WORKING PAPER

N° 2025-2

MONETARY POLICY TRANSMISSION AND HOUSEHOLD INDEBTEDNESS IN AUSTRALIA

KHUDERCHULUUN BATSUKH, NICOLAS GROSHENNY, NAVEED JAVED

www.tepp.eu

TEPP – Theory and Evaluation of Public Policies - FR CNRS 2042

Monetary policy transmission and household indebtedness in Australia*

Khuderchuluun Batsukh† Nicolas Groshenny‡ Naveed Javed§

February 16, 2025

Abstract

We highlight the importance of *high* and *low* states of household debt for the transmission of monetary policy in Australia during the period from 1994Q1 to 2019Q3. Using a state-dependent local projection model, we demonstrate that the impact of a monetary policy shock varies depending on the level of household debt. In particular, in low household debt conditions, output, investment, house prices, household debt-to-GDP, and debt-to-asset increase significantly to an expansionary monetary shock, while the responses of these variables are largely muted when the households are in a high-debt state. We infer from our results that the "home equity loan channel" may be active when household indebtedness is moderate, but inactive when it is high. We conjuncture that this channel likely played a crucial role in the transmission of monetary policy in Australia, and potentially accounted for the diminished effects of monetary policy under high household debt conditions.

Keywords: household debt, monetary policy, home equity loans.

JEL codes: E21, E32, E52

*We thank Anthony Brassil, Benjamin Beckers, Giovanni Caggiano, Fabio Canova, Efrem Castelnuovo, Yunjong Eo and Giovanni Pellegrino for their very helpful comments as well as seminar participants at the Universities of Adelaide and Nantes and participants at the 6th Biennial RBA/RBNZ Policy and Research Workshop-2024 for their feedback.

†University of Adelaide, School of Economics and Public Policy.
khuderchuluun.batsukh@adelaide.edu.au

‡GAINS, Le Mans Université and CAMA. nicolas.groshenny@univ-lemans.fr

§Reserve Bank of New Zealand, 2 The Terrace, Wellington 6140.
naveed.javed@rbnz.govt.nz (corresponding author).

1 Introduction

The 2008 Global Financial Crisis (GFC) has highlighted the risk that household indebtedness poses to a country's financial stability and its overall economy.[1] In Australia, household indebtedness has continued to rise after the GFC and has been a lingering concern to policymakers for the last two decades (Debelle, 2004; Kearns et al., 2021; Dumitrescu et al., 2022). This trend contrasts with many other developed economies where household indebtedness has generally stabilized or decreased after the GFC, making Australia an interesting case to study. Recent studies investigate the influence of household indebtedness on the transmission of monetary policy in the US or other OECD countries (Alpanda and Zubairy, 2019; Alpanda et al., 2021; Flodén et al., 2021; Cumming and Hubert, 2023). However, this particular question remains largely unexplored in the Australian context. Our aim is to fill this gap by examining how high and low states of household debt affect monetary policy transmission in Australia.

Our research is motivated by Australia's housing market, which differs from the global trends for two reasons. First, since the GFC, household debt and house prices have increased significantly in Australia, whereas globally, these have generally decreased or stabilized (Figures 1 and 2). Second, variable-rate mortgages (VRMs) traditionally make up the majority of home loans in Australia (Debelle, 2004). Figure 3 shows a close correlation between the mortgage rate and the cash rate, suggesting that changes in monetary policy may have a more immediate impact on household finances in Australia.

We adopt the empirical strategy of Alpanda and Zubairy (2019) to investigate the household debt related state dependencies of an expansionary monetary policy shock for Australia. To this end, we first construct a binary state variable measuring the degree (high or low) of households' indebtedness by extracting a low frequency trend from the household debt-to-GDP ratio. We then use quarterly data and the monetary policy shocks

[1] Schularick and Taylor (2012) and Jordà et al. (2013) find that an increase in household debt helps predict the occurrence of financial crises.

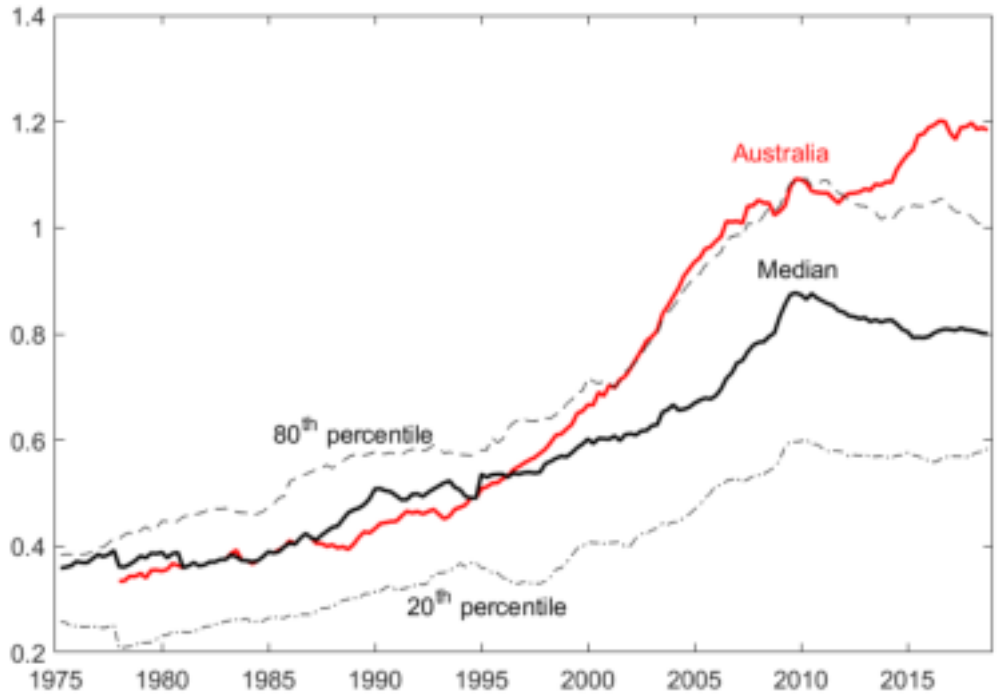


Figure 1: Household debt-to-GDP ratios in advanced economies. Sample: 1975Q1–2018Q4. Source: Alpanda et al. (2021) and authors' calculations.

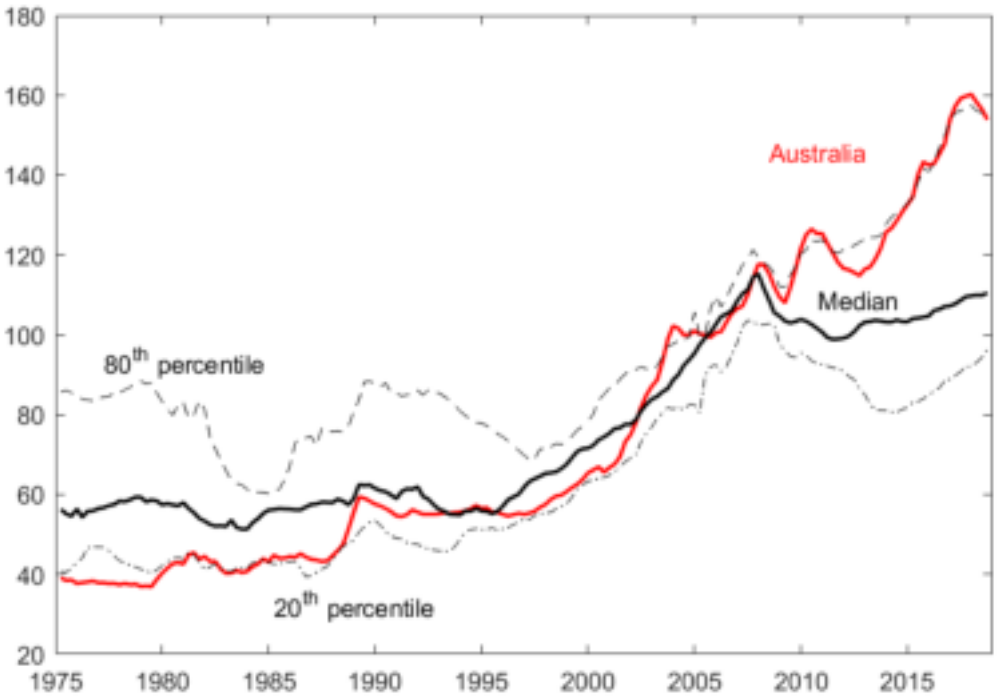


Figure 2: House price indices in advanced economies. Sample: 1975Q1–2018Q4. Source: Alpanda et al. (2021) and authors' calculations.

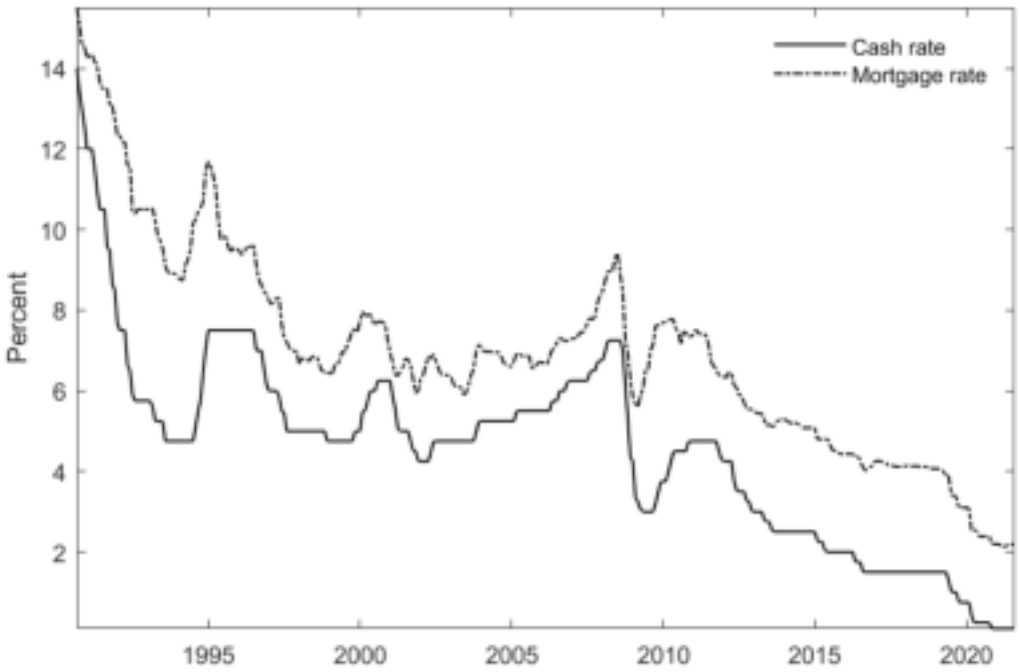


Figure 3: Cash rate and mortgage loan rate for Australia. Sample: 1990M9–2021M8.

of Beckers (2020) over the period 1994Q1-2019Q3 to estimate a state-dependent local projection model.[2] This model enables us to compare the responses of key macroeconomic variables to a surprise cut in the cash rate, when the initial state of household indebtedness is either high or low.

We find that monetary policy in Australia is less effective when household debt is high, which is in line with the empirical findings of Alpanda and Zubairy (2019) for the US. In particular, to an expansionary monetary shock, the responses of output, consumption, investment, house prices, household debt-to-GDP, and debt-to-asset ratios are largely muted in the high-debt state. In contrast, these variables increase significantly when households are in low-debt conditions. In addition, our consumption and investment subcomponents analysis shows a significant increase in durable goods consumption and residential and nonresidential investments when households are in a low-debt state.

[2]Beckers (2020)'s monetary shocks are based on the Romer and Romer (2004) strategy. See also Bishop and Tulip (2017).

Our results are also closely related to the two main channels through which household indebtedness may affect the propagation of monetary shocks (Calza et al., 2013; Bhutta and Keys, 2016; Hofmann and Peersman, 2017; Alpanda and Zubairy, 2019; Kim and Lim, 2020; Flodén et al., 2021): (i) the debt service channel, i.e. how a change in the policy rate affects the burden of interest payments borne by households, and (ii) the home equity loan channel, which refers to the ability for home owners to withdraw home equity when house prices increase. The literature suggests that the debt service channel (or cash flow channel) becomes stronger in context where adjustable-rate mortgages (ARMs) are predominant and where households' indebtedness is high. On the other hand, the efficacy of the equity channel hinges primarily on the extensiveness of mortgage equity release (i.e., home equity withdrawal). We discuss these two channels of monetary transmission further in the following.

The debt service channel makes monetary policy more effective under ARMs when household debt is high. The reason is that a policy rate cut immediately reduces mortgage rates, and both households with high and low debt can switch to mortgage loans with cheaper rates. The effects of a cut in the policy rate on households with high and low debt are then proportional. In other words, the more indebted a household is, the more it benefits from the interest rate cut through reduced interest payments.

The home equity loan channel, instead, dampens the efficacy of monetary policy as household indebtedness rises. The reason is: despite the fact that a policy rate cut lowers mortgage rates and increases house prices, highly indebted households are unable to access home equity loans due to their existing high debt. Put differently, the home equity channel amplifies the stimulative effects of a policy rate cut only for households with low levels of debt. Thus, this channel weakens at higher aggregate levels of household indebtedness. Moreover, the strength of this channel does not depend so much on whether mortgage rates are fixed or adjustable. Rather, it depends positively on the widespread availability of home equity withdrawal facilities and on the sensitivity of house prices to monetary

policy.

Whether household indebtedness amplifies or dampens the effectiveness of monetary policy would therefore depend on which of these two channels dominates. If the debt service channel prevails, monetary policy would become more effective as household debt increases. If, instead, the home equity channel predominates, monetary policy would be more powerful when household debt is low.

Our findings are consistent with a home equity transmission channel of monetary policy. We observe that for households in a low-debt state, a policy rate cut results in a significant increase in house prices and in the debt-to-GDP and debt-to-asset ratios. These findings reflect the ability of moderately indebted home owners to increase their borrowing through home equity withdrawals after a policy rate cut. Our empirical results suggest that such a home equity loan channel may have been at work in Australia during the period 1994-2019.[3,4]

The rest of the paper is structured as follows. The next section highlights our contribution to the literature. Section 3 describes our econometric strategy. Section 4 presents our main results. Section 5 provides four key robustness checks, while Section 6 concludes.

