Monetary Policy and Household Debt

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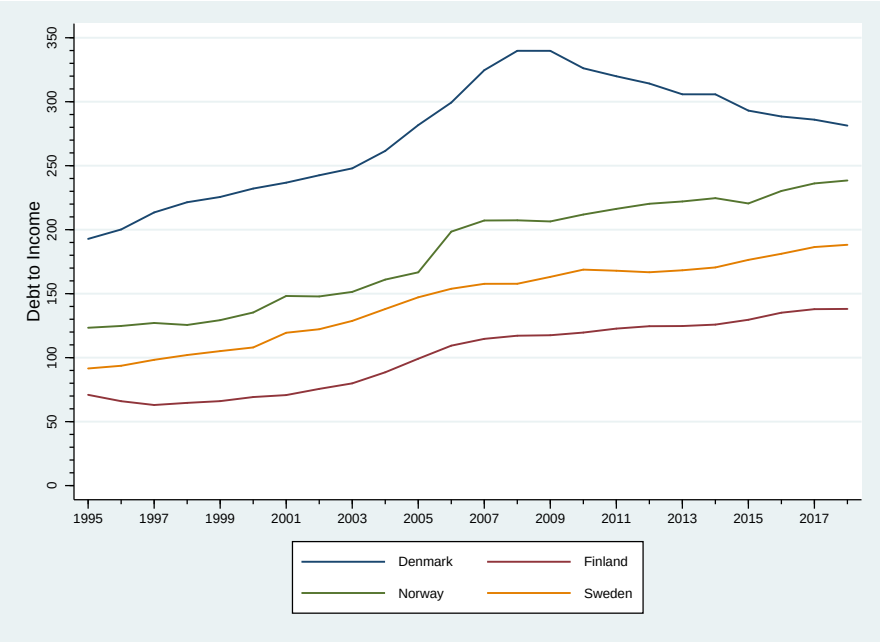
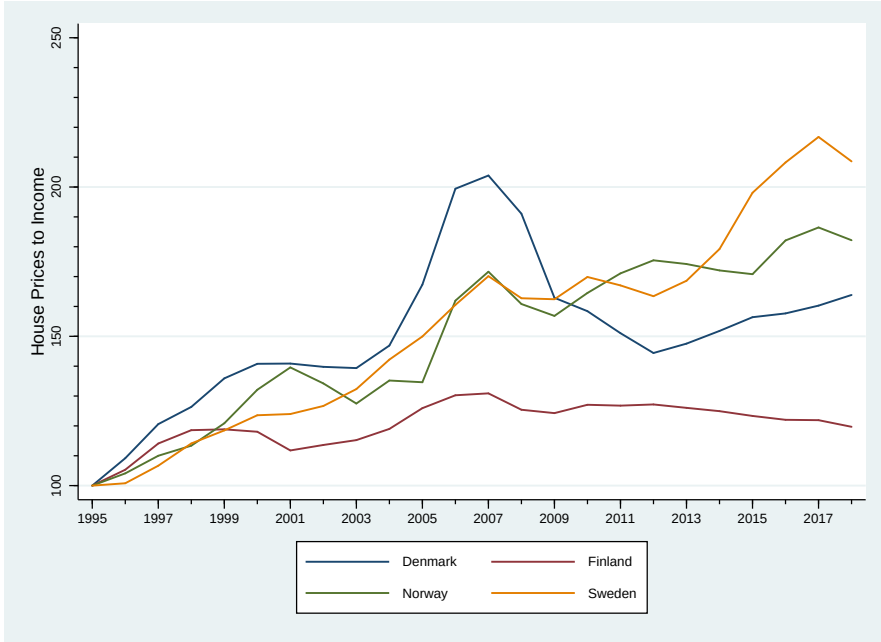
Debt and House Prices in Nordic Countries



(a) Debt relative to income



(b) Houseprices 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:

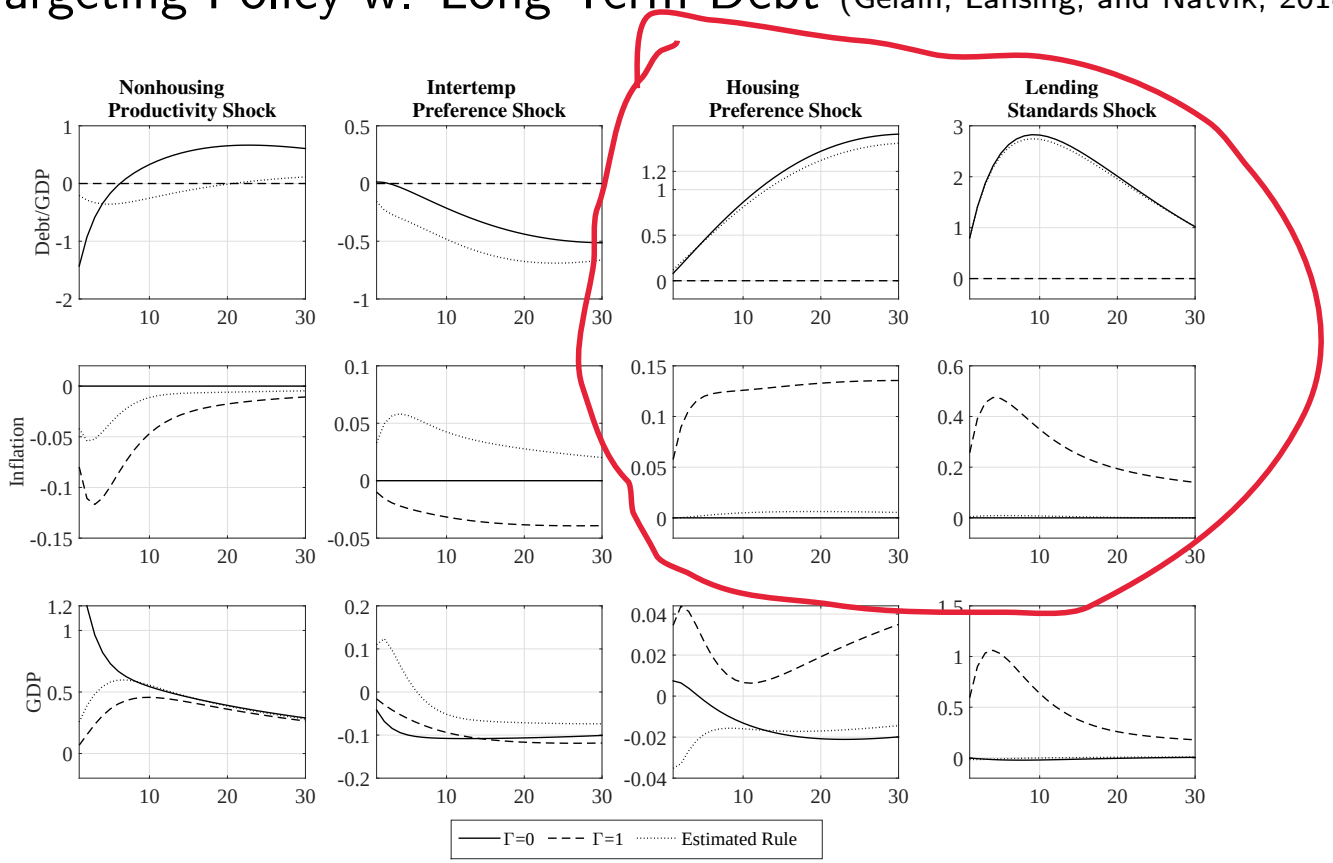
- What characterizes a monetary policy that stabilizes households' debt burdens?

