Monetary and macro prudential policies in a low interest-rate environment

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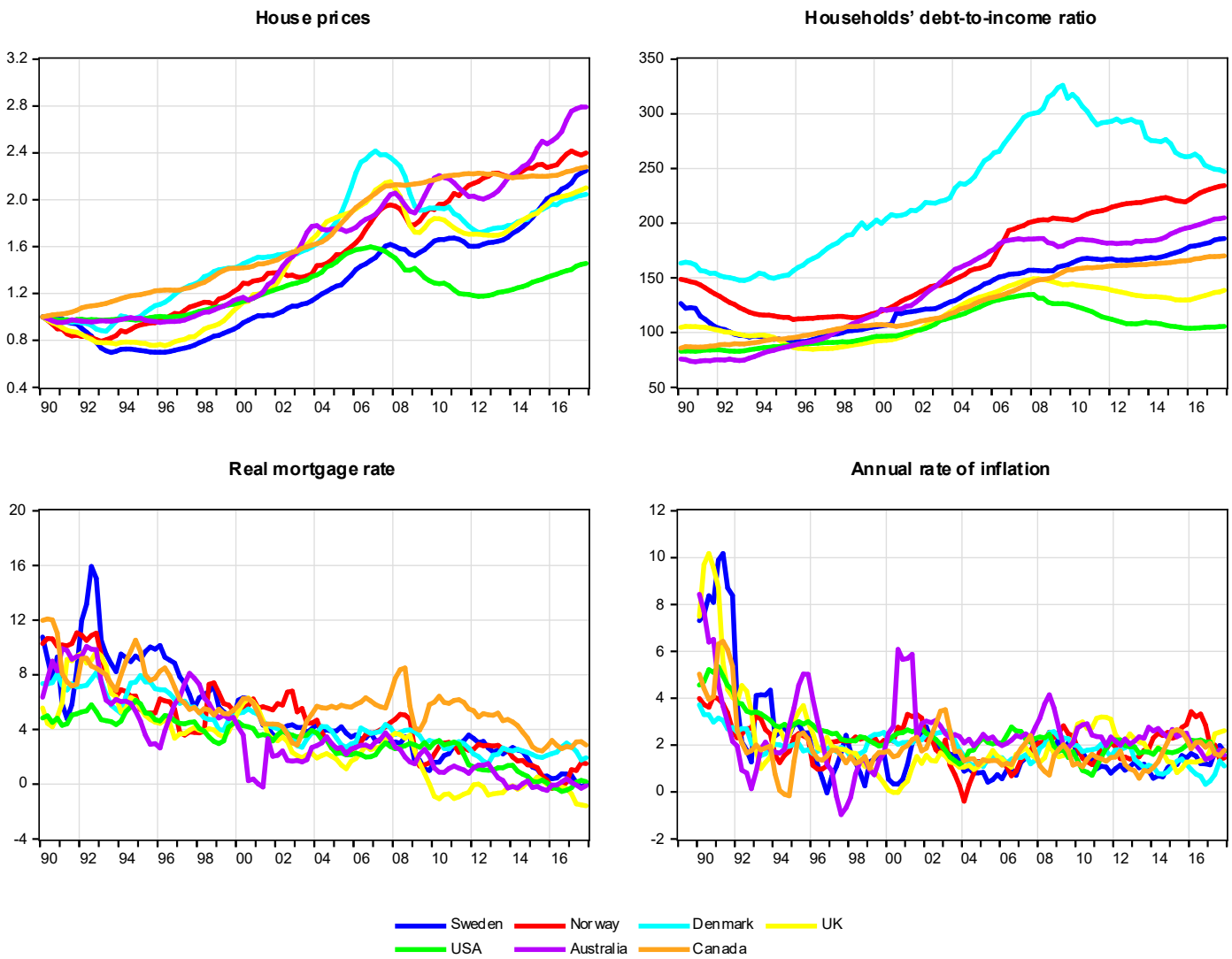
Household indebtedness have risen to unprecedented levels

Raises concerns about their vulnerability to normalized interest rates...

- Almost a decade after the unfolding of the Global Financial Crisis, several countries in Northern Europe, Canada and Australia are experiencing soaring household debt and fast-inflating house prices.
- While record low interest rates keep the debt-service-to-income ratio at sustainable levels presently, policy makers around the world have expressed concerns about households' vulnerability to normalized interest rates.
- Different preemptive macroprudential policies (as well as monetary or fiscal actions) have been put forward to stem the growing imbalances.

Household debt, house prices and policy rates



Research question: MPP, MP and ZLB

What is the interaction between macropru and monetary policy in a low-interest rate environment?

What we do

- Evaluate steady state effects of transition to a low-real interest rate/high debt environment.
- Study how macro-effects of MPP tightening depend on the ability of the CB to provide accommodation.
  - Tease out strength of interaction in low and high debt environments.
  - Tools: LTV, mortgage interest deductibility (MID). Ongoing work: evaluate the effects of DTI and amortization requirements.
- Calibration: high-debt economy ($\sim$Sweden) - many standard macro parameters ($\sim$US)
- The current economic conditions are extra-ordinary from a historical perspective thereby limiting the scope of a pure empirical approach. Here: model-based analysis.