2 Related literature

Our paper is related to three strands of literature. The first strand, to which our paper is closely related, focuses on empirical studies on the role of households' indebtedness in the transmission of monetary policy (Alpanda and Zubairy, 2019; Kim and Lim,

[3] Bhutta and Keys (2016) note that equity extraction is an understudied topic despite its potential importance to the macroeconomy. They argue that a home represents the largest asset in most households and their primary source of collateral for borrowing.

[4] La Cava et al. (2016) find evidence of 'borrower' cash flow channel for Australian households with variable-rate mortgage debt compared to those with fixed-rate mortgages (FRMs). Also see Price et al. (2019), La Cava and He (2021) and La Cava and Wang (2021).

2020; Alpanda et al., 2021; Cumming and Hubert, 2023).[5] Our work closely follows the empirical methodology of Alpanda and Zubairy (2019). They investigate whether the transmission of monetary policy shocks in the US changes according to the level of household indebtedness. They identify high and low states of indebtedness using the cyclical component of the household debt-to-GDP ratio. They estimate a state-dependent local projection model in which monetary policy shocks are identified through a standard recursive (Cholesky) identification scheme.[6] They find that US monetary policy is less powerful when household debt is high.

Beyond our specific focus on Australia, our empirical approach differs from Alpanda and Zubairy (2019) in two ways. First, our identification of monetary disturbances is different: we borrow the series of Australian monetary policy shocks constructed by Beckers (2020) who augments Romer and Romer (2004)'s methodology by taking into account the financial market conditions of Australia.[7] Second, in the robustness section, we adapt the empirical model to take into account small-open-economy dimensions, which are crucial in the Australian context, by controlling for two key global variables: the World Industrial Production index constructed by Baumeister and Hamilton (2019) and the Global Financial Cycle estimated by Miranda-Agrippino and Rey (2020).

Alpanda and Zubairy (2019) also calibrate a partial equilibrium model for the US economy, where long-maturity fixed-rate mortgages are prevalent and equity withdrawal facilities are widely diffused. Their model simulations show that a policy rate cut has a greater stimulative effect on low-debt households compared to high-debt households. In other words, their calibrated model predicts that the home equity channel is stronger than

[5] Another branch of the literature investigates the opposite causal link, i.e. how monetary policy affects household-debt dynamics. See Duygan-Bump et al. (2015), Fagereng et al. (2021) and Canakci (2021) among others.

[6] Alpanda and Zubairy (2019) construct monetary shocks using residuals from a three-variable Cholesky-identified SVAR model where the federal funds rate is ordered last after GDP and inflation. The shocks, thus obtained, are then used in their state-dependent local projection model to identify monetary disturbances.

[7] Alpanda and Zubairy (2019) also consider Romer and Romer shocks in their robustness analysis.

the debt service channel in the US. As a result, monetary policy is more effective when household debt is low. This theoretical prediction is consistent with their empirical findings.[8] We obtain the same result for Australia, even though there are notable institutional disparities across the US and Australian mortgage markets. Generally, most home loans in Australia are VRMs, whereas long-maturity fixed-rate mortgages are predominant in the US. Our results are also in line with the empirical findings of Calza et al. (2013). They find that the effects of monetary policy shocks on residential investment and house prices are markedly stronger in countries with more developed and flexible mortgage markets, such as Australia. Moreover, they also document that the impact on consumption is stronger only in those countries where (i) mortgage equity release is common and (ii) mortgage contracts are predominantly of the variable rate type. These two characteristics are also common in the Australian mortgage market.[9]

Alpanda et al. (2021) investigate whether the effectiveness of monetary policy may jointly depend on the business cycle, the state of household debt, and the average level of interest rates. They use panel data from 18 OECD countries to estimate a panel state-dependent local projection model. They find that monetary policy is least effective during recessions that coincide with moderate levels of household debt and high interest rates. Focusing on the state-dependence of monetary policy with respect to household debt, the findings of Alpanda et al. (2021) seem to contradict the ones of Alpanda and Zubairy (2019) for the US and ours for Australia.[10] This divergence may be explained in two ways: First, Alpanda et al. (2021) consider a panel of 18 countries. Hence, their average findings do not necessarily reflect the Australian mortgage market. Indeed, we have seen

[8] Alpanda et al. (2021) consider a simpler version of the partial equilibrium model which only features the debt service channel. They use data from 18 OECD countries to calibrate their model. They find that monetary policy is more effective when household debt is high.

[9] For further insights into the relationship between monetary policy and household indebtedness, see Iacoviello (2005), Calza et al. (2013), Sufi (2015), De Luigi and Huber (2018) and Beraja et al. (2019).

[10] Using different methodologies and datasets, Hofmann and Peersman (2017), Gelos et al. (2019), Kim and Lim (2020) and Flodén et al. (2021) also find evidence suggesting that the effects of monetary policy tend to be stronger when households' indebtedness is high.

that, in terms of the dynamics of household debt, Australia is an outlier among OECD countries (Figure 1). Second, Alpanda et al. (2021) and Alpanda and Zubairy (2019) identify their monetary shocks using different identification schemes, sign restrictions on impulse responses, and a Cholesky-identified SVAR, respectively.[11]

Our conjecture that the home equity loan channel is active when households are in a low-debt state is consistent with the findings in the US literature. Bhutta and Keys (2016) find that lower interest rates stimulate greater equity extraction during the housing boom due to the increase in home equity levels, whereas households with low home equity levels find it more difficult to use their home as collateral. Beraja et al. (2019) and Chen et al. (2020) present evidence that households with low levels of home equity have difficulty refinancing at a lower mortgage rate.[12] Similar evidence is documented for Australia by Schwartz et al. (2010), who find that households with high debt, measured by the loan-to-value ratio (LVR), face constraints against further borrowing or home equity withdrawals.

Our results contrast with those of Kim and Lim (2020). They find evidence of a cash flow channel for a panel of 23 economies, including Australia. They also find asymmetric effects of monetary policy such that the contractionary impact of monetary policy is more pronounced than the expansionary one. Their findings document that monetary policy is more powerful for countries in high-debt state with a higher share of ARMs, under a contractionary policy stance.[13,14] In response to monetary tightening, they find a significantly negative response of economic activity, consumption, investment, the price level

[11] Using UK loan-level microdata, Cumming and Hubert (2023) show that the response of aggregate consumption to a monetary shock depends on the distribution of household debt relative to income. They find that consumption responds more to monetary policy when the share of highly indebted households is large.

[12] Johnson and Li (2010) use US household survey data and find that a household with a debt service ratio (DSR) in the top two quintiles of the distribution is significantly more likely to be turned down for credit.

[13] Rubio (2011) and Garriga et al. (2017) employ New Keynesian dynamic stochastic general equilibrium and general equilibrium models, respectively, and conclude that monetary policy shocks have a stronger effect under ARMs.

[14] Under cash-flow channel, monetary policy can have a direct impact on aggregate household spending via the transfer of income between household borrowers and lenders (Kim and Lim, 2020).

and house prices. Similar findings are documented in Hofmann and Peersman (2017), who find evidence of a debt service channel of monetary transmission in 18 high-debt economies, including Australia. They attribute the dominance of the debt service channel to the responses of the debt service ratio (DSR).[15] A monetary tightening triggers an increase in DSR that leads to an income transfer from debtors to creditors. As a consequence, aggregate output declines because the reduced spending by the debtor is only partially compensated for by an increased spending of the creditors.

The second strand of literature examines the implications of household debt for business cycles and macroeconomic stability. Mian et al. (2013), Jordà et al. (2016) and Mian and Sufi (2018) find that episodes of buoyant household debt dynamics foreshadow severe recessions and financial crises. Dumitrescu et al. (2022) stress that, in periods of economic slack, lending institutions are less likely to extend new loans to highly indebted households, thus impeding them from smoothing consumption and, thereby, further exacerbating the slump.[16]

The third strand focuses on a growing literature that finds evidence of non-linearity based on business cycle, uncertainty, and sentiments in the transmission of monetary policy.[17] Several papers explore the extent to which the effectiveness of monetary policy depends on the state of the business cycle and compare the transmission of expansionary versus contractionary monetary shocks (Cover, 1992; Thoma, 1994; Weise, 1999; Angrist et al., 2018). From a methodological point of view, the closest paper to ours, in this branch of literature, is Tenreyro and Thwaites (2016). They estimate a smooth-transition local projection model on US data and find that the efficacy of monetary policy is subdued in

[15]DSR is the ratio of total debt payments (principal and interest) to the income of the private non-financial sector.

[16]See Benito et al. (2009) and Hunt et al. (2015) for further discussions of the macroeconomic implications of elevated household debt. For related discussions centered on the Australian context, see Wilkins and Wooden (2009), Loukoianova et al. (2019), Kolios (2020) and Kearns et al. (2021).

[17]For Australia, this literature is scant. The only papers studying the non-linear effects of monetary policy in Australia that we are aware of are Bodman (2006) and Leu and Sheen (2006). Both papers investigate the asymmetry of positive versus negative monetary shocks.

recessions. Besides the state of the business cycle, some papers investigate other sources of non-linearity in the transmission of monetary policy. Employing interacted VAR models, Aastveit et al. (2017) and Pellegrino (2021) find that monetary policy is less effective when uncertainty is high. Kurov (2010), Lien et al. (2021), and Dahmene et al. (2021) examine the influence of investor sentiment on the propagation of monetary disturbances. They find that monetary shocks have a greater impact on stock returns when investor sentiment is high. Debes et al. (2014) and Guo et al. (2016) consider the role of consumer sentiment and obtain similar results.

Our contribution lies in evaluating the non-linearity in the transmission of Australian monetary policy based on the low and high states of household debt. Using the state-dependent local projection approach of Alpanda and Zubairy (2019), we find that households with low debt respond strongly to an expansionary monetary shock compared to those with high debt. Our results showing an increase in house prices, debt-to-GDP and debt-to-asset ratios for the households in low-debt state reflect an active home equity loan channel. We discuss this further in the results section.

3 Econometric strategy

3.1 Data

We use quarterly data from 1994Q1–2019Q3.[18] The start date corresponds to the adoption of Inflation Targeting (IT) by Australia and the availability of monetary shock series by Beckers (2020).[19] We avoid the early period of Australia's IT regime, which the Reserve Bank of Australia (RBA) adopted in 1993. The end date marks the onset of the COVID-19 pandemic. The choice of our variables largely follows from Alpanda

[18] The data sources and descriptions are provided in Appendix A1.

[19] Beckers (2020) constructs augmented monetary shock series for Australia. He extended the approach of Romer and Romer (2004) by including credit spreads in the systematic component of monetary policy.

and Zubairy (2019). The variables of interest include: the cash rate (r), real GDP (gdp), real consumption (con), real investment (inv), real house price index (hp), household debt-to-GDP ratio ($debt/gdp$), household debt-to-asset ratio ($debt/asset$), household interest payments-to-income ratio (ip/inc), durable consumption ($dcon$), non-durable consumption ($ndcon$), service consumption ($scon$), residential investment ($rinv$), and non-residential investment ($nrinv$).[20] We control for core CPI inflation (π) and the trade weighted real exchange rate (rer). All variables are expressed in logs, except for the cash rate, inflation rate, household debt-to-GDP, debt-to-asset, and interest payments-to-income ratios.

3.2 Model

We apply the local projection techniques of Jordà (2005) to estimate a state-dependent local projection model following Alpanda and Zubairy (2019):

The linear local projection model takes the form:

$$y_{t+h} = \alpha_h + \theta_h(L)x_t + \beta_h\varepsilon_t + u_{t+h}, \quad \text{for } h = 1, 2, ..., \mathrm{H_z} \tag{1}$$

where $y = [r, gdp, con, inv, dcon, ndcon, scon, rinv, nrinv, hp, debt/gdp, debt/asset, ip/inc]'$ contains the variables of interest. $x = [r, gdp, \pi, rer, hp, z]'$ is a set of control variables. $z = [inv, con, dcon, ndcon, scon, rinv, nrinv, debt/gdp, debt/asset, ip/inc]'$. $\mathrm{H_z} = 16$ is the number of horizons. We include one variable at a time from the vector z to our set of controls, x. $\theta_h(L)$ is a polynomial in the lag operator. We include three lags of r, gdp, π, rer, hp, and z along with the current values of gdp, π, rer, and hp to the set of control variables.[21] α_h is a constant, and ε is the identified monetary shock series. The coefficient

[20] We use the real residential property prices index to measure real house prices. We use dwelling and non-dwelling private capital formation to measure residential and non-residential investment, respectively.

[21] In our setting, it implies that gdp, π, rer and hp respond to the cash rate with a lag but the cash rate responds to changes in these variables contemporaneously.

β_h measures the responses of y at time $t+h$ to the shock ε at time t. The impulse response functions (IRFs) are a sequence of all $\mathrm{H_z} \times 1$ vectors of estimated $\beta_h s$ for each variable of interest in y.

We extend the linear model of equation (1) to a state-dependent model by including an indicator variable I_{t-1}:

$$y_{t+h} = (I_{t-1})\left[\alpha_h^H + \theta_h^H(L)x_t + \beta_h^H \varepsilon_t\right] + \left(1 - I_{t-1}\right)\left[\alpha_h^L + \theta_h^L(L)x_t + \beta_h^L \varepsilon_t\right] + u_{t+h}, \quad (2)$$

where $I_{t-1} \in \{0, 1\}$ is a dummy variable in time $t-1$ that takes 1 if the household is in high-debt state (H) and 0 if the household is in low-debt state (L).

