weak association with nominal rates, some positive association with real rates.

- Why?
Debt growth and inflation

Gulbrandsen & Natvik (BI) MP Debt NEPR Dec 2019 24 / 32
Variation in inflation strongly associated with variation in real debt growth

- Well beyond any interest rate association
- Why?

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Debt growth and interest rates among movers vs stayers.

(k) Debt growth and nominal interest rate, first differences

(l) Debt growth and real interest rate, first differences
Debt growth and inflation among movers and stayers

![Graph showing debt growth and inflation among movers and stayers](image)

Gulbrandsen & Natvik (BI)
Debt-growth and inflation among movers and stayers

“Fisher dynamics” among the stayers

Note: Remarkably consistent with the historical US macro evidence in Mason and Jayadev (AEJ Macro, 2014)
Differencing out omitted variables changes nothing

- Omitted variables driving both inflation and debt growth among stayers?
  - Difference-in-differences between high DTI and low DTI households
10 years of evidence: Household debt matters for macro stability – in particular financial crises

- so it makes sense for central banks to consider the implications of monetary policy for household debt

- but it does not follow that monetary policy should target debt separately from other conventional policy objectives
Conclusion

- 10 years of evidence: Household debt matters for macro stability

- Conventional logic about monetary policy and household debt: Intertemporal substitution
  - Inconsistent with recent macro evidence on MP and debt
  - At odds with recent literature on MP and aggregate demand

- Plausible alternative channels: Cash flow effects and debt deflation
  - Similar to the recent (HANK) literature on MP and aggregate demand
  - Need for precise models with micro evidence!

- Suggestive micro evidence from Norway:
  - Debt matters for MP’s cash-flow effects, but less visible effects (if any?) in the other direction.
  - Fisherian debt deflation seems prominent

- Preliminary policy conclusion: stick to targeting inflation
  - ... at a sufficiently high level.
Diff-in-Diff debt growth, p85 minus p15 DTI. Stayers only.

\[(o)\] D-i-d of debt growth and first-differenced nominal rate

\[(p)\] D-i-d of debt growth and first-differenced real interest rate
Diff-in-diff debt growth, p85 minus p15 DTI. Stayers only.