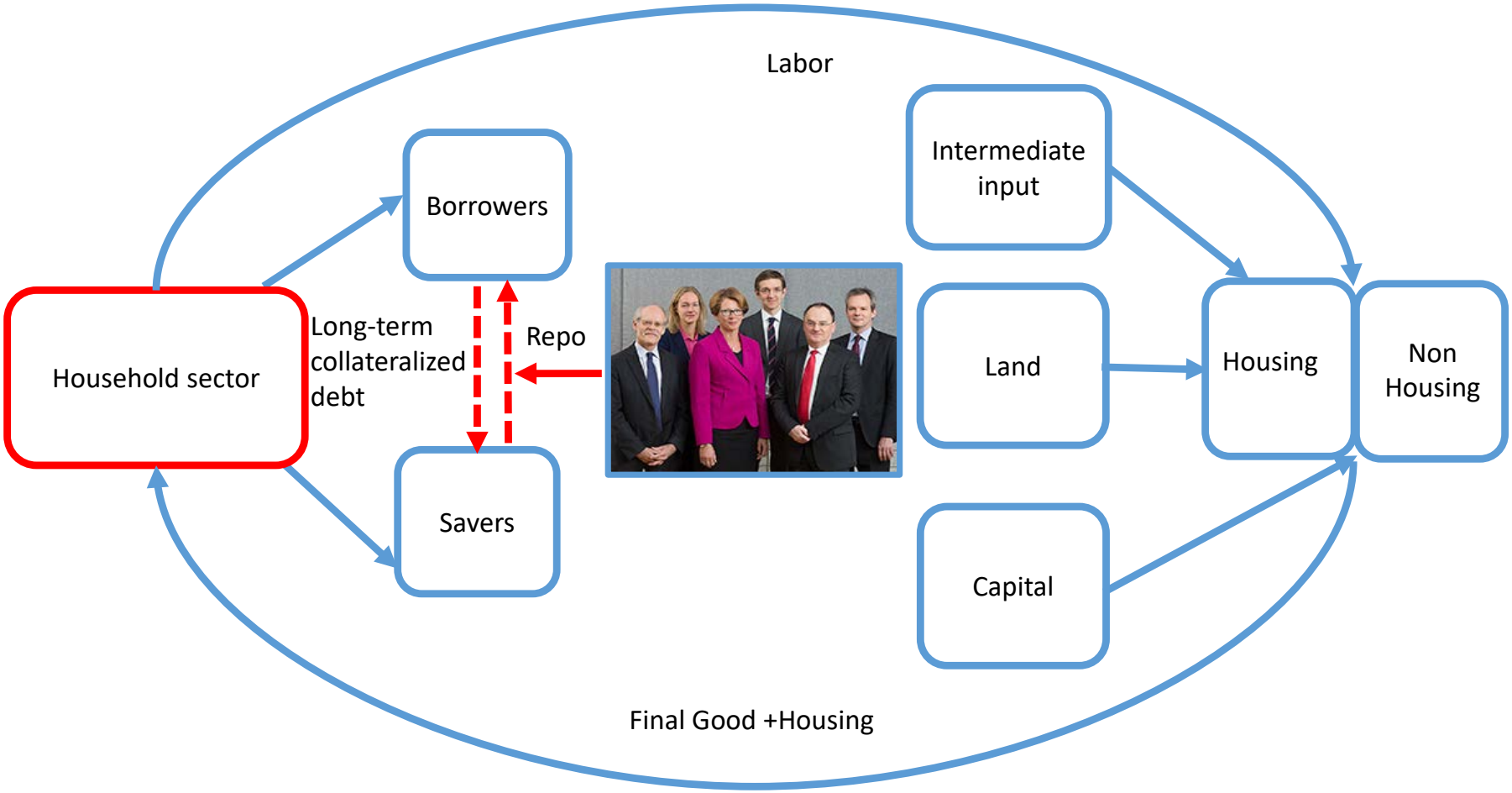
Overview of results

- The model engineers a doubling in borrowers' DTI in response to the transition to a low real rate equilibrium (from 3 to 0.5 percent), with a small reduction in DSTI.
- MPP effects on the aggregate economy can be substantially amplified when the ZLB is binding.
  - MID repeal has similar contractionary effects as LTV policies.
- Two mechanisms behind elevated contractionary effects of MPP tightening at the ZLB when debt is high:
  - An MPP tightening requires a larger degree of monetary accommodation when debt is high.
  - Monetary policy more potent (and hence larger adverse effects of monetary constraints) in low-rate (high debt) environment.
- Key message: need to think carefully about monetary constraints and initial state (debt levels) when designing MPP!

(Incomplete) Literature review

- **Housing and the macroeconomy**: Iacoviello (2005), Iacoviello and Neri (2010), Justiniano Primiceri and Tambalotti (2015).
- **Monetary policy transmission mechanism and HH debt:** Garriga et al. (2017), Gelain et al. (2017), Pietrunti and Signoretti (2018), Calza et al. (2013), Cloyne et al. (2018) Flodén et al. (2018).
- **Interaction between MP and MPP**: Alpanda and Zubairy (2017), Gelain and Ilbas (2017), Ferrero et al. (2018), Mendicino et al. (2017).
- **Interaction between MP and other stabilization policies at the ZLB**: Erceg and Lindé (2012), Erceg and Lindé (2014).