A state-dependent local projection approach has two key advantages: (i) they offer a convenient approach to compute IRFs that allow for transitions between states, and (ii) the coefficients β_h^H and β_h^L in equation (2) capture the average impact of the shock of interest conditional on the initial state and, hence, account for changes in the state variable over the projection horizon h.[22]

3.3 The state variable

Following Alpanda and Zubairy (2019) and Alpanda et al. (2021), we use the household debt-to-GDP ratio as a state variable. This ratio is a common measure of household indebtedness in a country. We first derive a household debt gap measure which is used to classify high- and low-debt states. To do so, we apply the Hodrick-Prescott (HP) filter with a large smoothing parameter $\lambda = 10^4$ to the household debt-to-GDP ratio and extract the trend component. This approach yields our household debt gap measure, which is expressed as the percentage deviation from the trend. Positive gaps correspond

[22] Literature that employs state-dependent local projection models includes: Auerbach and Gorodnichenko (2013), Tenreyro and Thwaites (2016), Alpanda and Zubairy (2019), Auer et al. (2021), Alpanda et al. (2021), among others.

to states of high debt, while negative gaps refer to states of low debt.[23] The large value for λ captures the long duration and large amplitude of the debt cycle. The value we use for λ is in line with Bauer and Granziera (2016), Aikman et al. (2017), and Alpanda and Zubairy (2019).[24]

Figure 4 plots the household debt-to-GDP ratio (solid line) with its HP trend (dashed line). The two vertical lines indicate the subsample that we use in our model estimation. The household debt-to-GDP ratio generally has an upward trend throughout the sample except for a drop following the GFC. Since the middle of the 1990s, the trend has increased over time in a context marked by rising household income, falling mortgage rates, easy access to credit (Claus and Nguyen, 2020; Kearns et al., 2021), and robust optimism among households about the overall economy (Claus and Nguyen, 2020; Drachal, 2020; Lim and Bone, 2022).

Figure 5 shows the debt gap constructed from the household debt-to-GDP ratio. The household debt gap provides additional insights into the evolution of household indebtedness in Australia. The rapid accumulation of household debt in Australia may to a large extent have been driven by easy access to credit resulting from financial deregulation in the 1990s and low interest rates post-GFC (Loukoianova et al., 2019). The Australian mining boom that lasted between 2000 and 2015 may also have contributed to this fast accumulation. The mining boom drove up both residential investment and household income. These factors led to the accumulation of high household debt. In Figure 5, the positive debt gap reached its highest level and lasted for the longest period between 2002Q2 and 2010Q4 (excluding a short dip during the GFC), which coincided with the boom period of the mining sector and the housing market.

[23] To compute the debt trend, we HP-filter the household debt-to-GDP series for the period 1977Q1–2020Q4. To estimate our model in equation (2), we discard the debt gap data before 1994Q1 and after 2019Q3 to address the end-point problem associated with the HP-filter (Kim and Lim, 2020).

[24] Bernardini and Peersman (2018) employ the same methodology to construct the state variable using the domestic non-financial private debt-to-GDP ratio.

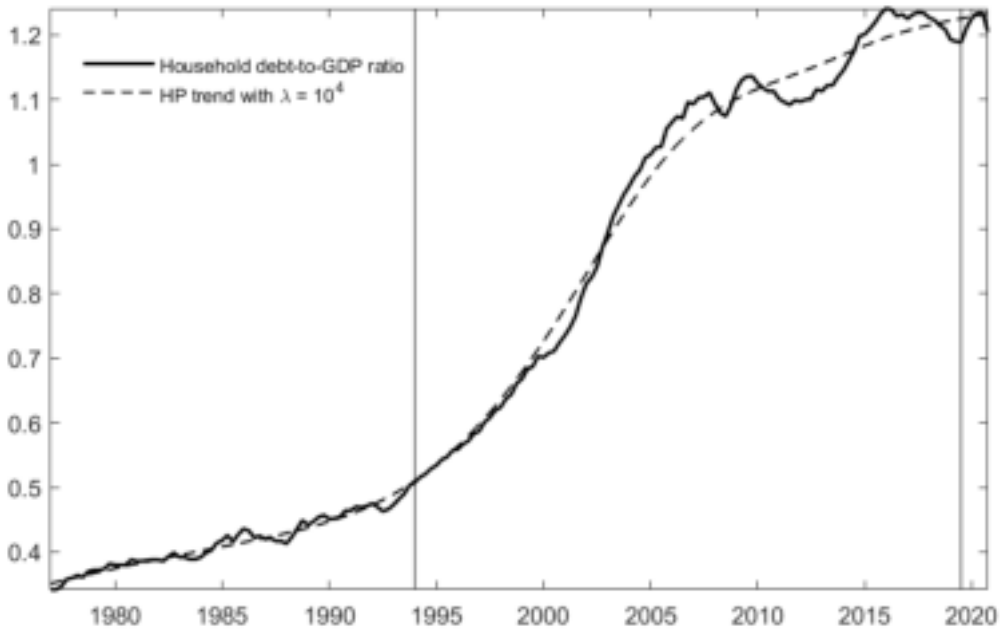


Figure 4: The household debt-to-GDP ratio. Sample: 1977Q1–2020Q4. Solid line: the household debt-to-GDP ratio. Dashed line: a HP trend with $\lambda = 10^4$. Two vertical lines: subsample for the model estimation, 1994Q1–2019Q3.

3.4 Romer and Romer monetary shocks for Australia

We use the Augmented Romer and Romer monetary shocks for Australia, constructed by Beckers (2020), in our state-dependent local projection model. Beckers (2020)'s methodology for identifying monetary policy shocks for Australia builds on Romer and Romer (2004) and Bishop and Tulip (2017). Beckers specifies a forward-looking Taylor-type rule, which he estimates using the RBA's forecasts of output, unemployment, and inflation. Motivated by Caldara and Herbst (2019), Beckers also includes different measures of credit spreads for Australia as additional explanatory variables in his regression. This accounts for the systematic response of the cash rate to changes in credit market conditions.[25] The residuals from this regression are dubbed 'Augmented Romer and Romer monetary shocks'. These residuals capture the non-systematic changes in the cash rate, conditional on the RBA's information set, including credit spreads, at the time of

[25] Caldara and Herbst (2019) show that including credit spread is essential to correctly characterize the systematic component of US monetary policy.

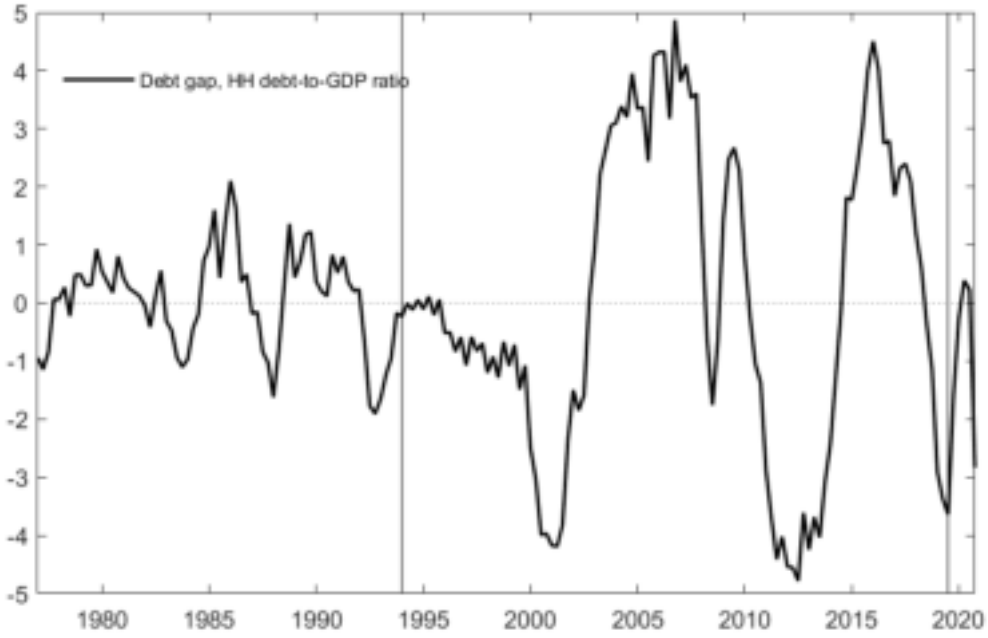


Figure 5: Household debt gap. Percentage deviation from HP trend with $\lambda = 10^4$. Sample: 1977Q1–2020Q4. Two vertical lines: subsample for the model estimation, 1994Q1–2019Q3.

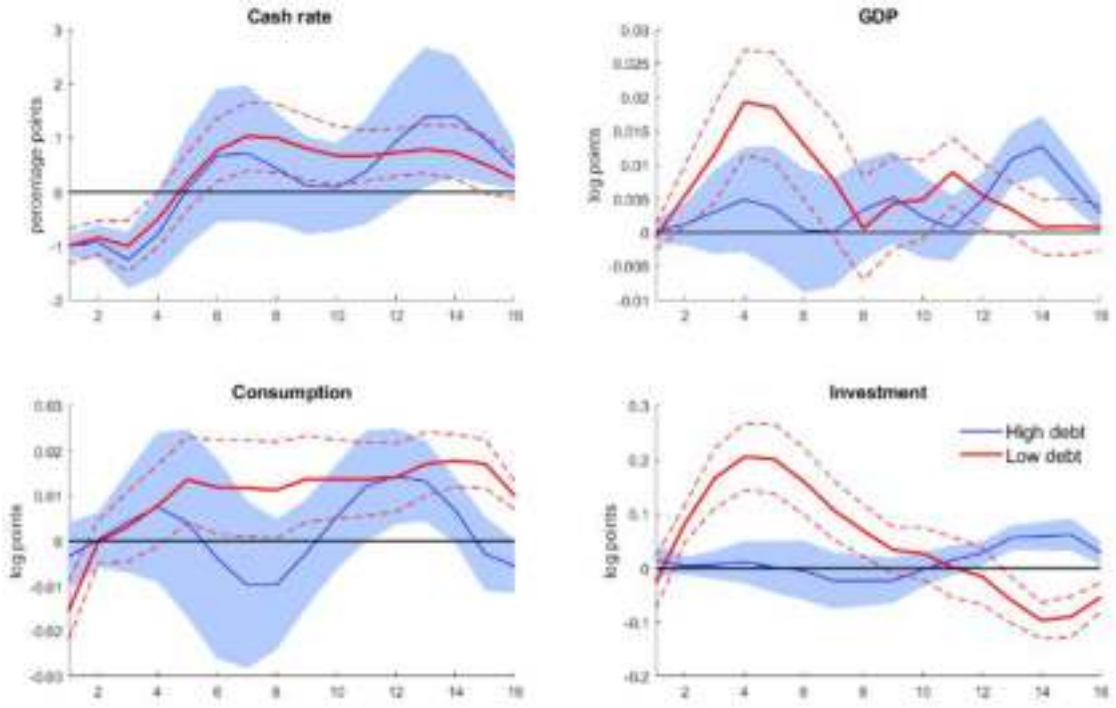
each monetary policy decision.[26] Appendix A2 presents further details on the Augmented Romer and Romer monetary shocks for Australia.

4 Results

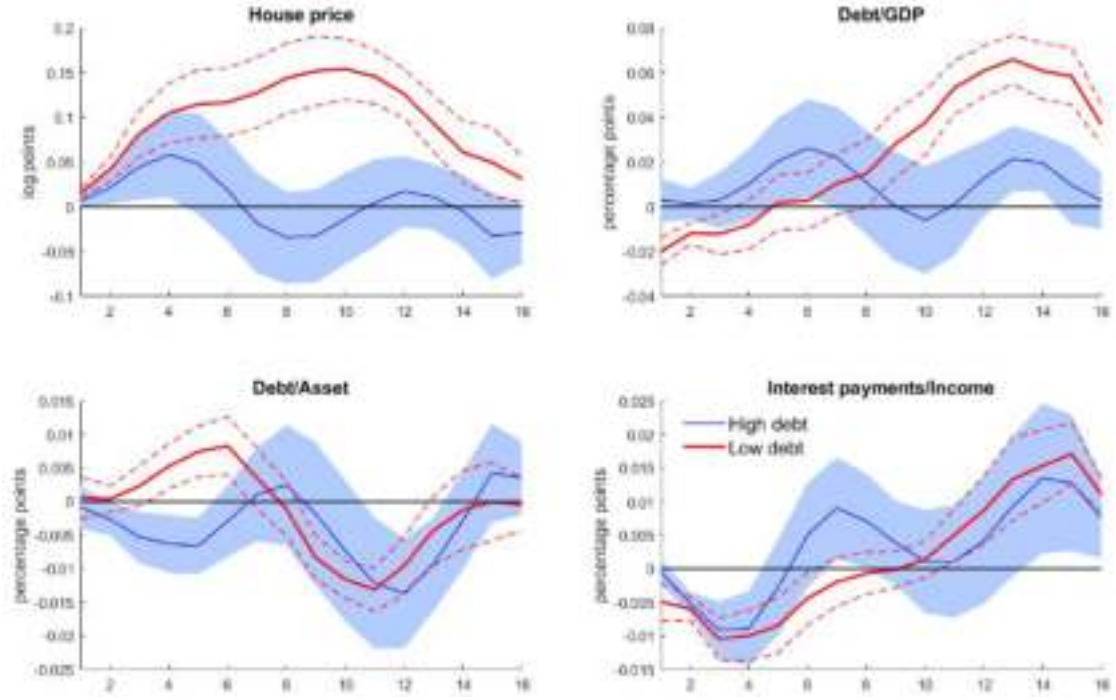
Figure 6 reports the smoothed impulse responses of the key macroeconomic and household finance variables to a 1 percentage point expansionary monetary shock.[27] The horizon h is on the x-axis showing the number of quarters, and the coefficients β_h^H and β_h^L are on the y-axis. The blue and red lines represent the impulse responses in high- and low-debt states, respectively. Figure 6(a) shows a significant expansion in real GDP and an increase in real consumption, and real investment to an expansionary monetary shock that hits the Australian economy when households are in low-debt state. For GDP and

[26] Beckers (2020) shows that adding the credit spread to the RBA's interest rate rule helps to remove the price puzzle

[27] "Smoothed" here means three-period centered moving averages of the IRFs and the confidence intervals (Tenreyro and Thwaites, 2016).