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?

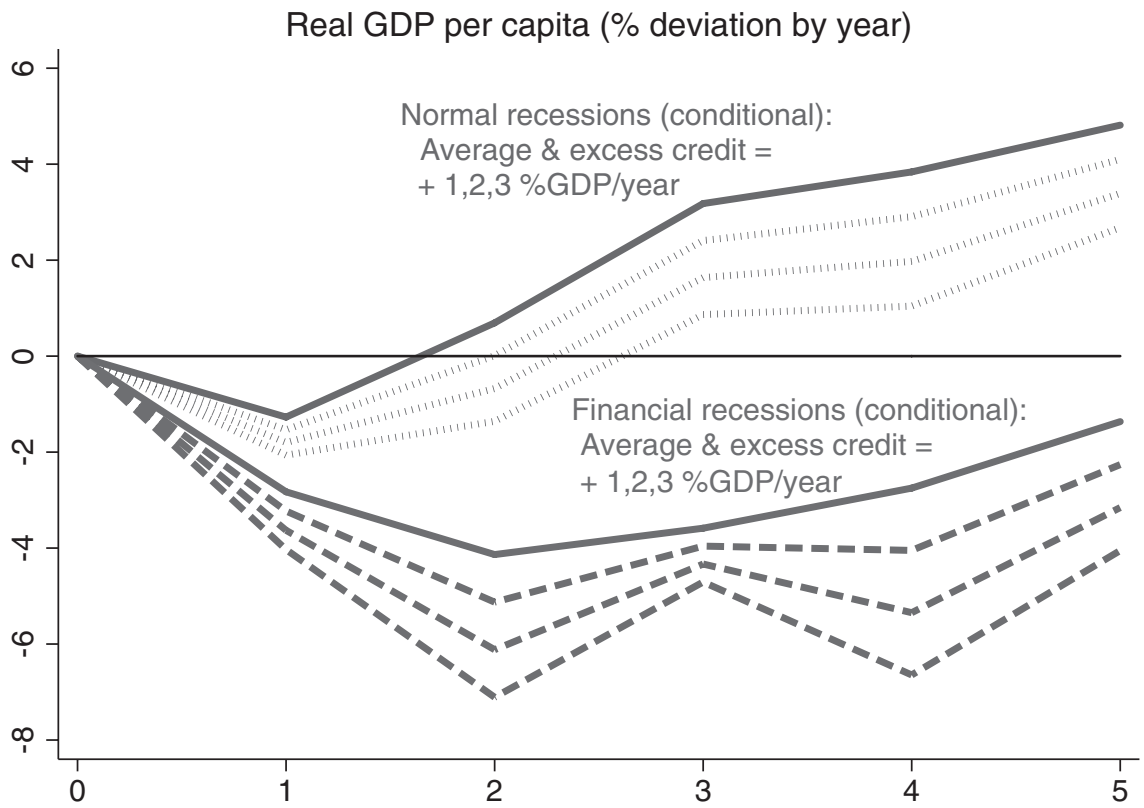


FIG. 2. Conditional Paths, Continuous Excess Credit Treatment.

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

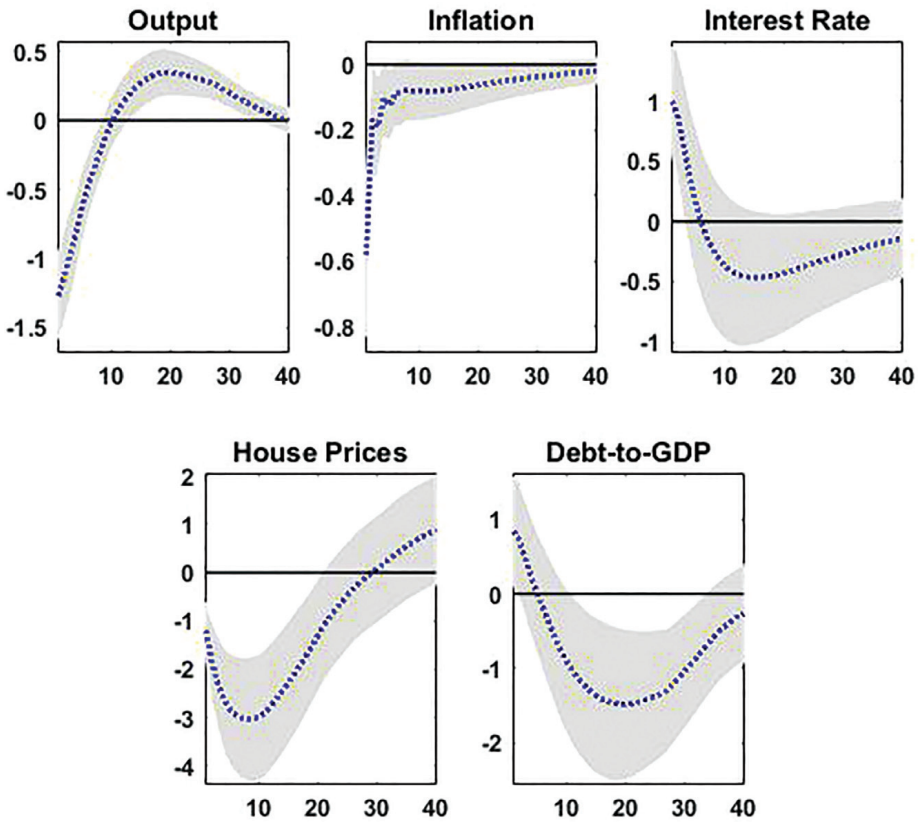
Micro evidence from households in the US by Baker (JPE 2018), Dynan (Brookings 2012):

- 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



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"