The model


Labor
Borrowers
Intermediate input
Household sector
Long-term collateralized debt
Repo
Land
Housing
Non Housing
Savers
Capital
Final Good +Housing

New features: long-term debt and housing transaction costs

- Long-term debt - to match reasonable debt responses to MP shocks (Alpanda and Zubairy, 2017):

$$\underbrace{\frac{M_t}{P_t} \equiv [r^M_{t-1} + \kappa]\frac{D_{t-1}}{P_t}}_{\text{Mortgage payments}}$$

$$\underbrace{\frac{D_t}{P_t} = (1-\kappa)\frac{D_{t-1}}{P_t} + \frac{L_t}{P_t}.}_{\text{Stock of debt evolution}}$$

$$\underbrace{\frac{L_t}{P_t}}_{\text{New loans}} \leq \underbrace{\theta_t q_t IH_{lt}}_{\text{Collateralized debt}} + \underbrace{\gamma[q_t(1-\delta_h)h_{lt-1} - (1-\kappa)\frac{D_{t-1}}{P_t}]}_{\text{Equity extraction}}.$$

- Housing transaction costs - to match reasonable non-durable consumption responses (TGT: Cloyne et al., 2018)

Monetary and macroprudential policy

- **Monetary Policy**
  - Interest rates react to inflation and **output gap** according to a Taylor rule. The monetary authority recognizes any policy change with permanent impact on the output gap.
  - Constrained by the ZLB
- **Macroprudential Policy Tools**: LTV, MID
  - Ongoing work: DTI constraint.

Calibration: two economies with different DTI.

Table 1. Parameters that drive the change in indebtedness.

Moment	1990's		2010's	
	Value	Target	Value	Target
Real rate	0.9925	3%	0.99875	0.5%
Inflation rate	0.005	2%	0.00375	1.5%
LTV	0.75	75%	0.85	85%

Table 2 Steady state values in the two indebtedness regimes

	1990's	2010's
DTI borrowers	245%	482%
DSTI borrowers	4.67%	4.38%
Non-residential investment /GDP	20.49%	24.13%
Residential investment /GDP	3.00%	7.24%
House prices (Δ%)		51.3%

▸ More

Results: long-term effects of MPP instruments

Table 3. Steady state effects of debt-reducing policies in the two indebtedness regimes (Percent change).

	Low debt		High debt	
	LTV	Deductibility	LTV	Deductibility
Output	-0.43	0.00	-0.87	0.00
Consumption	-0.10	-0.12	-0.019	-0.024
Non-residential investment/GDP	0.14	0.00	0.38	0.00
Residential investment/GDP	-5.9	0.00	-6.5	0.00
House prices	-1.9	-2.5	-1.8	-1.7
DTI aggregate	-14.6	-15.0	-14.4	-12.6
DSTI borrowers	-14.2	-14.0	-14.5	-11.8

MPP in the short-run: simulations set-up

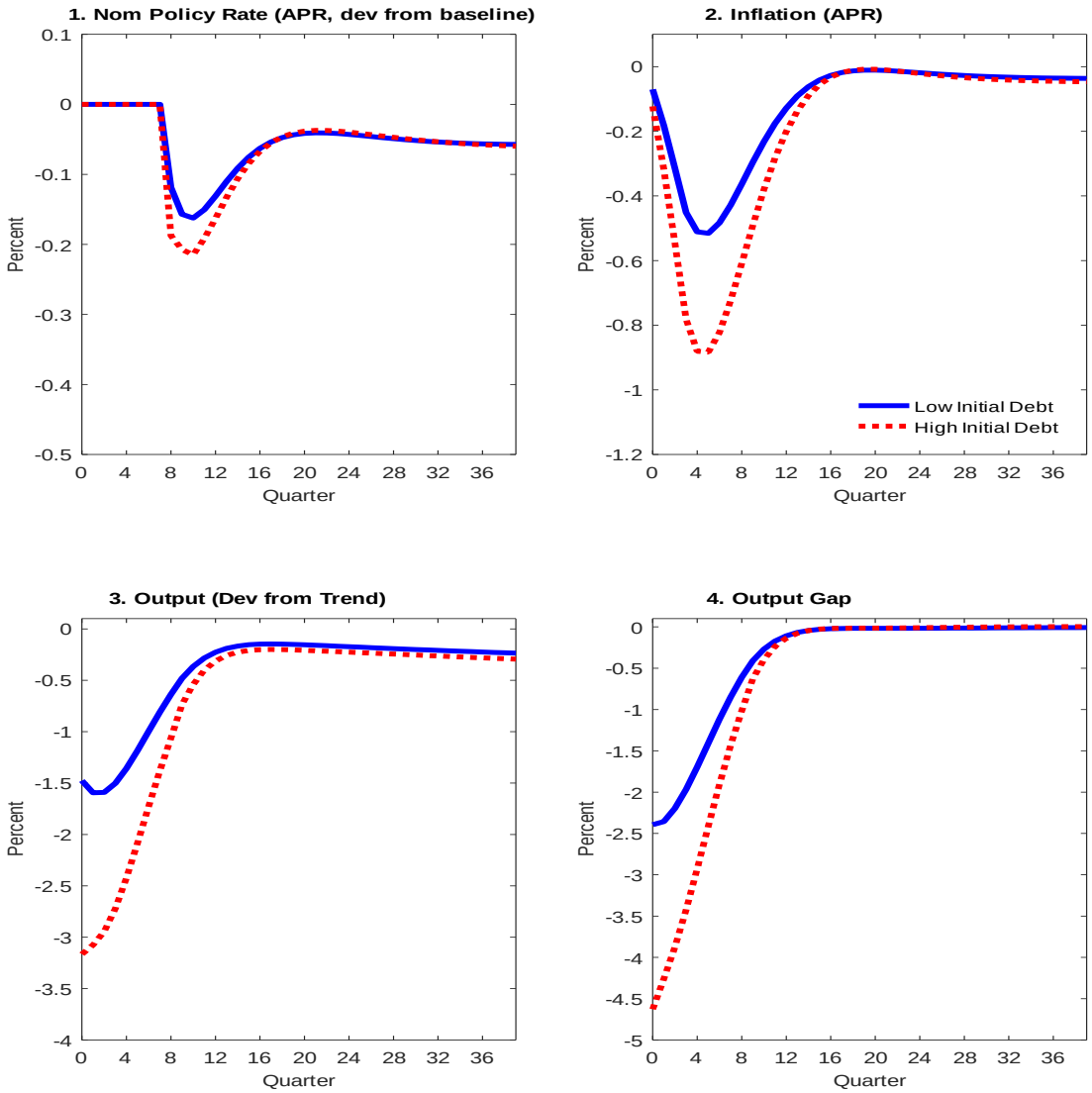
- We assume that the economy is driven to the ZLB by "a mix of adverse shocks":
  - Linear setting: do not need to specify which shocks, only the path of the shadow rate (Erceg and Lindé, 2014)
  - For simplicity, assume for now that macropru policy actions cannot impact on the *duration* of the trap (2 years)
- Impulse responses are constructed as in Erceg and Lindé (2012)
  - **Baseline:** Monetary policy is constrained at the ZLB for 8 quarters
  - **Scenario**: Add a macroprudential shock to the system.
  - The **IRFs** we plot are