(a) Key macroeconomic variables



(b) Key household finance indicators

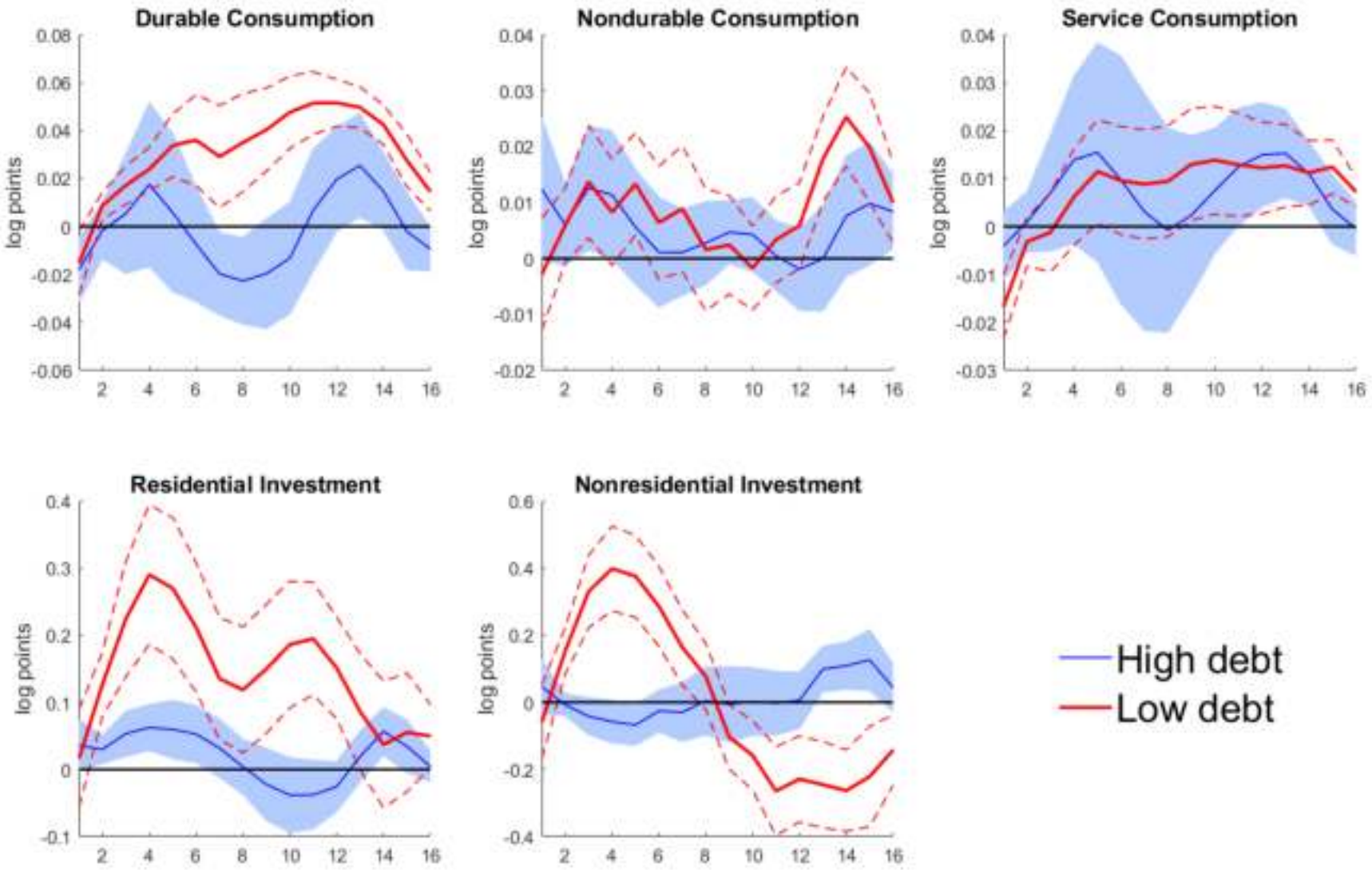
Figure 6: IRFs to a monetary shock that reduces the cash rate by 1 percentage point. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

investment, peak responses occur in the fourth quarter after the shock hits. For consumption, the response is insignificant in the first four quarters, but becomes significantly persistent throughout the rest of the horizon. In contrast, in the high-debt state, the responses of these three variables are muted to an expansionary monetary disturbance. The differences that we observe in the responses of real GDP across the two debt states appear to be driven by the state-dependent reactions of real investment and real consumption. Specifically, as we discuss below, real durable goods consumption and real residential investment seem to be the key drivers of the different responses of real GDP in the two states.

Figure 6(b) shows the impulse responses of key household finance variables. In the low-debt state, a combination of significantly positive responses of house prices and debt-to-asset ratio shows that households with low debt are more likely to use their home equity as collateral.[28,29] The response of the debt-to-GDP ratio, on the other hand, is negative in the first four quarters, reflecting the cut in the policy rate. However, the debt-to-GDP ratio starts to increase gradually from the fifth quarter, which corresponds to the rising interest payments-to-income ratio reflecting the increase in the debt stock of households under low debt. The response of the interest payments-to-income ratio qualitatively tracks the response of the cash rate, with a lag of about five quarters. Quantitatively, the pass-through of the policy rate shock to the interest payments-to-income ratio is incomplete. Precisely, the initial decrease in the interest payments-to-income is only a fraction of the cut in the cash rate. The responses of house prices, debt-to-GDP and debt-to-asset ratios show the gradual accumulation of debt stock of households under low-debt state, potentially through the home equity loan channel. Low-debt households appear to utilize

[28] Di Maggio et al. (2017) use the US individual loan level information to compute zip-code level mortgage characteristics that feature households with large and small shares of adjustable rate mortgages (ARMs). They find a significant increase in house price growth in zip codes with a larger share of ARMs during the period of interest rate decline (2007:III through 2012:IV).

[29] Aladangady (2014) also find evidence of an increase in home values in the US in response to monetary easing. He further documents that collateral effects through increased home values play a dominant role in amplifying consumption responses for households with high debt service ratios (DSRs).



Subcomponents of aggregate consumption and investment

Figure 7: IRFs to a monetary shock that reduces the cash rate by 1 percentage point. The blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

the equity withdrawal facilities against the increase in their house prices, resulting in an increase in the household debt-to-asset and debt-to-GDP ratios in the medium and long term, respectively. In the high-debt state, again we observe that the responses of these variables are mostly insignificant.

In Figure 7, we consider the IRFs of the subcomponents of real aggregate consumption and investment. We report significantly positive and hump-shaped responses of durable consumption, residential investment, and nonresidential investment in the low-debt state.[30] On the other hand, when the shock hits in the high-debt state, responses of the subcomponents of consumption and investment are subdued and largely insignificant.

Overall, our results indicate that a policy rate cut activates the home equity loan channel for low-debt households, while it is turned off for high-debt households. This finding is consistent with that of Alpanda and Zubairy (2019), who find that the effectiveness of US monetary policy diminishes when households are relatively highly indebted. They attribute this decline in monetary policy effectiveness in the high-debt state to the weakening of the home equity loan channel. We conjecture that highly indebted Australian households may encounter greater difficulties in accessing home equity loans or cheaper funding sources following a mortgage rate decline, compared to households with low levels of debt.

5 Robustness checks

This section examines the robustness of our findings with respect to (i) an alternative measure of household indebtedness, (ii) controlling for open-economy variables, (iii) controlling for the lags of debt-to-GDP ratio, and (iv) controlling for the lags of debt-to-asset and interest payments-to-income ratios. Overall, our baseline results are robust to these

[30] La Cava et al. (2016) also find an increase in durable goods spending of Australian households with variable rate mortgage debts, when the cash rate declines.

checks. We report the robustness results at the end of this section.

(i) Alternative measure of household indebtedness. In our baseline case, we use the household debt-to-GDP ratio to measure household indebtedness. Here, we want to assess whether our results are robust to using an alternative measure of household indebtedness, the debt-to-income ratio.[31,32] We repeat the same econometric procedure as in the baseline: we apply the HP filter (with $\lambda = 10^4$) to the debt-to-income ratio in order to construct the debt-gap measure and its associated binary state variable. We then re-estimate equation (2), using our baseline variable specification. Figure 8 shows the debt-to-income ratio along with its trend. Figure 9 displays the corresponding debt gap. Figures 10 and 11 report the responses of the key macroeconomic and household finance variables. Overall, we see that our results are robust and consistent with our baseline findings. These results re-emphasize that home equity loan channel dominates over the debt service channel in determining the transmission of monetary shocks in Australia.

(ii) Controlling for open-economy variables. Next, we examine the robustness of our baseline findings by including additional controls that account for open-economy aspects which are crucial to the Australian context (Brischetto and Voss, 1999; Dungey and Pagan, 2000). As extra controls, we consider the World Industrial Production index constructed by Baumeister and Hamilton (2019) to proxy for global economic activity, and the Global Financial Cycle estimated by Miranda-Agrippino and Rey (2020) to capture the influence of US monetary policy on global funding costs.[33] We replace house prices with the World Industrial Production index (wip) and the Global Financial Cycle (gfc) in equation (2), such that $x = [r, gdp, \pi, rer, wip, gfc, z]'$, while we move house prices to vector z. In Figure

[31] Price et al. (2019) use owner-occupier household debt as a measure of debt while controlling for income and housing wealth, in the Australian context. They find evidence of reduced household spending for high levels of owner-occupier mortgage debt.

[32] Kearns et al. (2021) assess the riskiness of household indebtedness in Australia by using the household debt-to-income ratio. For household indebtedness ratios, the higher the ratio, the higher the risk of default.

[33] Miranda-Agrippino and Rey (2020) exploit a worldwide cross section of risky asset prices to estimate a global common factor dubbed the Global Financial Cycle. They show that US monetary policy is the main determinant of the Global Financial Cycle.

12, we again see that the responses of key macroeconomic variables are robust. Notably, the increase in GDP, consumption, and the debt-to-GDP ratio is more pronounced relative to the baseline results. Figure 13 shows that the responses of the subcomponents of the variables are more pronounced in the low-debt state relative to that in the high-debt state. Overall, Figures 12 and 13 show that the differences in the magnitudes of the IRFs across the two states widen when we take into account global factors.

(iii) Controlling for the lags of debt-to-GDP ratio. As another robustness check, we consider controlling for the lags of the debt-to-GDP ratio. In the baseline case, equation (2) had six controls, $x = [r, gdp, \pi, rer, hp, z]'$. In this exercise, we add three lags of the debt-to-GDP ratio to equation (2) as an additional control. Thus, equation (2) has seven controls in total, $x = [r, gdp, \pi, rer, hp, debt/gdp, z]'$. Figure 14 shows the responses of key macroeconomic and household finance variables to a monetary shock that reduces the cash rate by one percentage point. Overall, the results are robust with the baseline findings and consistent with our inference that home equity loan channel dominates over the debt service channel.

(iv) Controlling for lags of the debt-to-assets and interest payments-to-income ratios. Finally, we check the robustness of our baseline results with two household indebtedness measures, the debt-to-asset and interest payments-to-income ratios, as additional controls. We replace house prices with debt-to-asset and interest payments-to-income ratios, such that $x = [r, gdp, \pi, rer, debt/asset, ip/inc, z]'$. Figure 16, top and bottom panels, shows the responses when we include the two indebtedness ratios as control variables. We again find that the results are robust to those of our baseline. The responses of most variables are more pronounced to an expansionary monetary shock in the low-debt state compared to that of the high-debt state, especially for investment, house prices, and the debt-to-GDP ratio. Figure 17 reports that the responses of the subcomponents are also robust to our baseline results.