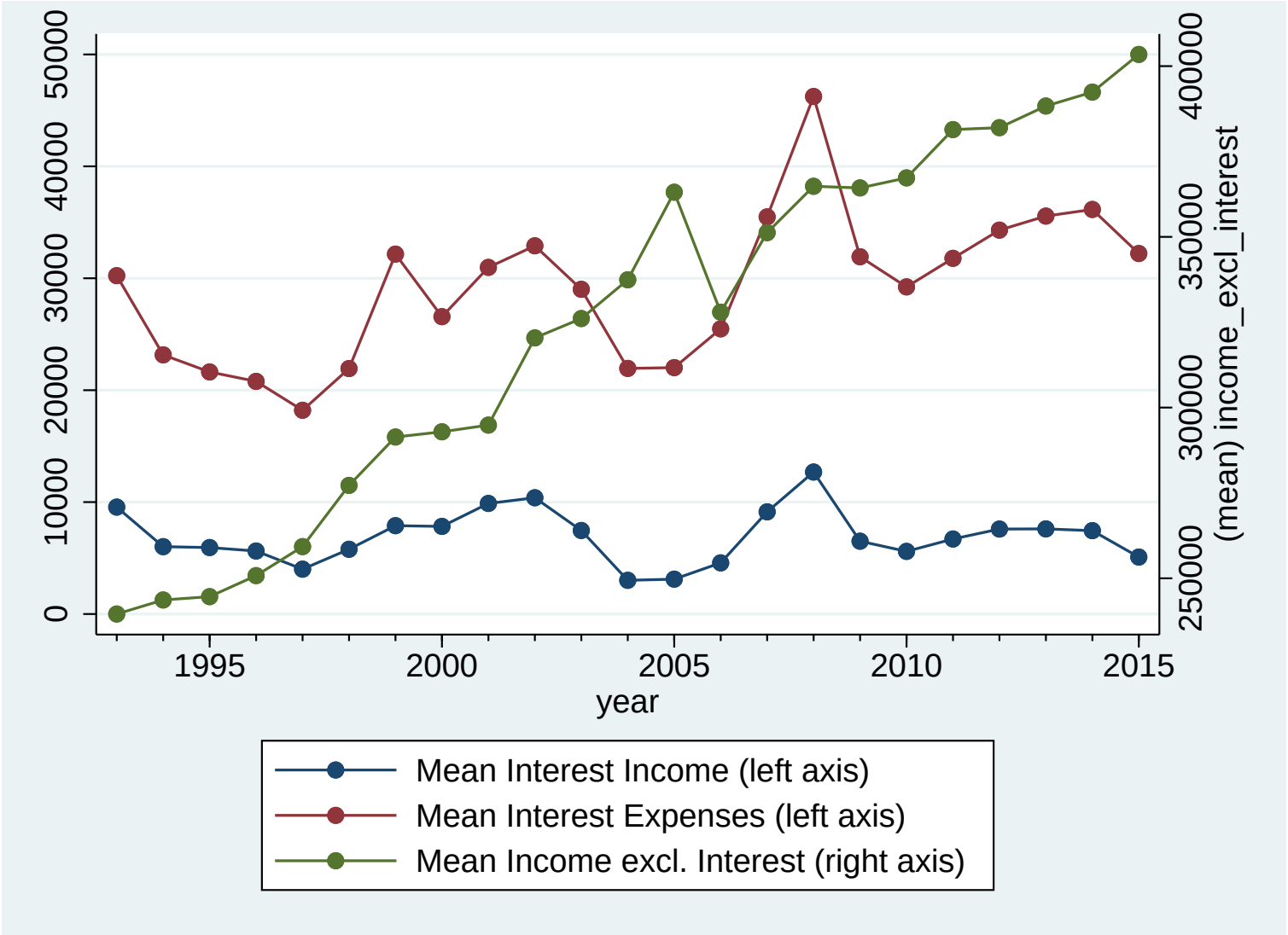
- Caveat: Maybe house prices are a separate, fourth channel.

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

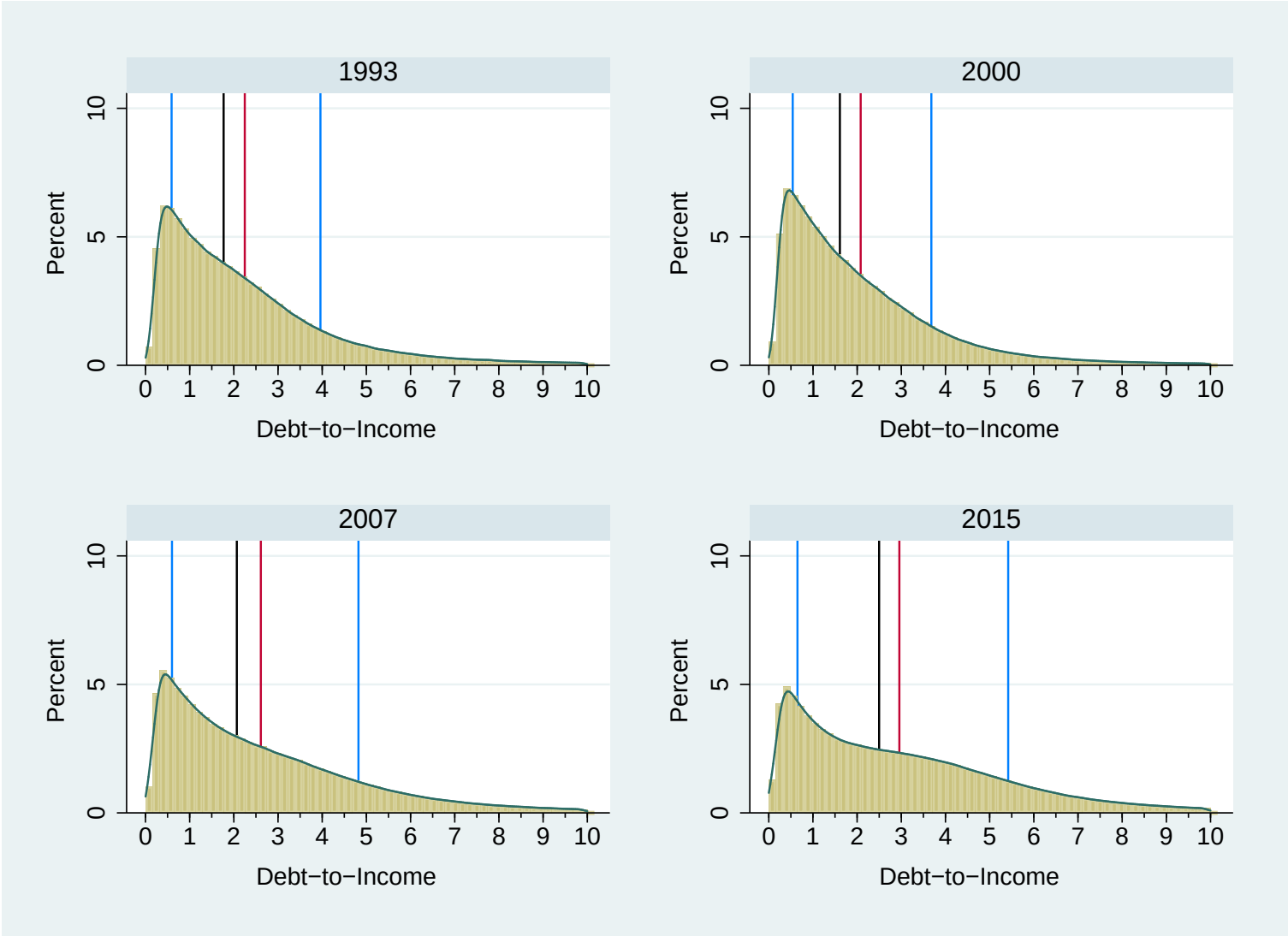
The Norwegian data

- Population tax record data from 1993 - 2006.
  - 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



The distribution of debt-to-income over time.



Summary statistics

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

	Stayers	Movers	High DTI	Low DTI
Age	48	36	41	48
Debt	613150	621443	1440133	256449
Debt Growth	15049	178509	-8096	91221
Income	315047	239751	349640	337969
Interest Income	7454	3553	3071	6502
Interest Expenses	29683	27287	70731	11585
N	52296846	7927718	685392	685392

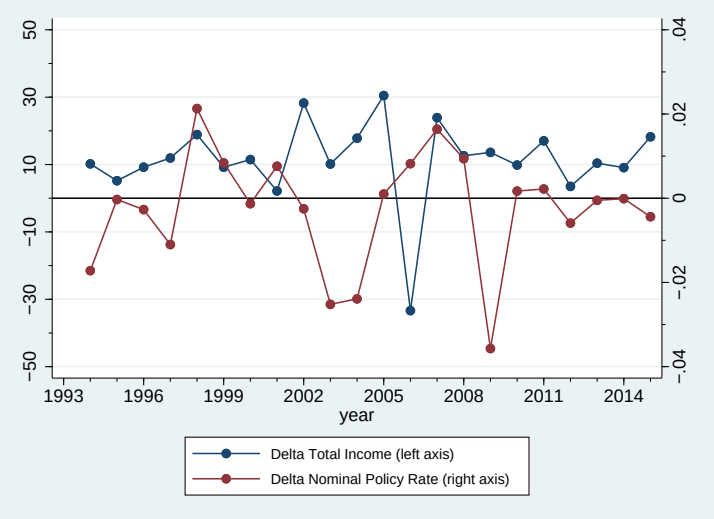
Notes: Mean by group across years (1993-2015). High and Low Debt-to-Income (DTI) refers to households in the 84 to 86 and 14 to 16 percentiles of the sample with NOK 50.000 $<$ real debt $<$ NOK 5 million, DTI $<$ 10.