$$\textbf{IRFs} = \textbf{Scenario-Baseline}$$

this will then show up as a zero interest rate response the first 8 quarters and then a negative interest rate effect (= there is scope for rate cuts in the scenario).

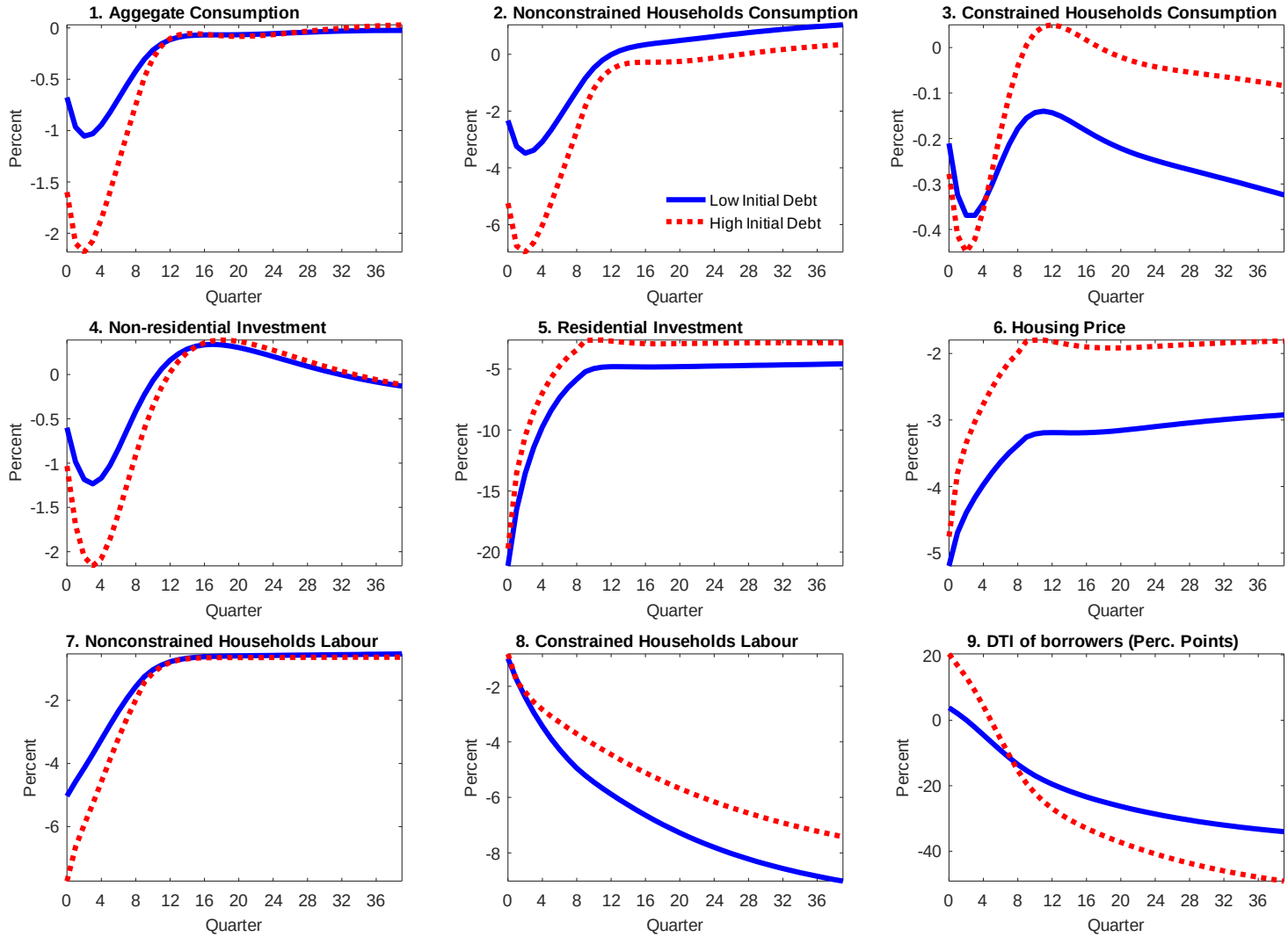
Dynamic effects of MPP at the ZLB

Aggregate effects of permanent LTV tightening in an 8-quarter liquidity trap



Dynamic effects of MPP at the ZLB

Effects of permanent LTV tightening: digging deeper



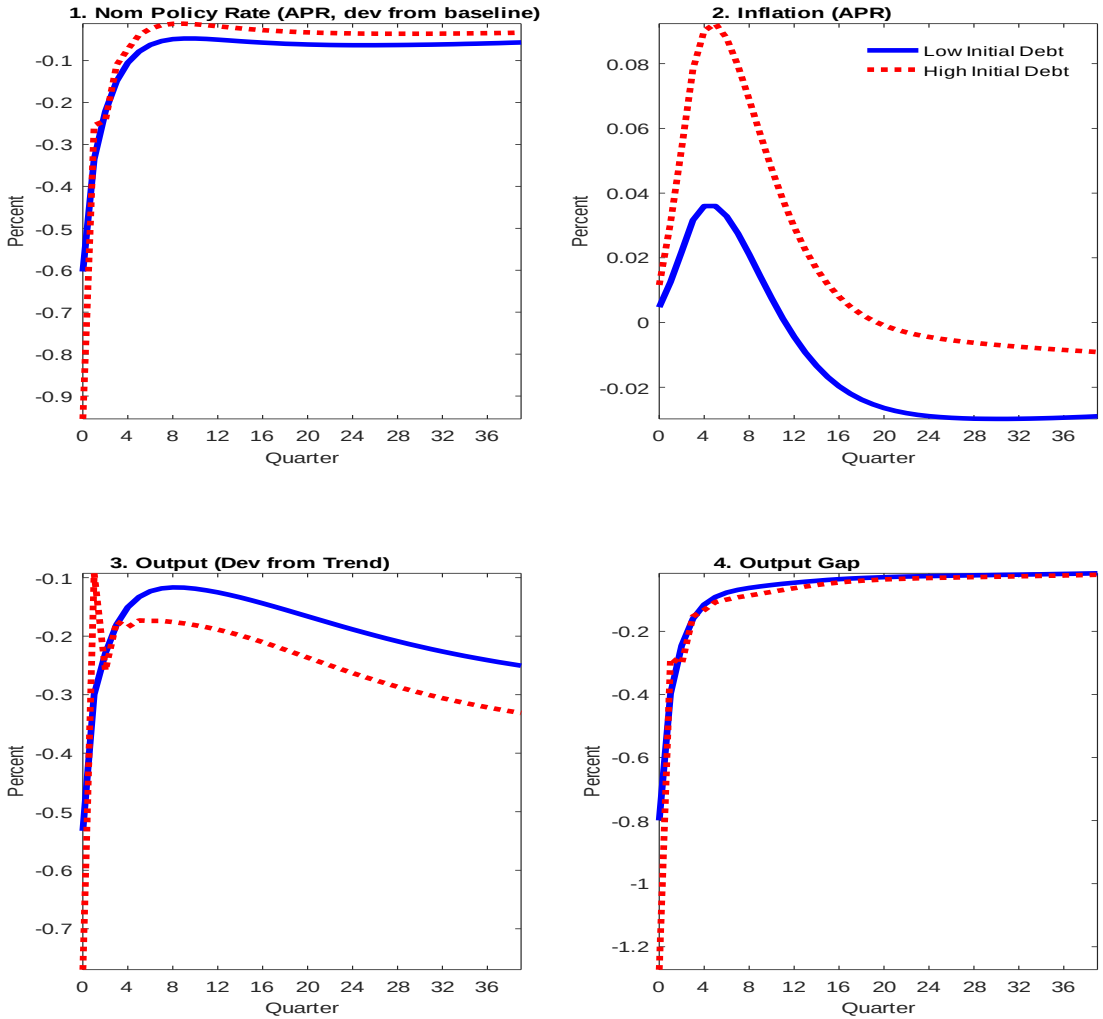
Dynamic effects of MPP at the ZLB

Effects of LTV tightening: dissecting the mechanism

- Effects of LTV tightening notably larger in high debt equilibrium compared to the low debt equilibrium.
- We now explain why - two mechanisms/explanations:
  1. LTV tightening requires more monetary accommodation to keep output gap and inflation closer to targets when debt is high (and this is not possible in a liquidity trap).
  2. The adverse effects of monetary constraints are larger when debt is high because monetary policy have larger effects on the economy in such a situation.
- Go through explanations 1 and 2 in slides below.