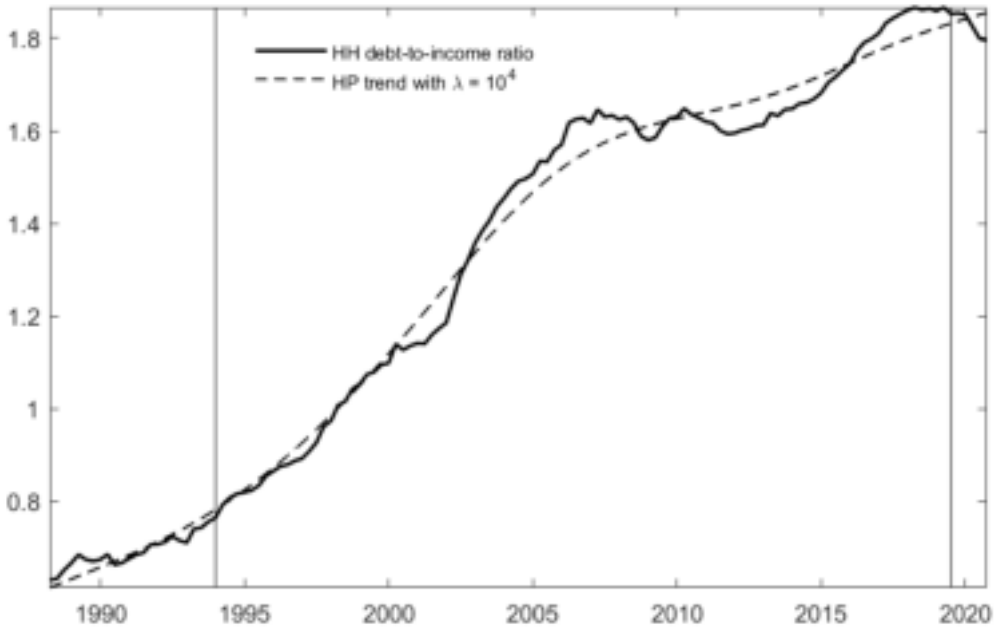


Figure 8: Debt-to-income ratio

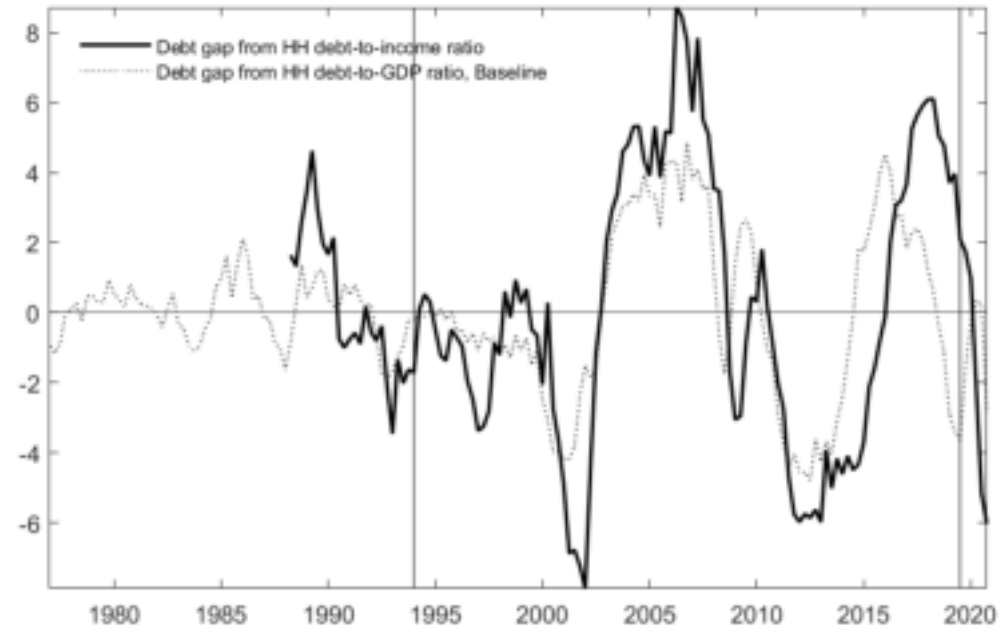
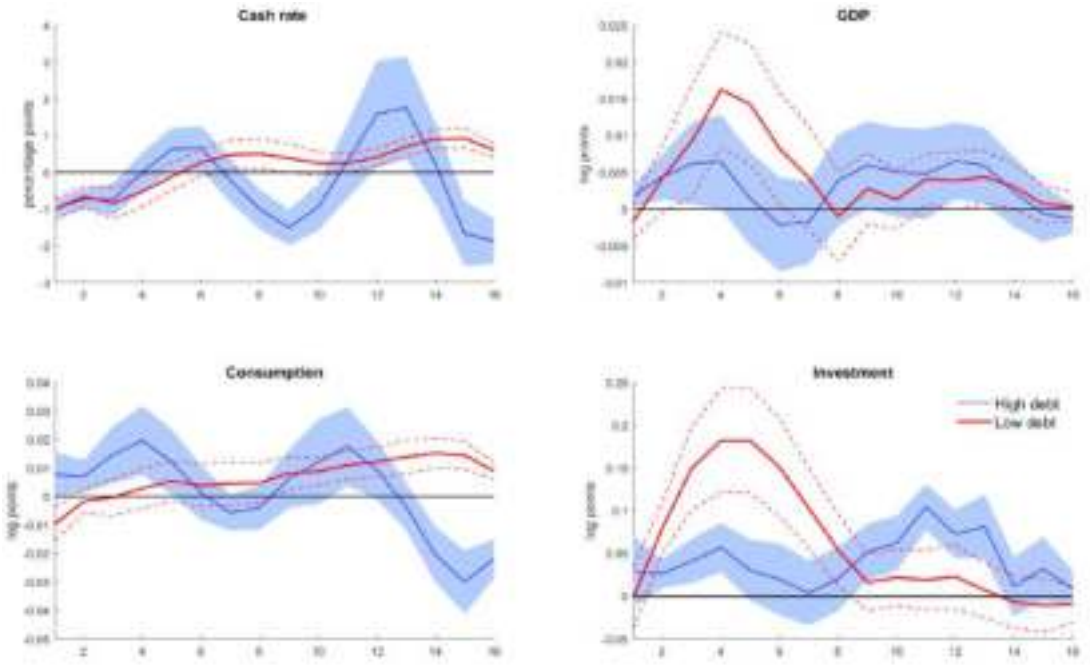
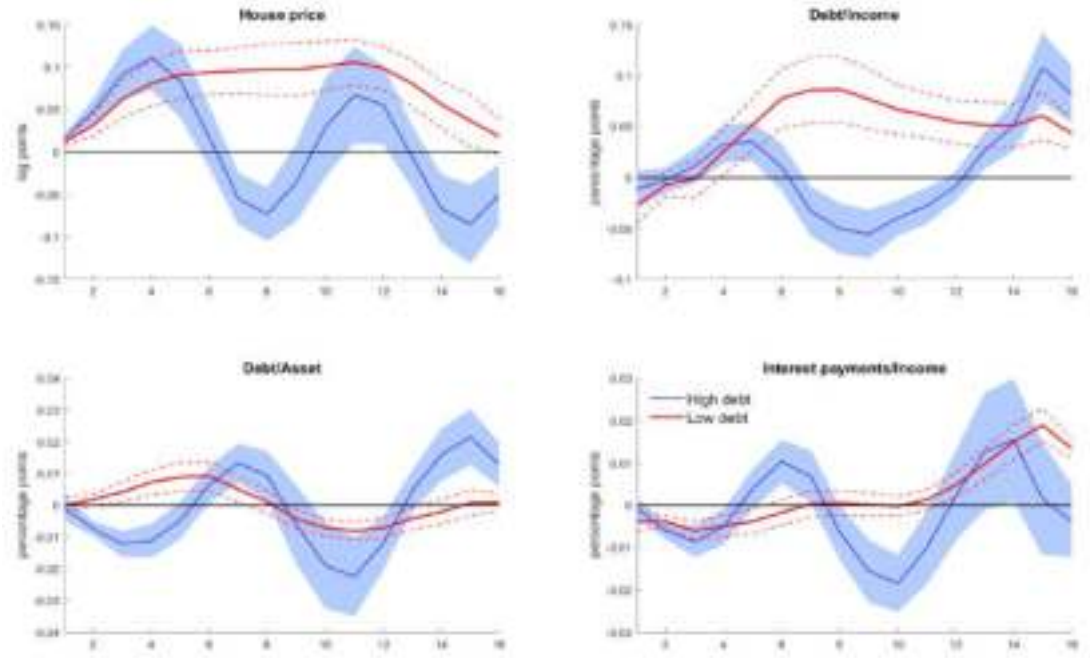


Figure 9: Debt-to-GDP and debt-to-income gaps

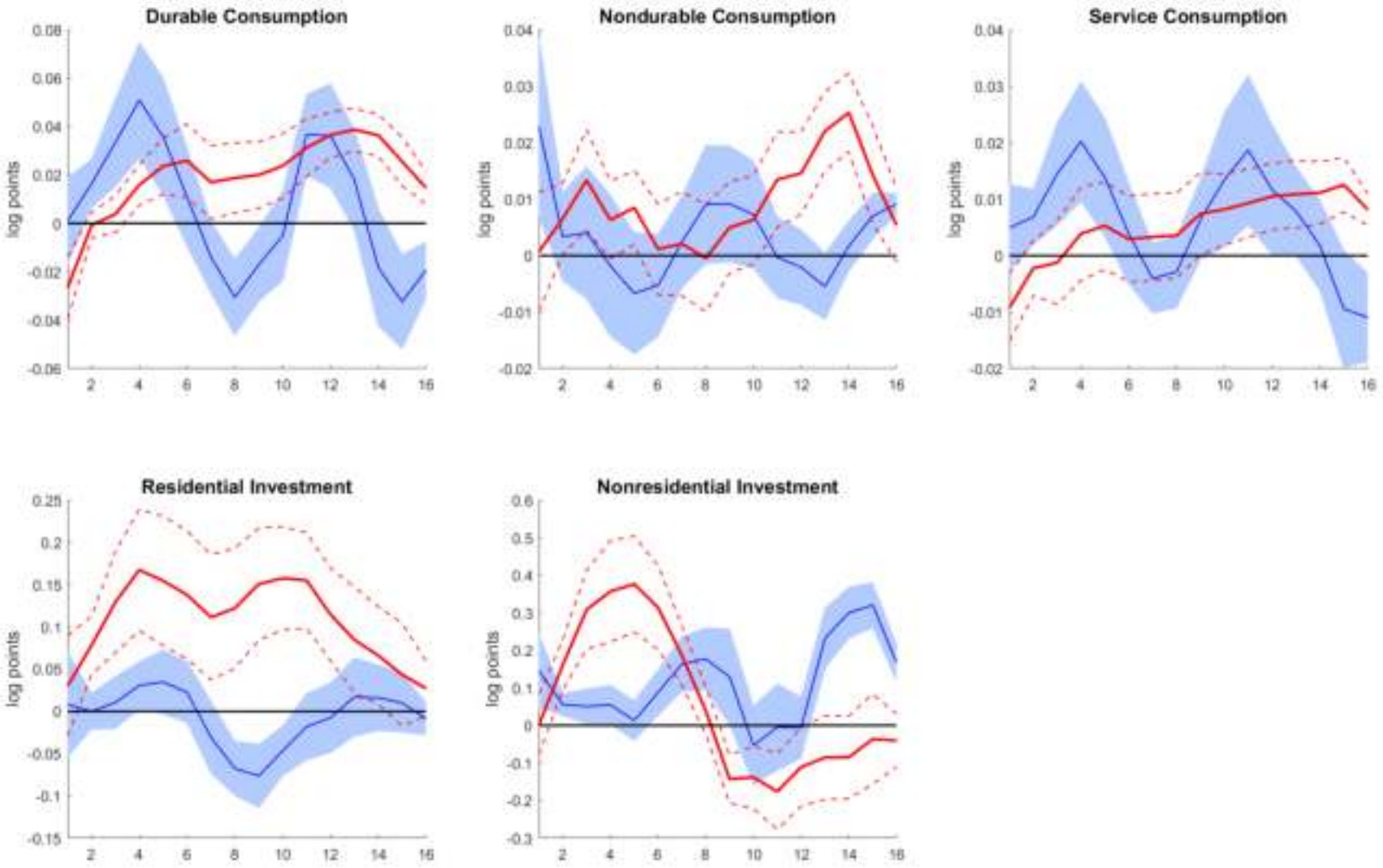


(a) Key macroeconomic variables



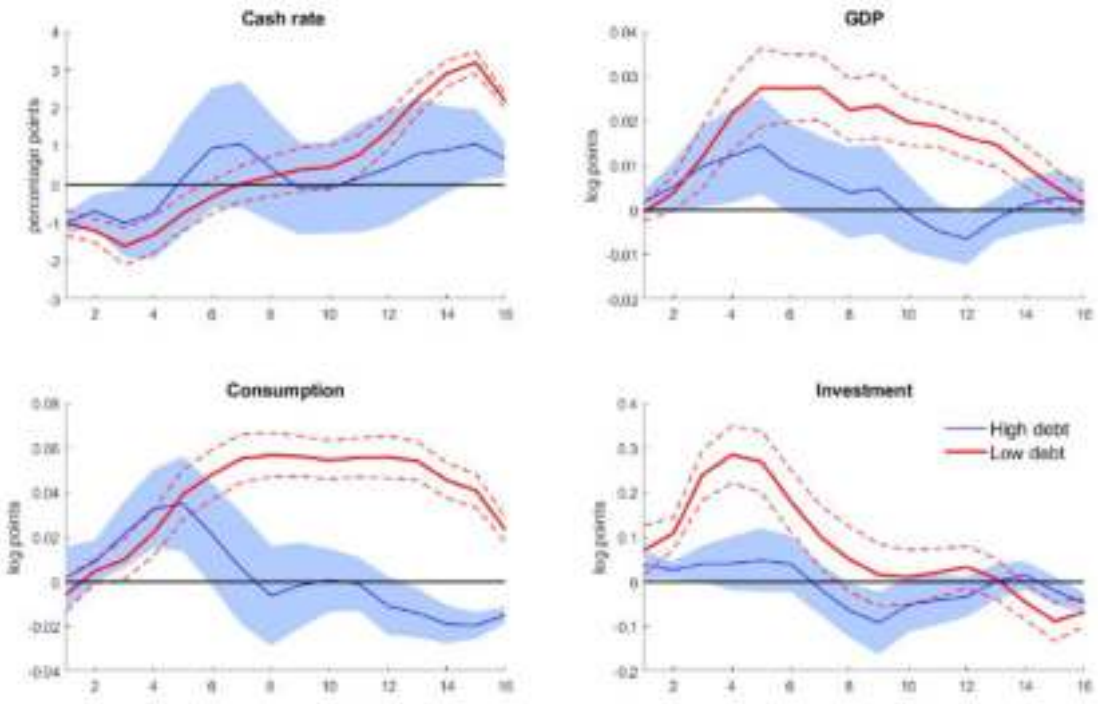
(b) Key household finance indicators

Figure 10: Robustness check 1: IRFs to a monetary policy shock that reduces the cash rate by 1 percentage point, with the debt-to-income ratio as the state variable. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

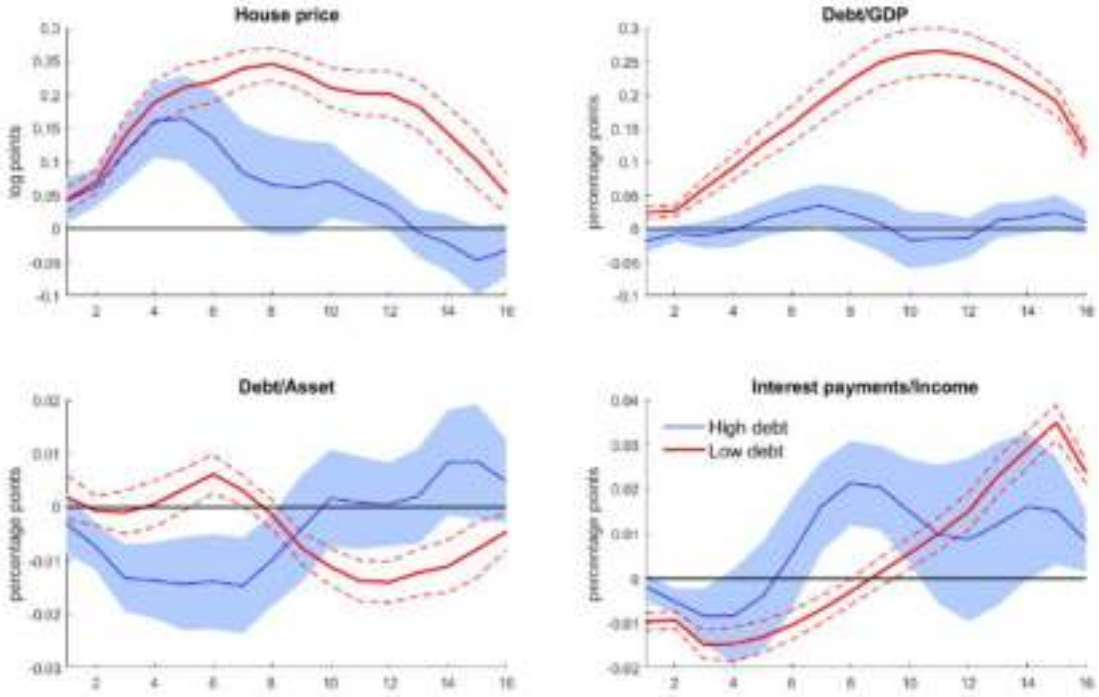


Subcomponents of aggregate consumption and investment

Figure 11: Robustness check 1: IRFs to a monetary policy shock that reduces the cash rate by 1 percentage point, with the debt-to-income ratio as the state variable. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