Cash flows and nominal interest rates.

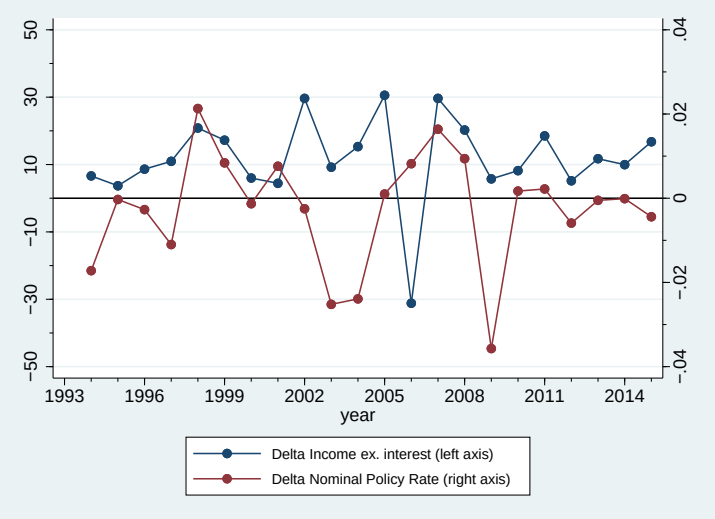
How do the components of disposable income – households' cash flows – co-move with the nominal interest rate?

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

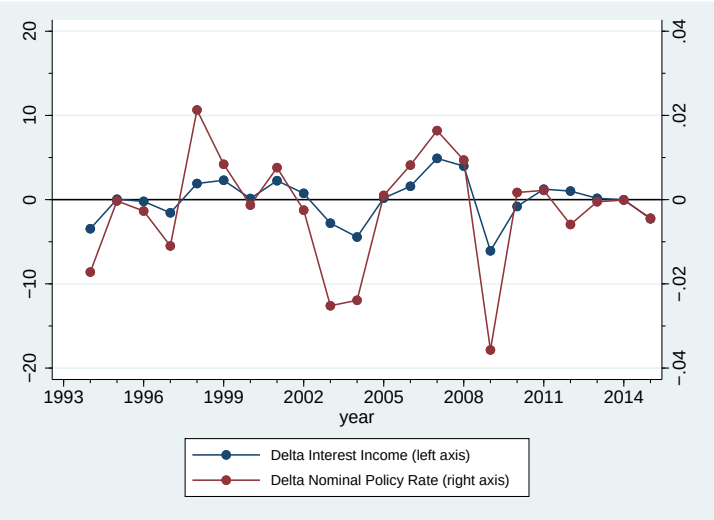
Cash flows and nominal interest rates. 1995 - 2018.



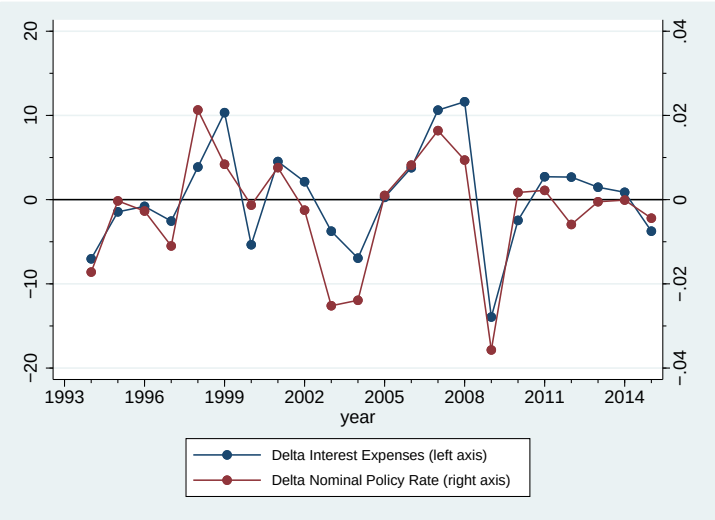
(a) Total income



(b) Income excl. interest



(c) Interest income



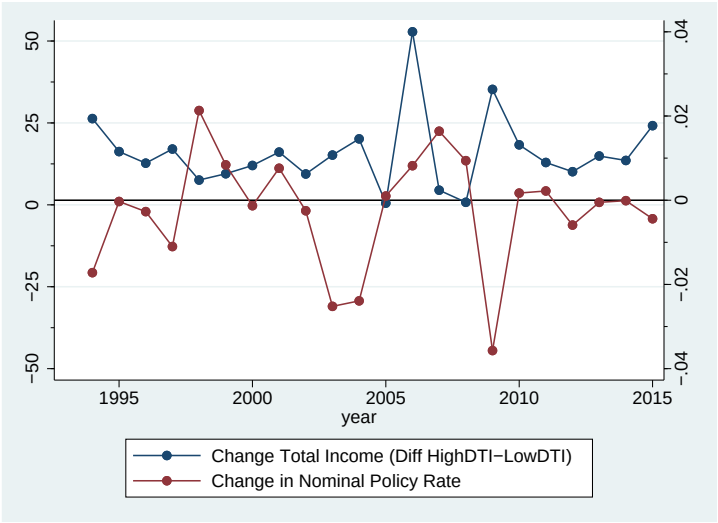
(d) Interest expenses

Cash flows and nominal interest rates

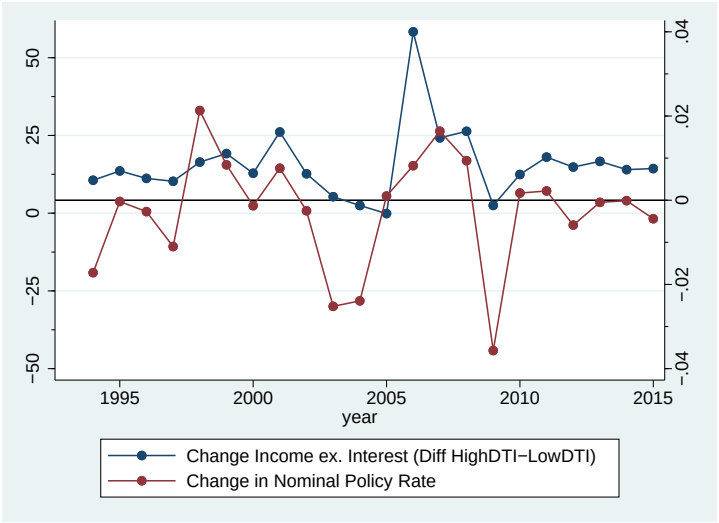
How do the components of disposable income – households' cash flows – co-move with the nominal interest rate?

- 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.

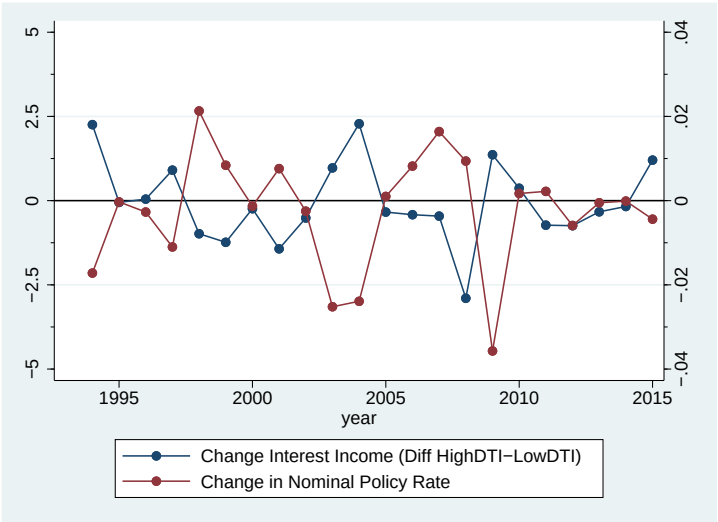
Diff-in-diff cash flows, high vs. low DTI households.