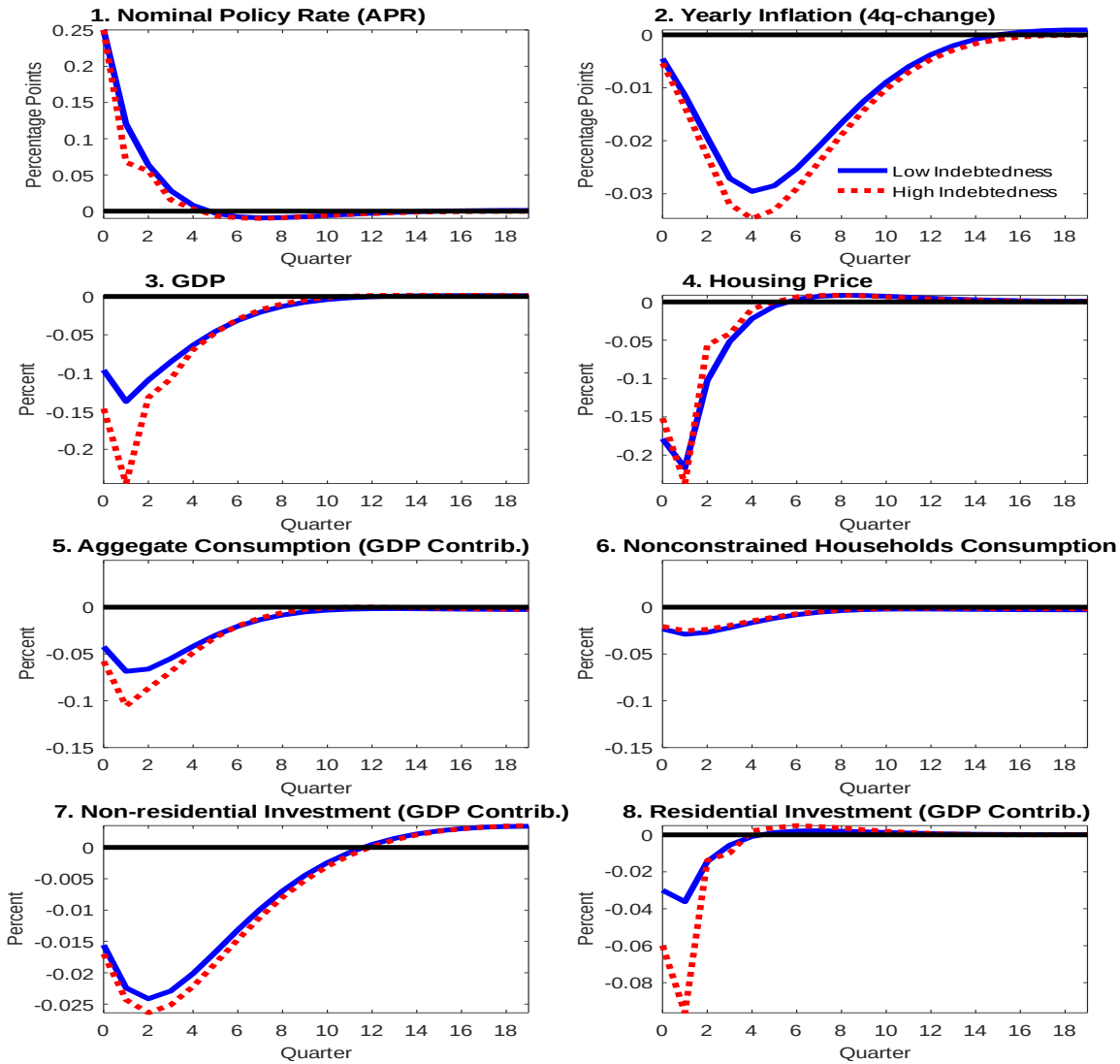
Explanation 1: LTV tightening needs more accommodation

Effects of a contractionary LTV shock



Explanation 2: Strength of MP depends on debt level

Effects of a contractionary MP shock



Conclusions

- MPP effects can be substantial on the aggregate economy when the ZLB is binding:
  - LTV tightening requires more monetary accommodation to keep output gap and inflation closer to targets when debt is high (and this is not possible in a liquidity trap).
  - In a high debt – low rate environment, monetary policy has larger effects:
    1. Borrowers are more affected in high debt economy.
    2. Investment (both residential and non-residential) is a larger share of output in a low rate - high debt economy.
- MID similar contractionary effects as LTV.
- Results suggest scope for policy coordination.

Work in progress

- Explore effects of other MPP tools (e.g., DTI)
- Different ways of generating the Baseline scenario.
- Interaction between MPP and duration of the trap.

Thank you!

Calibration

Table 4. Housing related parameters

Description	Symbol	Value
Amortization rate on HH loans	κ	0.0075
Share refinancing	Φ	0.3
Housing preference weight, patients	j_P	0.0685
Housing preference weight, impatients	j_I	0.219
Fraction of home equity withdrawn quarterly	γ	0.02
Housing adjustment costs	ϕ_h	4.2