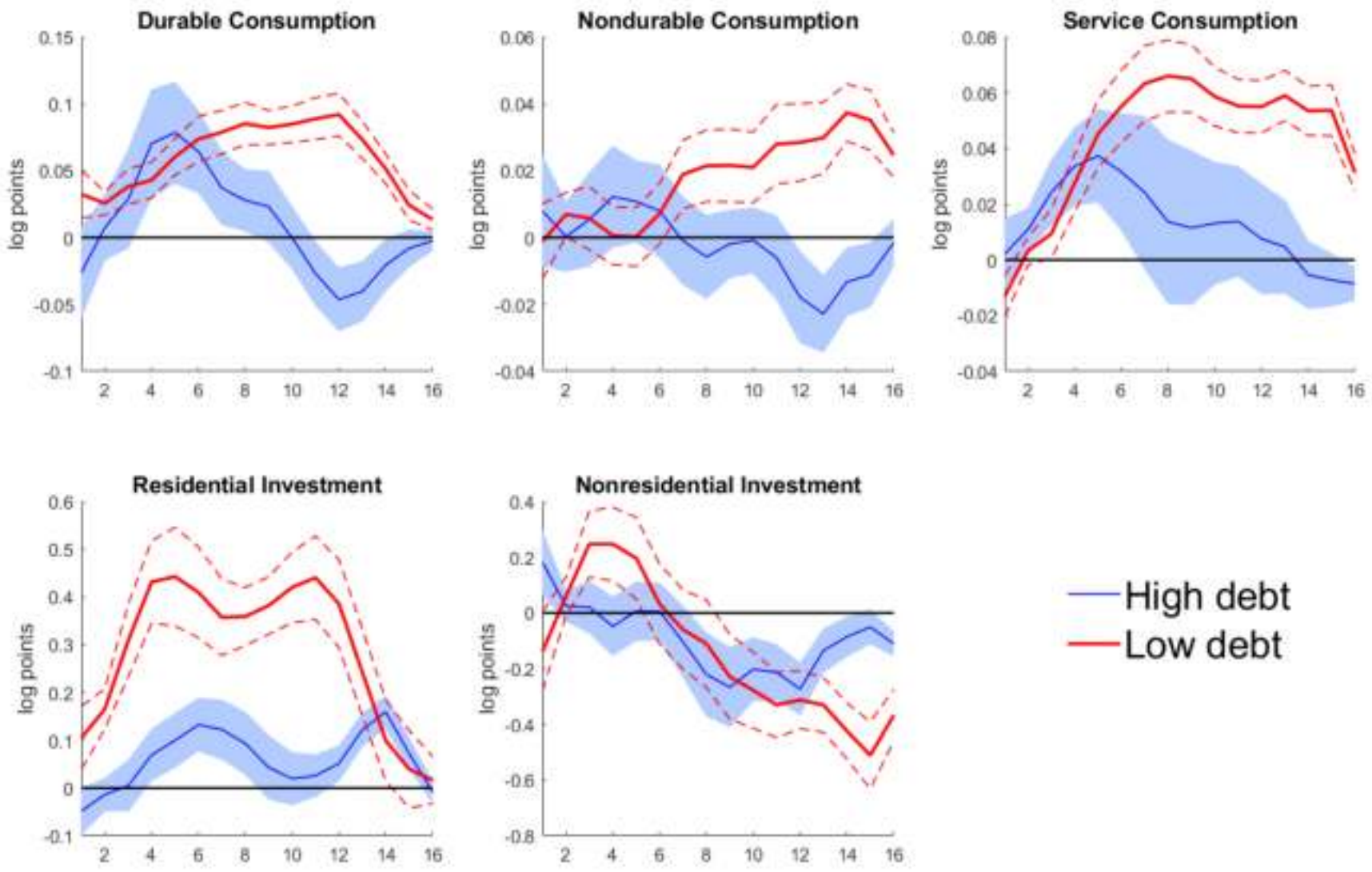


(a) Key macroeconomic variables



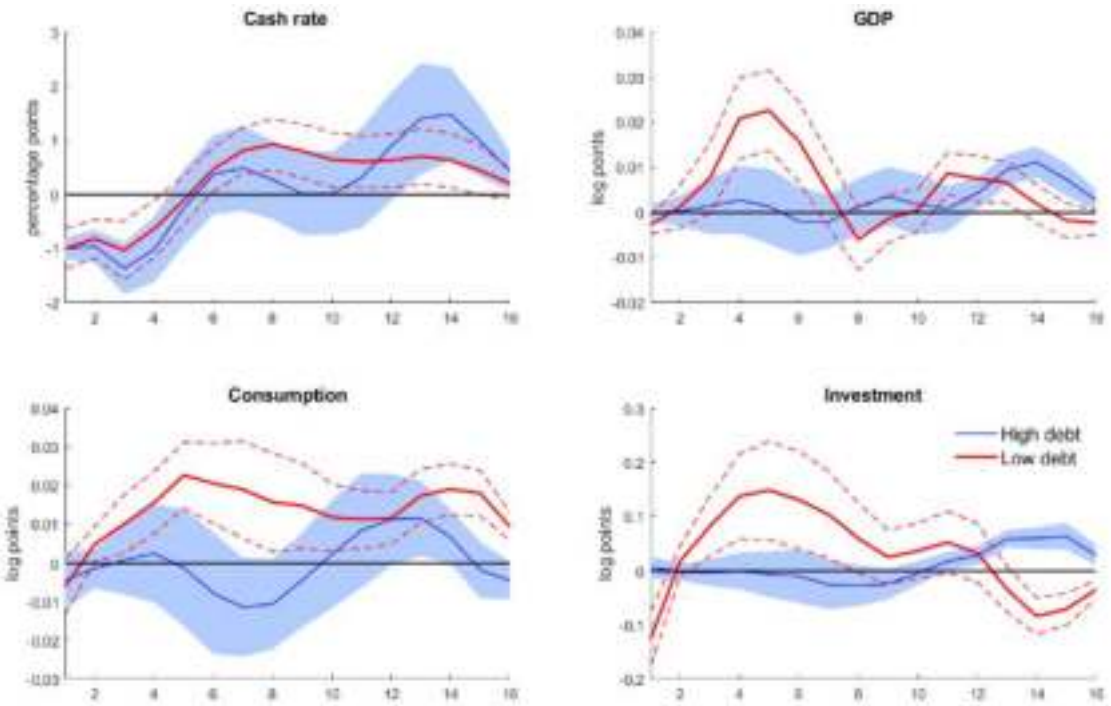
(b) Key household finance indicators

Figure 12: Robustness check 2: IRFs to a 1 ppts expansionary monetary shock using the model with two global variables as additional controls: World Industrial Production index and Global Financial Cycle index. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

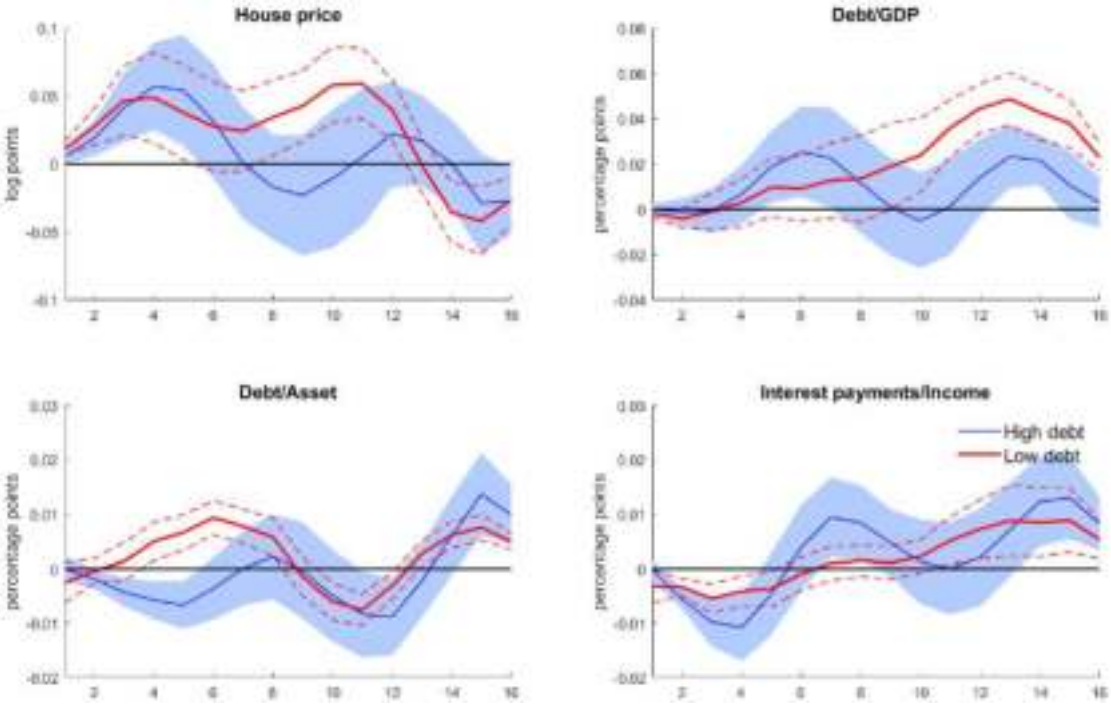


Subcomponents of aggregate consumption and investment

Figure 13: Robustness check 2: IRFs to a 1 ppts expansionary monetary shock using the model with two global variables as additional controls: World Industrial Production index and Global Financial Cycle index. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) state. Dashed lines (shaded regions) represent 95% confidence bands.

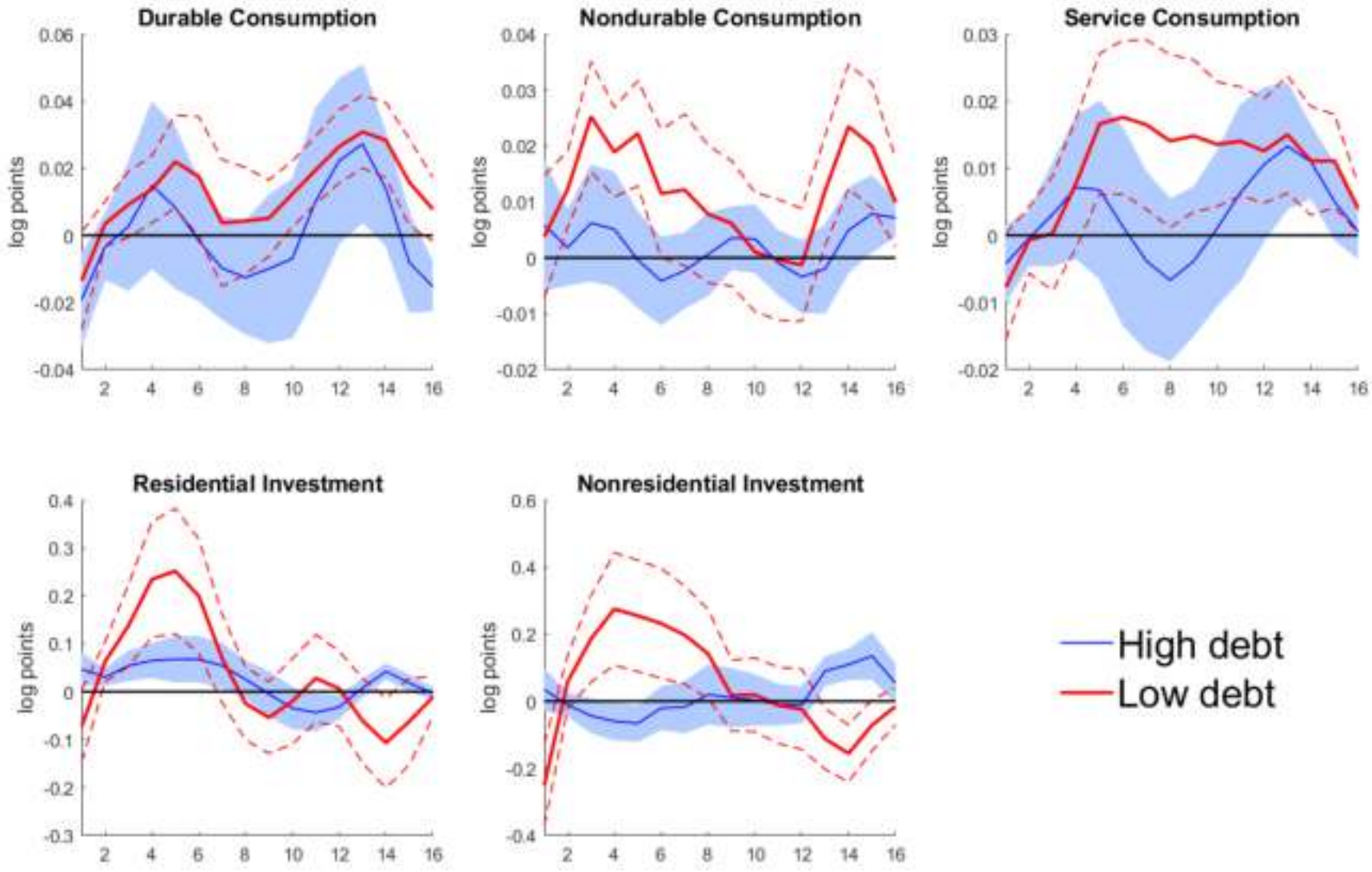


(a) Key macroeconomic variables



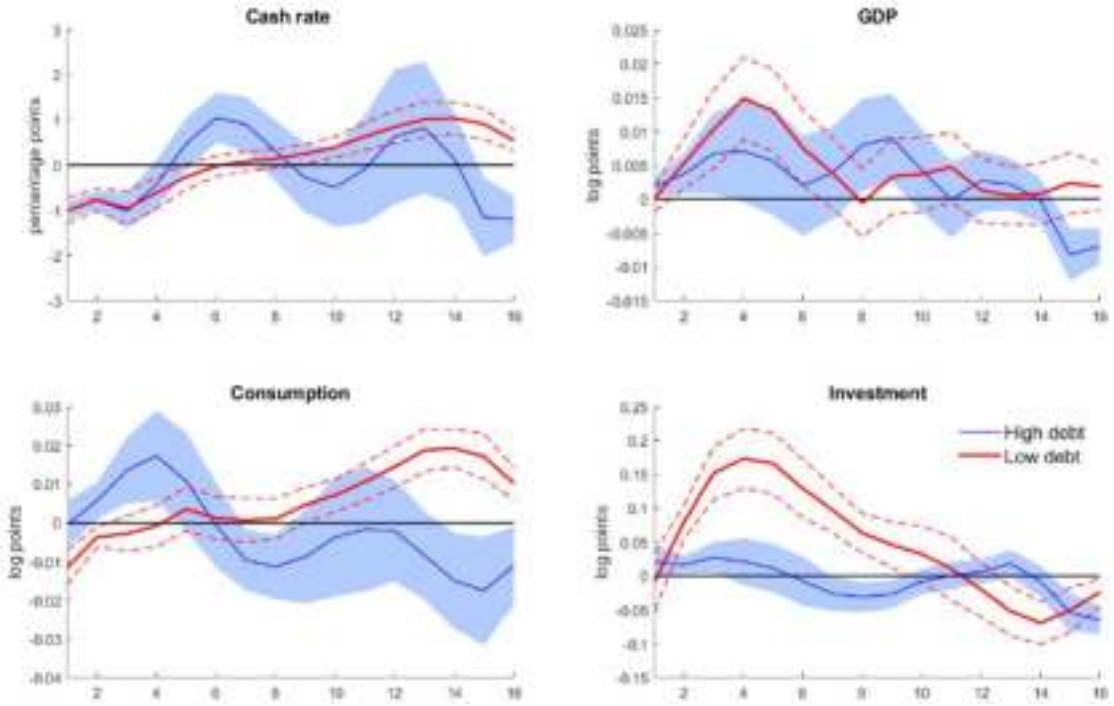
(b) Key household finance indicators

Figure 14: Robustness check 3: IRFs to a 1 ppts expansionary monetary shock using the model with three lags of debt-to-GDP as additional controls. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