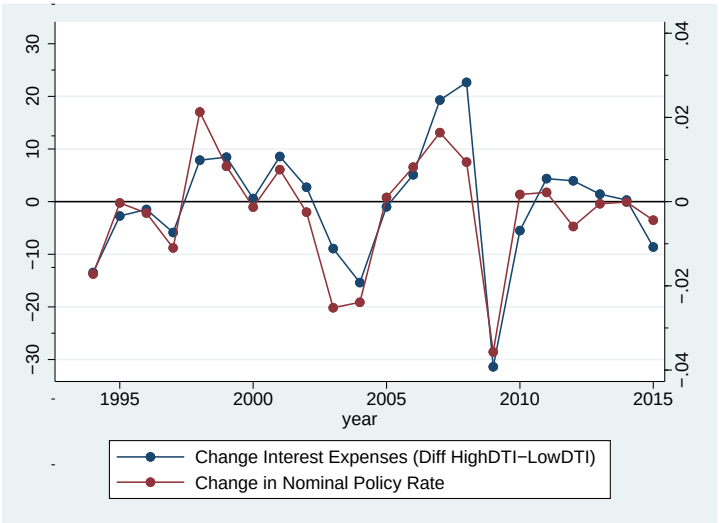
(e) Total income



(f) Income excl. interest



(g) Interest income



(h) Interest expenses

From cash flows to debt growth

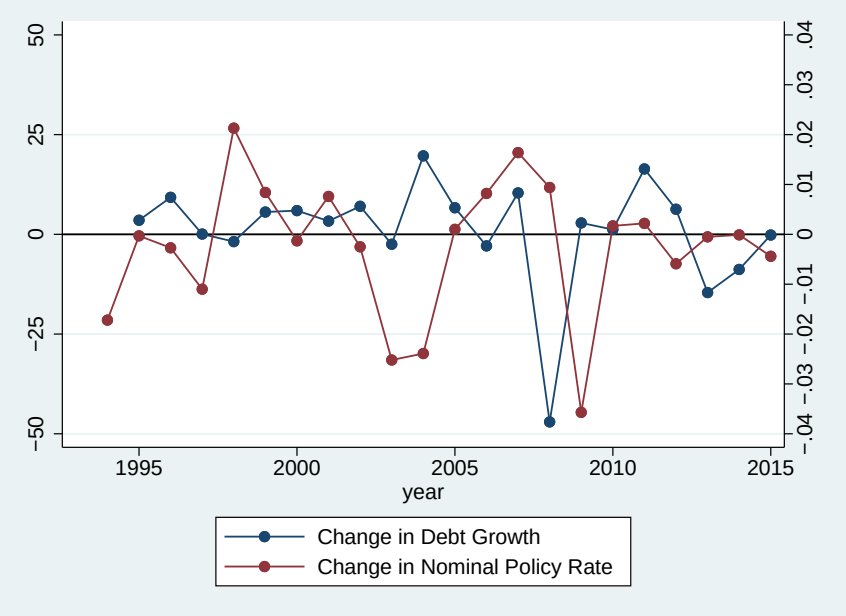
How do the components of disposable income – households' cash flows – co-move with the nominal interest rate?

- 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

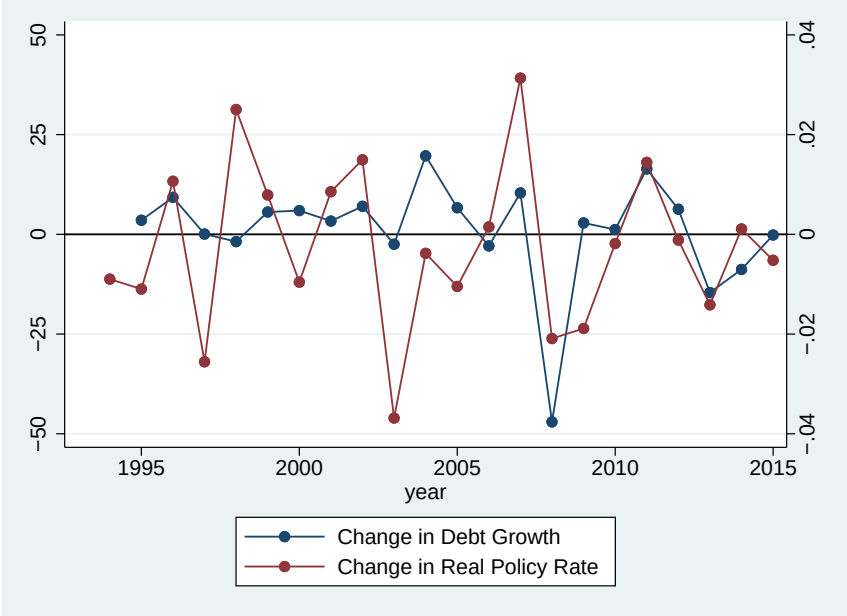
Next: How does debt growth co-move with interest and inflation?

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

Debt growth and interest rates



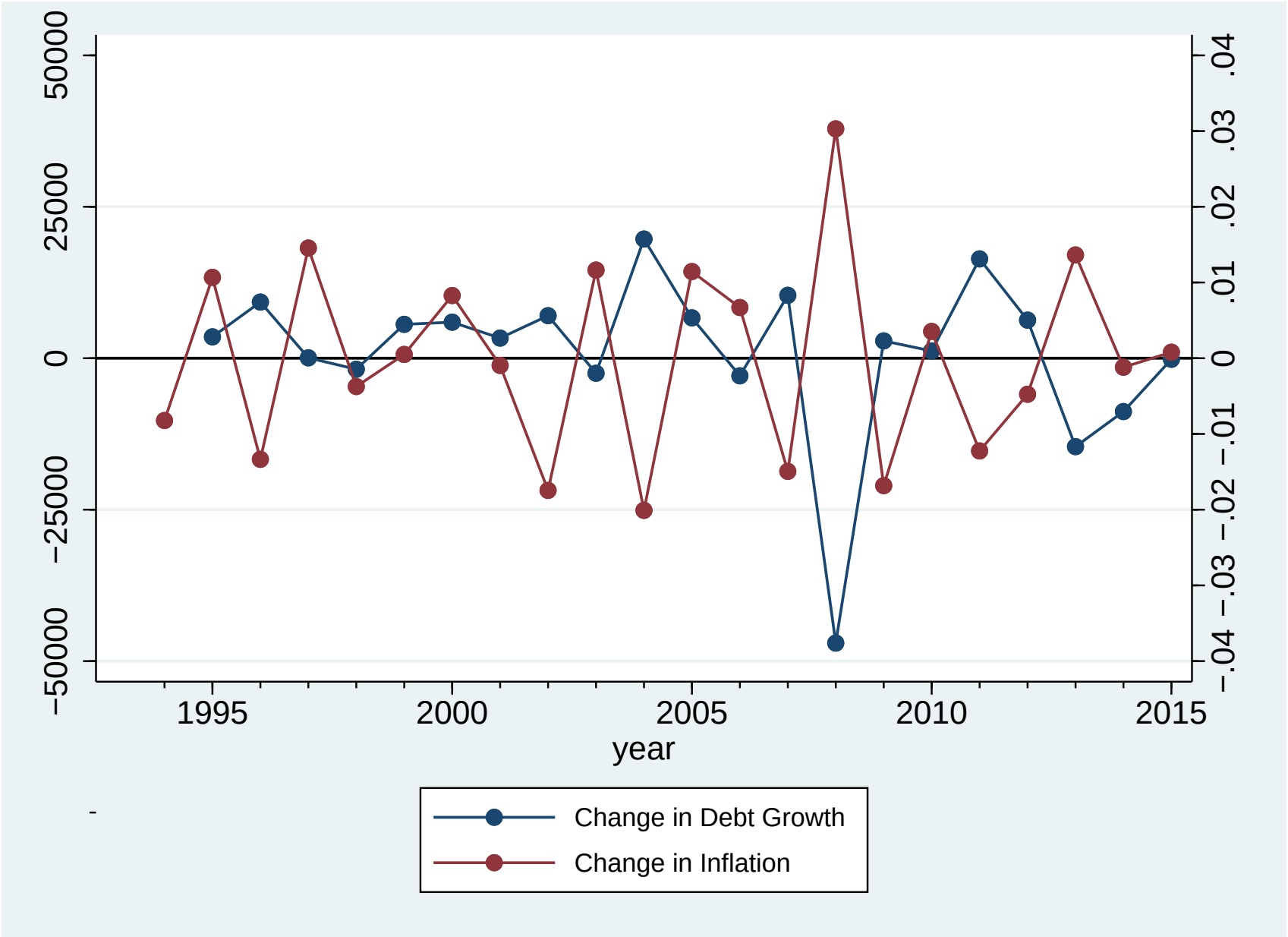
(i) Debt growth and nominal policy interest rate, first differences