Sources: Swedish credit registry data, Swedish FSA Mortgage Survey

▸ Back

Steady state effects of interest rate change

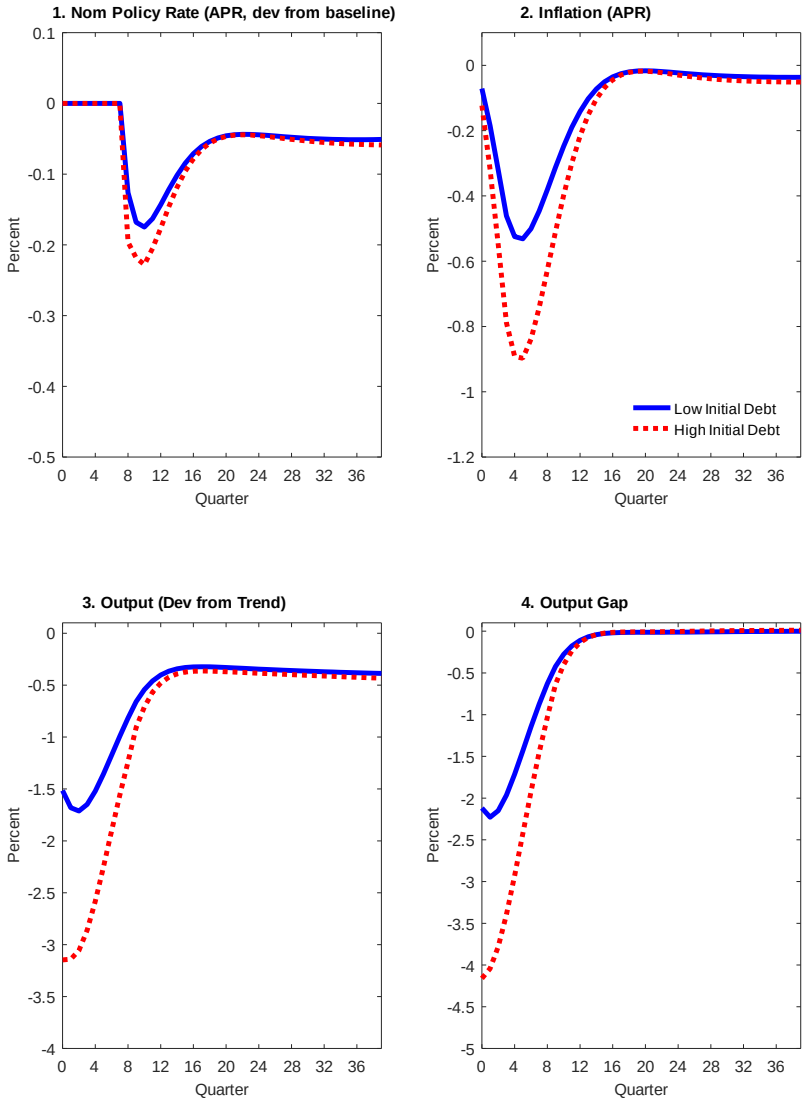
Table 5. Steady state values in the three indebtedness regimes.

	1990's	1990's + low R	2010's
DTI borrowers	245%	393%	482%
DSTI borrowers	4.67%	4.47%	4.38%
Non-residential investment/GDP	20.49%	24.23%	24.13%
Residential investment/GDP	3.00%	6.63%	7.24%
House prices (% change)		48.4%	51.3%

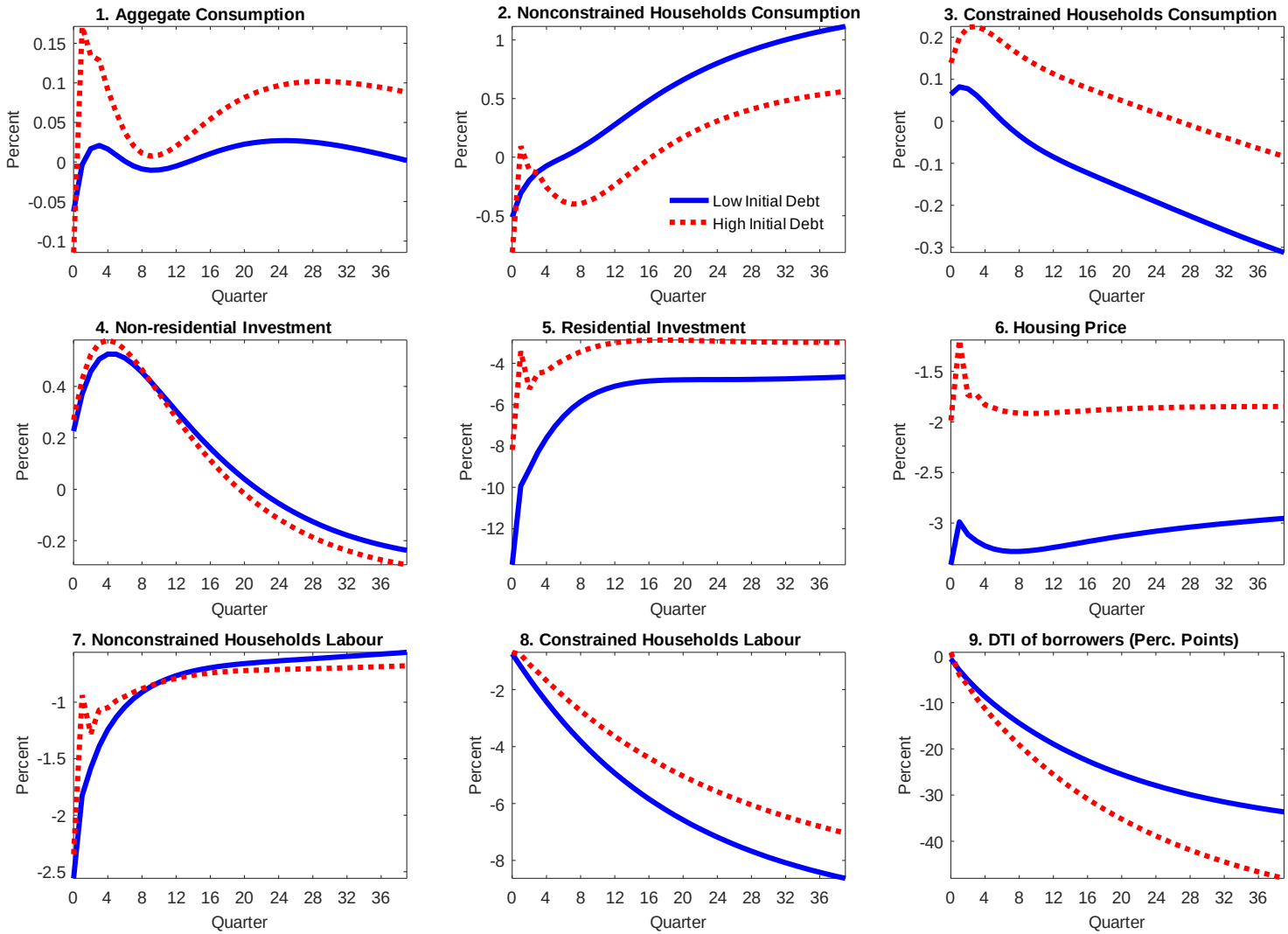
- This implies that, for example, 62% of the total increase in DTI going from 1990's to 2010's is driven by the real rate.
- In terms of the other values documented, the interest rate change accounts for an even larger share of the total change.