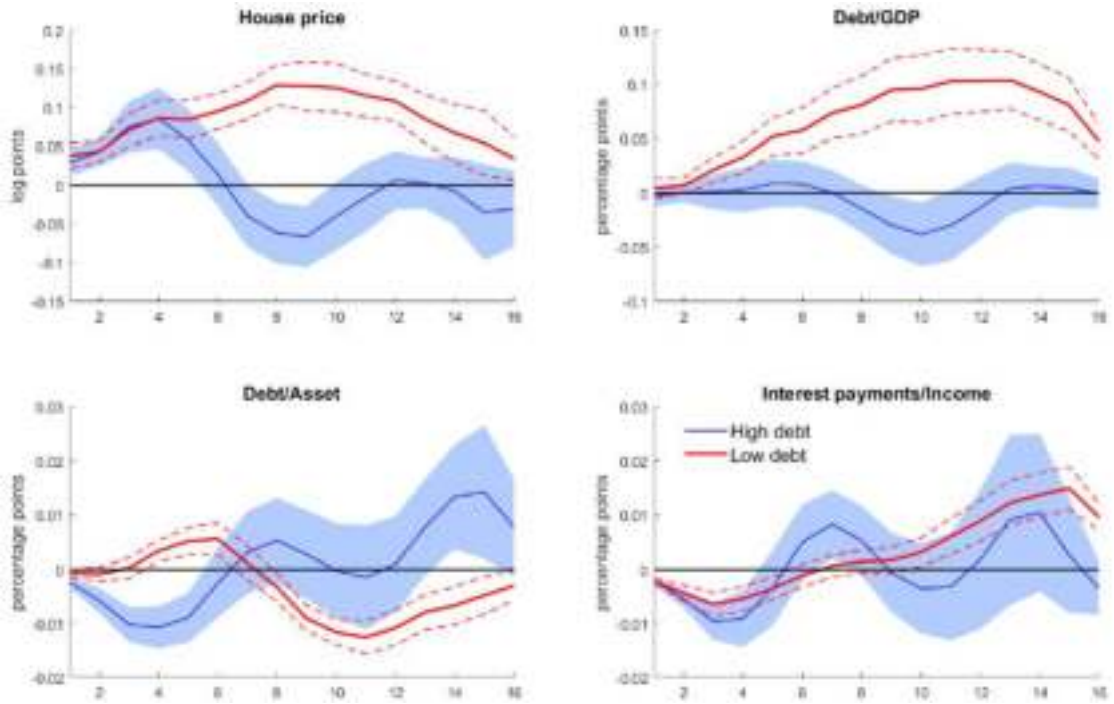


Subcomponents of aggregate consumption and investment

Figure 15: Robustness check 3: IRFs to a 1 ppts expansionary monetary shock using the model with three lags of debt-to-GDP as additional controls. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

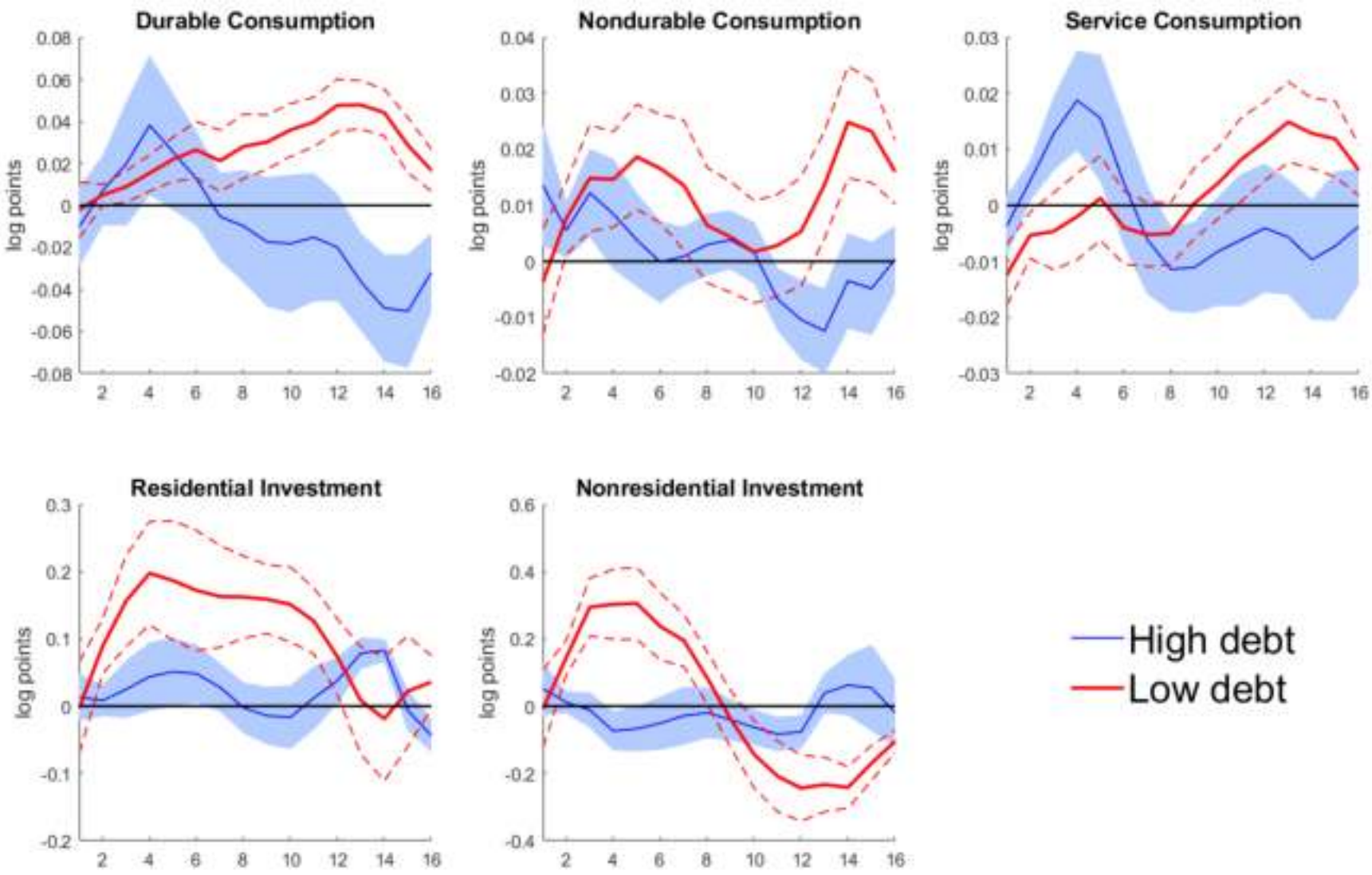


(a) Key macroeconomic variables



(b) Key household finance indicators

Figure 16: Robustness check 4: IRFs to a 1 ppts expansionary monetary shock using the model with three lags of debt-to-assets and interests-to-income as additional controls. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.



Subcomponents of aggregate consumption and investment

Figure 17: Robustness check 4: IRFs to a 1 ppts expansionary monetary shock using the model with three lags of debt-to-assets and interests-to-income as additional controls. Blue (red) lines show responses to a shock that hits the economy in the high-(low-) debt state. Dashed lines (shaded regions) represent 95% confidence bands.

6 Conclusion

Our paper provides new empirical evidence that shows how the high versus low state of household indebtedness in Australia is instrumental in gauging the efficacy of monetary policy. We use a state-dependent local projection model to demonstrate that the effectiveness of monetary policy amplifies when households are in a low-debt state, while it largely diminishes in high-debt conditions. In particular, to an expansionary monetary shock, we observe a significant increase in output, investment, house prices, debt-to-GDP and debt-to-asset during periods of low household debt. Our results are robust to using debt-to-income as an alternative measure of household indebtedness and controlling for two open-economy variables: World Industrial Production index and Global Financial Cycle.

In addition, our findings point to a likely dominant home equity loan channel for the households with low debt. The significant increase in house prices to an expansionary monetary shock makes it more likely for low-debt households to have easy access to collateral through increased home values and reduced interest burden. Thus, we conjecture that a combination of an increase in house prices along with a rise in debt-to-GDP and debt-to-asset reflects an underlying home equity loan channel at work.

References

Aastveit, K. A., Natvik, G. J., and Sola, S. (2017). Economic uncertainty and the influence of monetary policy. *Journal of International Money and Finance*, 76:50–67.

Aikman, D., Kiley, M., Lee, S. J., Palumbo, M. G., and Warusawitharana, M. (2017). Mapping heat in the US financial system. *Journal of Banking & Finance*, 81:36–64.

Aladangady, A. (2014). Homeowner balance sheets and monetary policy. *FEDS working paper*.

Alpanda, S., Granziera, E., and Zubairy, S. (2021). State dependence of monetary policy across business, credit and interest rate cycles. *European Economic Review*, 140:103936.

Alpanda, S. and Zubairy, S. (2019). Household debt overhang and transmission of monetary policy. *Journal of Money, Credit and Banking*, 51(5):1265–1307.

Angrist, J. D., Jordà, Ò., and Kuersteiner, G. M. (2018). Semiparametric estimates of monetary policy effects: string theory revisited. *Journal of Business & Economic Statistics*, 36(3):371–387.

Auer, S., Bernardini, M., and Cecioni, M. (2021). Corporate leverage and monetary policy effectiveness in the Euro area. *European Economic Review*, 140:103943.

Auerbach, A. J. and Gorodnichenko, Y. (2013). Output spillovers from fiscal policy. *American Economic Review*, 103(3):141–46.

Bauer, G. H. and Granziera, E. (2016). Monetary policy, private debt and financial stability risks. *Private Debt and Financial Stability Risks (November 11, 2016)*.

Baumeister, C. and Hamilton, J. (2019). Structural Interpretation of Vector Autoregressions with Incomplete Identification: Revisiting the Role of Oil Supply and Demand Shocks. *American Economic Review*, 109(5):1873–1910.

Beckers, B. (2020). Credit spreads, monetary policy and the price puzzle. *RBA Research Discussion Paper*, 2020-01.

Benito, A., Waldron, M., Young, G., and Zampolli, F. (2009). The role of household debt and balance sheets in the monetary transmission mechanism. *Bank of England Quarterly Bulletin*, page Q1.

Beraja, M., Fuster, A., Hurst, E., and Vavra, J. (2019). Regional heterogeneity and the refinancing channel of monetary policy. *The Quarterly Journal of Economics*,

134(1):109–183.

Bernardini, M. and Peersman, G. (2018). Private debt overhang and the government spending multiplier: Evidence for the United States. *Journal of Applied Econometrics*, 33(4):485–508.

Bhutta, N. and Keys, B. J. (2016). Interest rates and equity extraction during the housing boom. *American Economic Review*, 106(7):1742–1774.

Bishop, J. and Tulip, P. (2017). Anticipatory Monetary Policy and the Price Puzzle. *Reserve Bank of Australia, RDP*, 2.

Bodman, P. M. (2006). Are the effects of monetary policy asymmetric in Australia? *UQ Macroeconomics Research Group, University of Queensland*.

Brischetto, A. and Voss, G. (1999). A Structural Vector Autoregression Model of Monetary Policy in Australia. *Reserve Bank of Australia Research Discussion Papers*, (December).

Caldara, D. and Herbst, E. (2019). Monetary policy, real activity, and credit spreads: Evidence from Bayesian proxy SVARs. *American Economic Journal: Macroeconomics*, 11(1):157–92.

Calza, A., Monacelli, T., and Stracca, L. (2013). Housing Finance and Monetary Policy. *Journal of the European Economic Association*, 11:101–122.

Canakci, M. (2021). The Impact of Monetary Policy on Household Debt in China. *The Journal of Asian Finance, Economics and Business*, 8(4):653–663.

Chen, H., Michaux, M., and Roussanov, N. (2020). Houses as ATMs: mortgage refinancing and macroeconomic uncertainty. *The Journal of Finance*, 75(1):323–375.

Claus, E. and Nguyen, V. H. (2020). Monetary policy shocks from the consumer perspective. *Journal of Monetary Economics*, 114:159–173.

Coibion, O., Gorodnichenko, Y., Kueng, L., and Silvia, J. (2017). Innocent Bystanders? Monetary policy and inequality. *Journal of Monetary Economics*, 88:70–89.

Cover, J. P. (1992). Asymmetric effects of positive and negative money-supply shocks. *The Quarterly Journal of Economics*, 107(4):1261–1282.

Cumming, F. and Hubert, P. (2023). The distribution of households' indebtedness and the transmission of monetary policy. *Review of Economics and Statistics*, 105(5):1304–1313.

Dahmene, M., Boughrara, A., and Slim, S. (2021). Nonlinearity in stock returns: Do risk aversion, investor sentiment and, monetary policy shocks matter? *International Review of Economics & Finance*, 71:676–699.