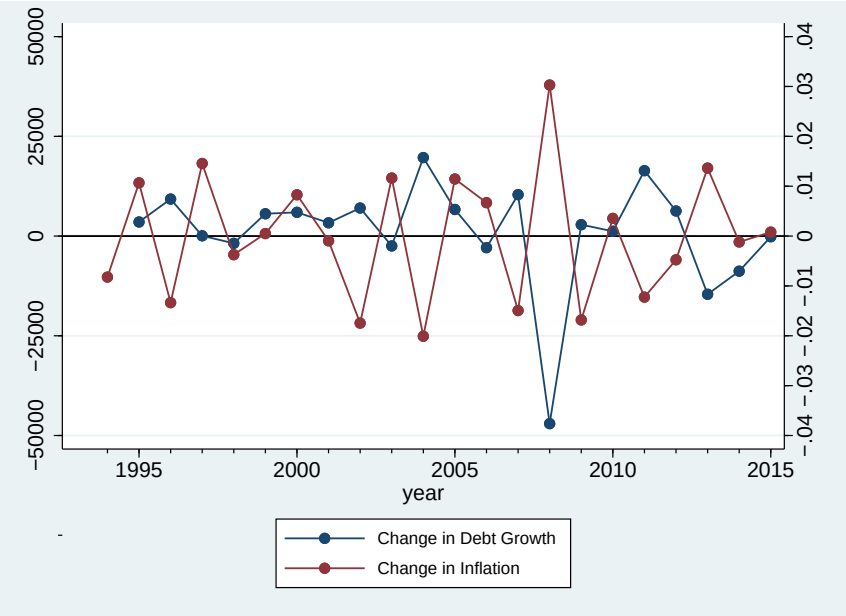
(j) Debt growth and real interest rate, first differences

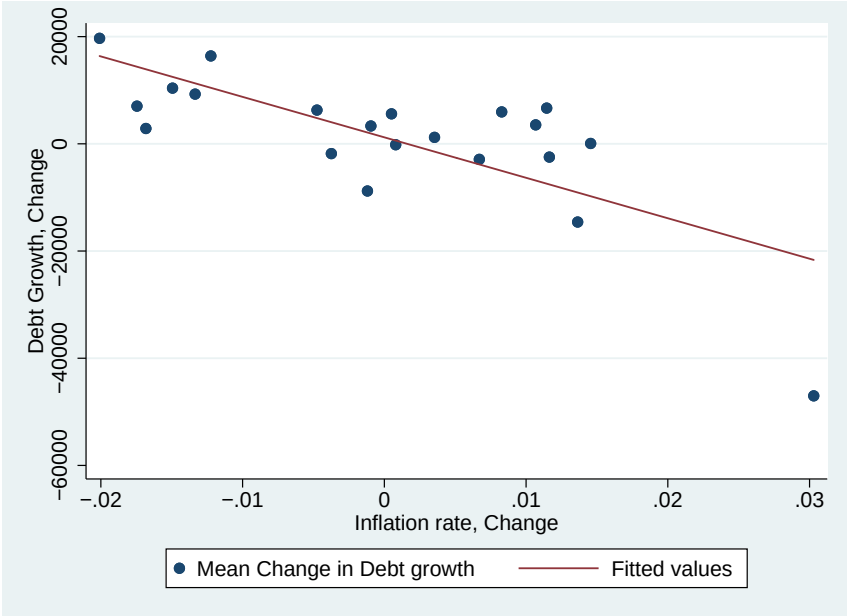
- Weak association with nominal rates, some positive association with real rates.
  - Why?