Dynamic effects of a reduction in interest rate deductibility

Effects when monetary policy is constrained

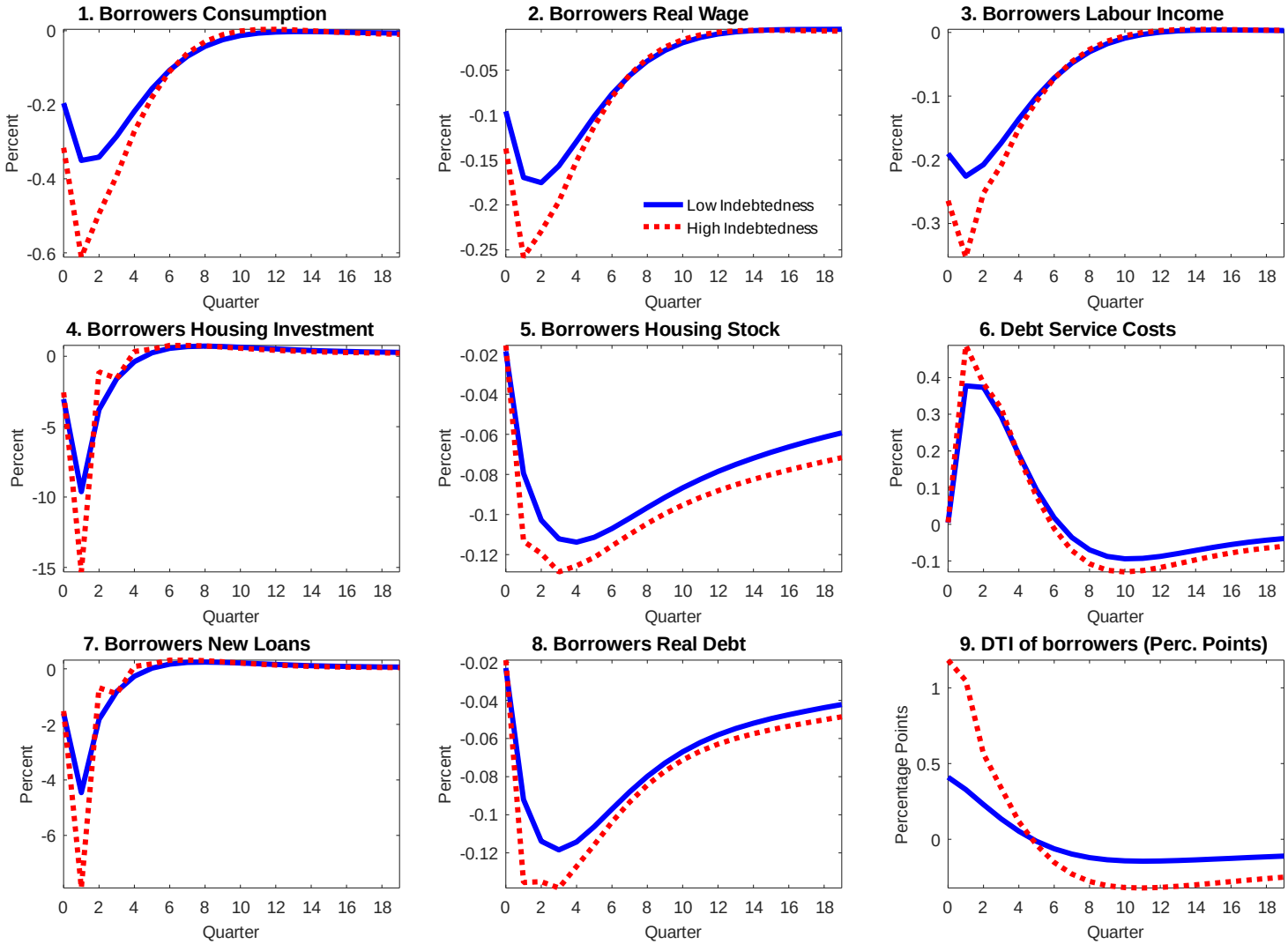


Explanation 1: Effects of LTV tightening when monetary policy is unconstrained



Explanation 2: Strength of MP depends on debt level

Effects of contractionary monetary policy shock: dissecting the mechanism



Residential Investment