Debt growth and inflation



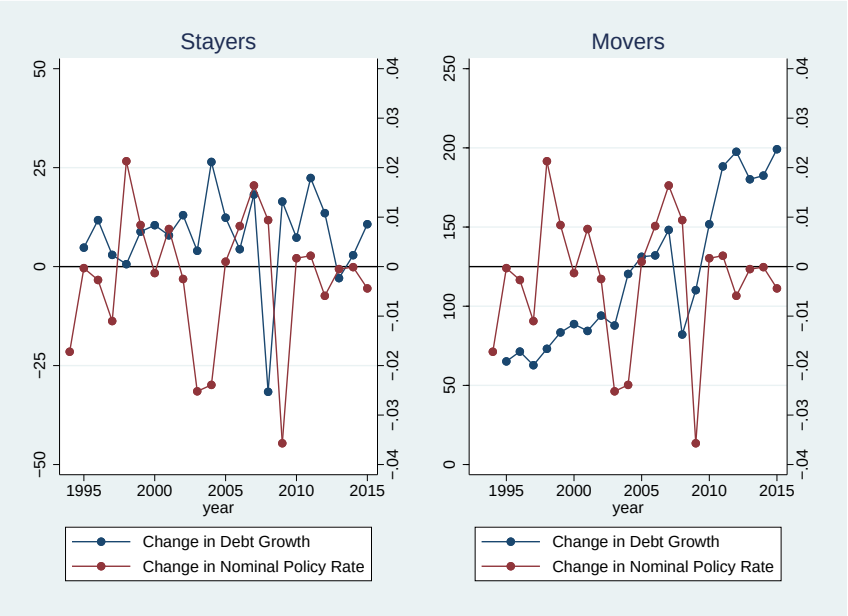
Debt growth and inflation



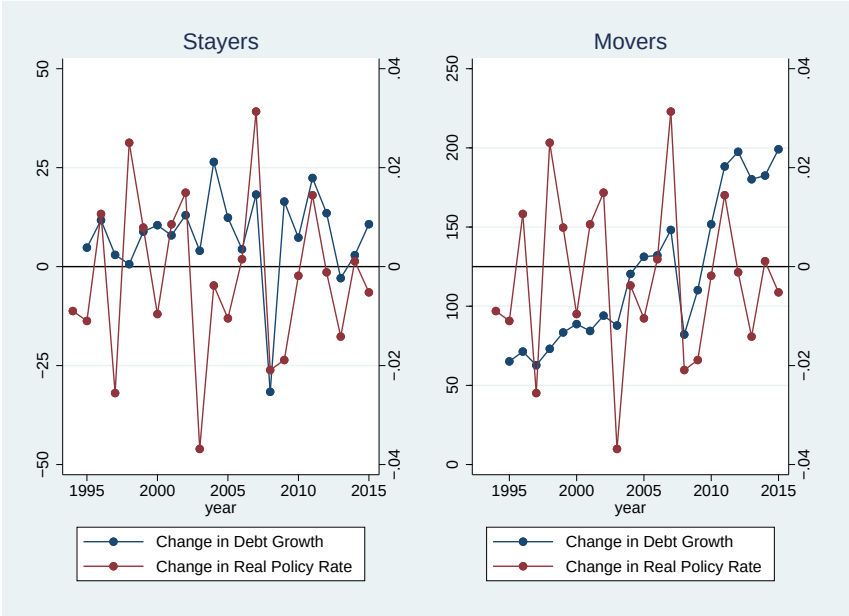


- Variation in inflation strongly associated with variation in real debt growth
  - Well beyond any interest rate association
  - Why?

Debt growth and interest rates among movers vs stayers.

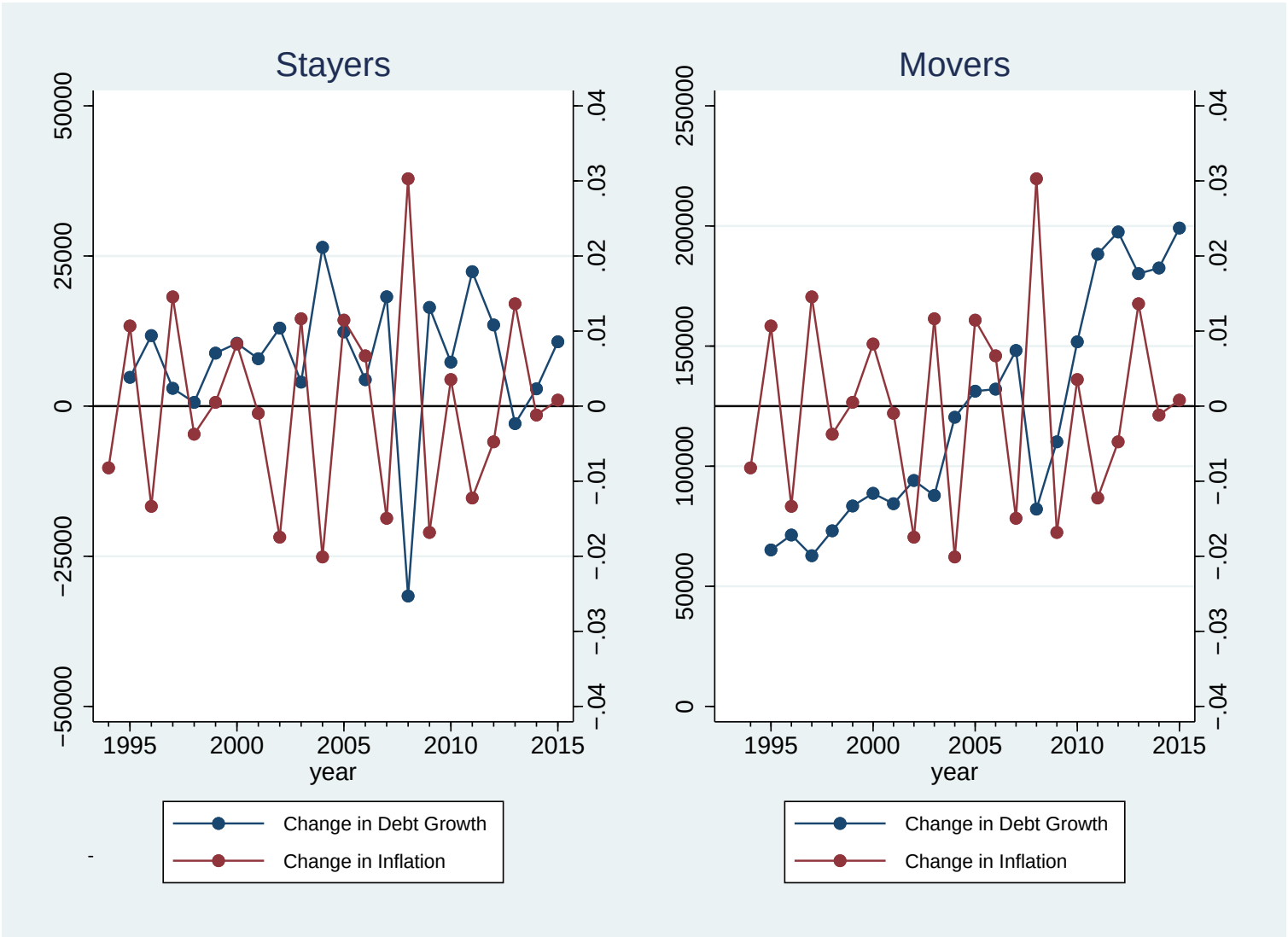


(k) Debt growth and nominal interest rate, first differences

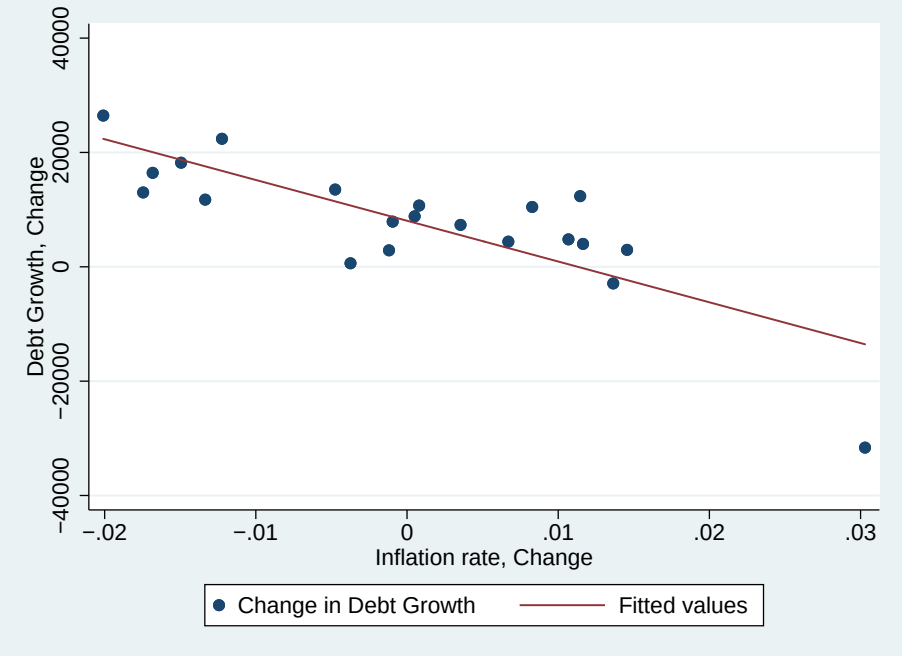


(l) Debt growth and real interest rate, first differences

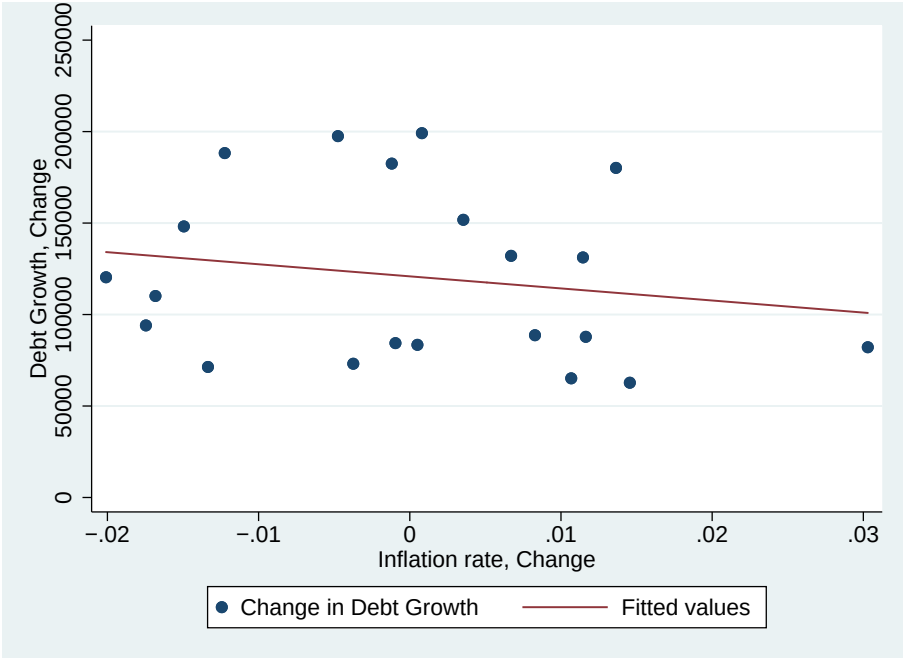
Debt growth and inflation among movers and stayers



Debt-growth and inflation among movers and stayers



(m) Stayers

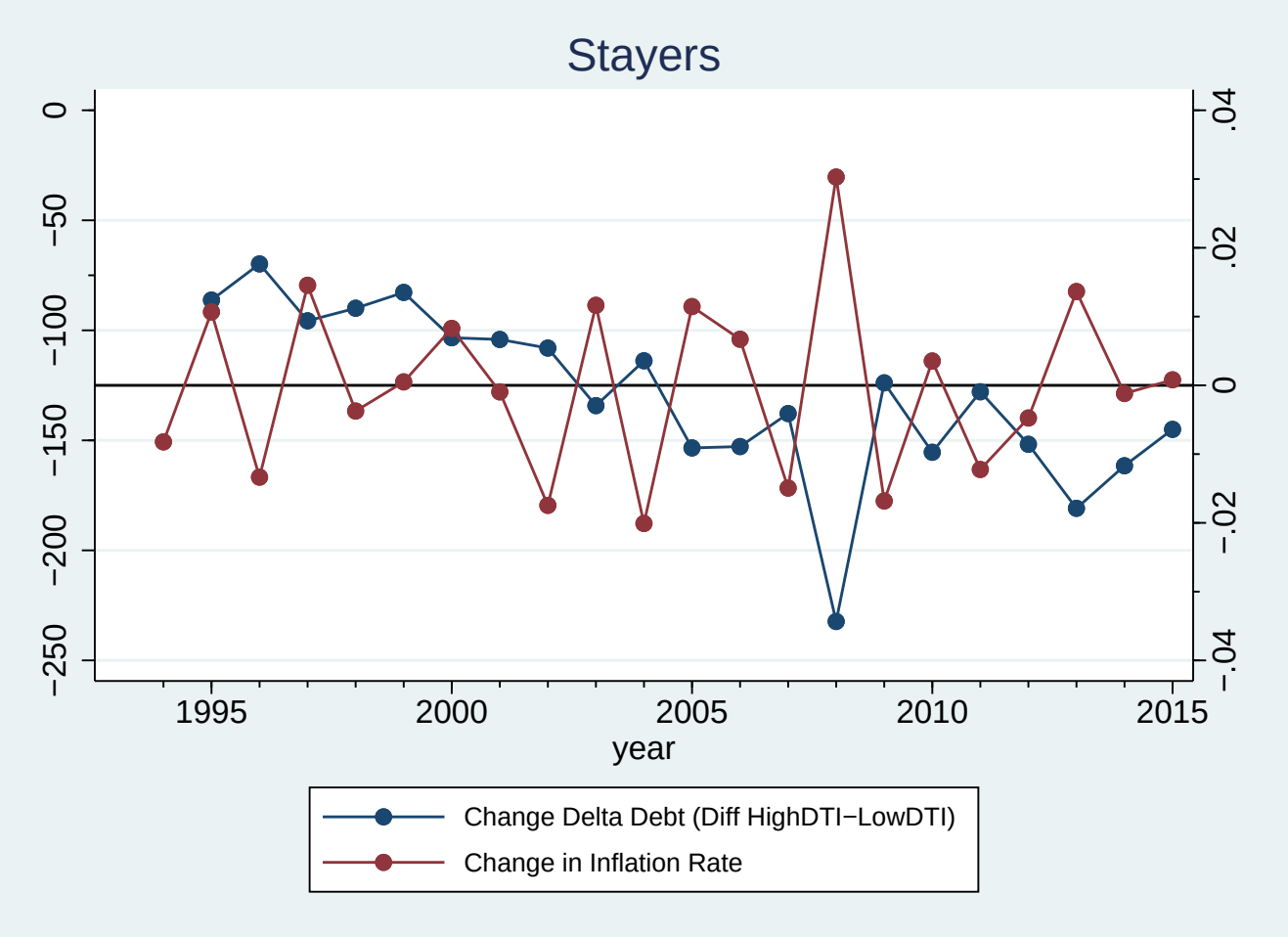


(n) Movers

- "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



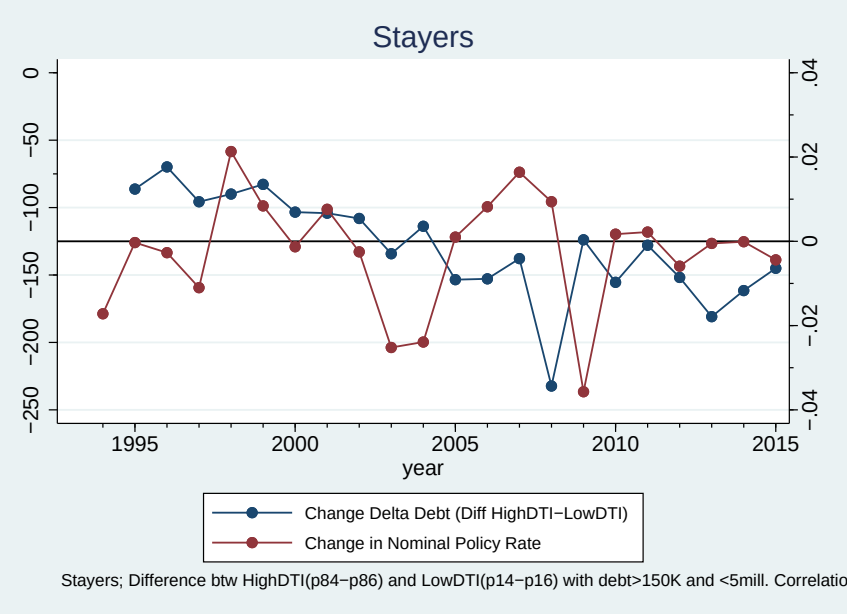
Conclusion

- 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.