De Luigi, C. and Huber, F. (2018). Debt regimes and the effectiveness of monetary policy. *Journal of Economic Dynamics and Control*, 93:218–238.

Debelle, G. (2004). Macroeconomic implications of rising household debt. *BIS working paper No.153*.

Debes, S., Gareis, J., Mayer, E., and Rüth, S. (2014). Towards a consumer sentiment channel of monetary policy. Technical report, WEP-Würzburg Economic Papers.

Di Maggio, M., Kermani, A., Keys, B. J., Piskorski, T., Ramcharan, R., Seru, A., and Yao, V. (2017). Interest rate pass-through: Mortgage rates, household consumption, and voluntary deleveraging. *American Economic Review*, 107(11):3550–3588.

Drachal, K. (2020). Forecasting unemployment rate in Poland with dynamic model averaging and internet searches. *Global Business and Economics Review*, 23(4):368–389.

Dumitrescu, B. A., Enciu, A., Hândoreanu, C. A., Obreja, C., and Blaga, F. (2022). Macroeconomic Determinants of Household Debt in OECD Countries. *Sustainability*, 14(7):3977.

Dungey, M. and Pagan, A. (2000). A structural VAR model of the Australian economy. *Economic record*, 76(235):321–342.

Duygan-Bump, B., Levkov, A., and Montoriol-Garriga, J. (2015). Financing constraints and unemployment: Evidence from the Great Recession. *Journal of Monetary Economics*, 75:89–105.

Fagereng, A., Gulbrandsen, M. A., Holm, M. B., and Natvik, G. J. (2021). How does monetary policy affect household indebtedness? *Norges Bank Working Paper*, 2021(5).

Flodén, M., Kilström, M., Sigurdsson, J., and Vestman, R. (2021). Household Debt and Monetary Policy: Revealing the Cash-Flow Channel. *The Economic Journal*, 131(636):1742–1771.

Garriga, C., Kydland, F. E., and Šustek, R. (2017). Mortgages and monetary policy. *The Review of Financial Studies*, 30(10):3337–3375.

Gelos, M. R., Griffoli, M. T. M., Narita, M. M., Grinberg, F., Rawat, U., and Khan, S. (2019). Has Higher Household Indebtedness Weakened Monetary Policy Transmission? *International Monetary Fund Working Paper*, 2019(011).

Guo, H., Hung, C.-H. D., and Kontonikas, A. (2016). Investor Sentiment regimes, Monetary Policy Shocks, and Stock Price Reaction.

Hofmann, B. and Peersman, G. (2017). Is there a debt service channel of monetary transmission? *BIS Quarterly Review, December*.

Hunt, C. et al. (2015). Economic implications of high and rising household indebtedness. *Reserve Bank of New Zealand Bulletin*, 78(1):1–11.

Iacoviello, M. (2005). House prices, borrowing constraints, and monetary policy in the business cycle. *American economic review*, 95(3):739–764.

Johnson, K. W. and Li, G. (2010). The debt-payment-to-income ratio as an indicator of borrowing constraints: Evidence from two household surveys. *Journal of Money, Credit and Banking*, 42(7):1373–1390.

Jordà, Ò. (2005). Estimation and inference of impulse responses by local projections. *American economic review*, 95(1):161–182.

Jordà, Ò., Schularick, M., and Taylor, A. M. (2013). When credit bites back. *Journal of money, credit and banking*, 45(s2):3–28.

Jordà, Ò., Schularick, M., and Taylor, A. M. (2016). The great mortgaging: housing finance, crises and business cycles. *Economic policy*, 31(85):107–152.

Kearns, J., Major, M., and Norman, D. (2021). How Risky is Australian Household Debt? *Australian Economic Review*, 54(3):313–330.

Kim, Y. and Lim, H. (2020). Transmission of monetary policy in times of high household debt. *Journal of Macroeconomics*, 63:103168.

Kolios, B. (2020). Australian household debt and the macroeconomic environment. *Journal of Economic Studies*.

Kurov, A. (2010). Investor sentiment and the stock market's reaction to monetary policy. *Journal of Banking & Finance*, 34(1):139–149.

La Cava, G. and He, C. (2021). The Distributional Effects of Monetary Policy: Evidence from Local Housing Markets in Australia. *Australian Economic Review*, 54(3):387–397.

La Cava, G., Hughson, H., and Kaplan, G. (2016). The household cash flow channel of monetary policy. *RBA Research Discussion Paper*, 2016(12).

La Cava, G. and Wang, L. (2021). The rise in household liquidity. *RBA Research*

Discussion Paper, 2021(10).

Leu, S. C.-Y. and Sheen, J. (2006). Asymmetric monetary policy in Australia. *Economic Record*, 82:S85–S96.

Lien, D., Sun, Y., and Zhang, C. (2021). Uncertainty, confidence, and monetary policy in China. *International Review of Economics & Finance*, 76:1347–1358.

Lim, S. S. and Bone, M. (2022). Optimism, Debt Accumulation, and Business Growth. *Journal of Behavioral and Experimental Economics*, 97:101828.

Loukoianova, M. E., Wong, Y. C., and Hussiada, I. (2019). Household debt, consumption, and monetary policy in Australia. *International Monetary Fund Working Paper*, 2019(076).

Mian, A., Rao, K., and Sufi, A. (2013). Household balance sheets, consumption, and the economic slump. *The Quarterly Journal of Economics*, 128(4):1687–1726.

Mian, A. and Sufi, A. (2018). Finance and business cycles: The credit-driven household demand channel. *Journal of Economic Perspectives*, 32(3):31–58.

Miranda-Agrippino, S. and Rey, H. (2020). US monetary policy and the global financial cycle. *The Review of Economic Studies*, 87(6):2754–2776.

Nguyen, K. and La Cava, G. (2020). Start Spreading the News: News Sentiment and Economic Activity in Australia. *Sydney: Reserve Bank of Australia*, 33.

Pellegrino, G. (2021). Uncertainty and monetary policy in the US: a journey into nonlinear territory. *Economic Inquiry*, 59(3):1106–1128.

Price, F., Beckers, B., and La Cava, G. (2019). The effect of mortgage debt on consumer spending: Evidence from household-level data. *RBA Research Discussion Paper*, 2019(06).

Romer, C. D. and Romer, D. H. (2004). A new measure of monetary shocks: Derivation and implications. *American Economic Review*, 94(4):1055–1084.

Rubio, M. (2011). Fixed-and variable-rate mortgages, business cycles, and monetary policy. *Journal of Money, Credit and Banking*, 43(4):657–688.

Schularick, M. and Taylor, A. M. (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870-2008. *American Economic Review*, 102(2):1029–61.

Schwartz, C., Hampton, T., Lewis, C., and Norman, D. (2010). A survey of housing equity withdrawal and injection in Australia. *The Blackwell Companion to the Economics of Housing: The Housing Wealth of Nations*, pages 147–175.

Sufi, A. (2015). Out of many, one? Household debt, redistribution and monetary policy during the economic slump. *Andrew Crockett Memorial Lecture, BIS*.

Tenreyro, S. and Thwaites, G. (2016). Pushing on a string: US monetary policy is less powerful in recessions. *American Economic Journal: Macroeconomics*, 8(4):43–74.

Thoma, M. A. (1994). Subsample instability and asymmetries in money-income causality. *Journal of econometrics*, 64(1-2):279–306.

Weise, C. L. (1999). The asymmetric effects of monetary policy: A nonlinear vector autoregression approach. *Journal of Money, credit and Banking*, pages 85–108.

Wilkins, R. and Wooden, M. (2009). Household debt in Australia: The looming crisis that isn't. *Australian Economic Review*, 42(3):358–366.

Appendix

A1 Data sources

Variable	Source and code
Augmented Romer and Romer shock	Beckers (2020), Nguyen and La Cava (2020)
Cash rate	RBA
Consumption	ABS, A2304081W
Durable consumption	ABS, authors' calculation
Non-durable consumption	ABS, authors' calculation
Service consumption	ABS, authors' calculation
GDP	ABS, A2304402X
GDP price deflator (2015=100)	FRED
Global financial cycle	Miranda-Agrippino and Rey (2020)
Household debt-to-gdp ratio	Trading economics
Household debt-to-income ratio	RBA, BHFDDIT
Household debt-to-asset ratio	RBA, BHFDA
House prices (Real residential prop. price index for AU)	FRED
Inflation (CPI inflation, q-to-q, exl. volatile items)	ABS, A2330845W
Investment (Private, fixed capital formation)	ABS, A2304100T
Residential investment	ABS, authors' calculation
Non-residential investment	ABS, authors' calculation
Oil price (WTI spot price)	FRED
Trade-weighted index (in real terms)	RBA, FRERTWI
Unemployment rate (Aged 15-64)	FRED
World industrial production index	Baumeister and Hamilton (2019)

Table A1: Data sources

A2 Romer and Romer regression for Australia

The Taylor-type regression is directly from Beckers (2020). The regression follows the methodology used by Romer and Romer (2004) and estimates the Australian version of Romer and Romer monetary policy shocks.

$$\Delta cr_t = \alpha + \rho_1 cr_{t-1} + \mathbf{Y}^{fc}_{t+h|t}\boldsymbol{\beta} + \mathbf{CS}_t\boldsymbol{\gamma} + m_t \tag{3}$$

where Δcr is the change in the cash rate at the RBA Board meeting in month t, cr_{t-1} is the cash rate prior to the meeting, $\mathbf{Y}^{fc}_{t+h|t}$ is a vector of variables that contains the RBA's h-quarters ahead macroeconomic forecast, and $\mathbf{CS}_t$ is credit market spread (the spread between large business lending rate and 3-month BAB rate) at the time of the meeting. The residual, $\hat{m}_t$, from equation (3) is the augmented RR shock. The residual, $\hat{m}_t$, is a monthly series. Following Coibion et al. (2017) and Romer and Romer (2004), we sum the estimated residual, $\hat{m}_t$, within each quarter to convert it to a quarterly series.

Figure A1 plots the Augmented RR shocks. The figure shows two episodes marked by highly volatile monetary policy shocks, one at the very beginning of the sample period, the other around 2008. The first episode corresponds to the adoption of Inflation Targeting by the RBA. The second episode relates to the bankrupty of Lehman in September 2008.

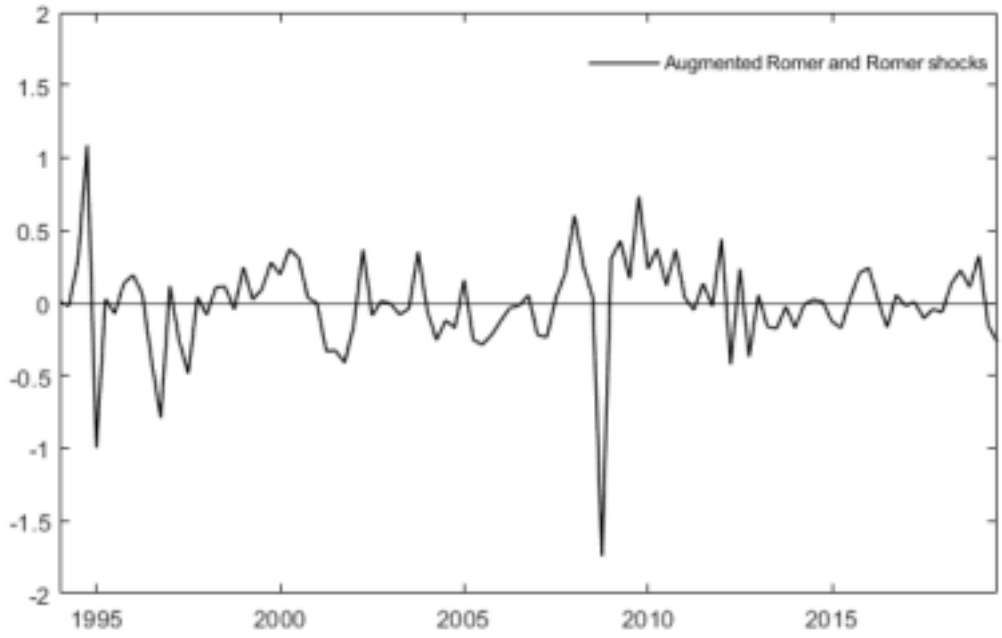


Figure A1: The Augmented Romer and Romer monetary shocks. Sample: 1994Q1–2019Q3. Sources: Beckers (2020) and Nguyen and La Cava (2020) who extended the shock series from 2018Q4 until 2019Q3.

TEPP Working Papers 2025

25-1. Payroll tax reductions on low wages and minimum wage in France
Julien Albertini, Arthur Poirier, Anthony Terriau

TEPP Working Papers 2024

24-9. Training and job-to-job mobility with transfer fees
Arnaud Chéron, Anthony Terriau

24-8. Corporate taxation and firm heterogeneity
Julien Albertini, Xavier Fairise, Anthony Terriau

24-7. Effects of a business support program on firm performances in France
Fabrice Gilles, Yannick L'Horty, Ferhat Mihoubi

24-6. Increased fine for repeat offenders and conglomerate dynamics
Armel Jacques

24-5. The valuation of energy efficiency labels in the French housing market
Sylvain Chareyron

24-4. A comprehensive analysis of production efficiency : a tax reform perspective
Laurence Jacquet, Etienne Lehmann

24-3. How to measure energy poverty in warm and cold climate territories? A multidimensional approach
Manitra Rakotomena, Olivia Ricci

24-2. Innovating for the good or for the bad. An EU-wide analysis of the impact of technological transformation on job polarisation and unemployment
Ylenia Curci, Nathalie Greenan, Silvia Napolitano

24-1. Is training helpful in boosting the self-confidence and professional integration of young people not in employment, education or training? Results from a randomized experiment
Nicolas Moreau, Alexis Parmentier, Mylène Lebon-Eyquem

TEPP Working Papers 2023

23-8. Dornbusch's overshooting and the systematic component of monetary policy in SOE-SVAR
Nicolas Groshenny, Naveed Javed

23-7. Is participatory democracy in line with social protest? Evidence from French yellow vests movement
Benjamin Monnery, François-Charles Wolff

23-6. On-the-job search, life-cycle training and the role of transfer fees
Arnaud Cheron, Anthony Terriau

23-5. Estimating the laffer tax rate on capital income : cross-base responses matter!
Marie-Noëlle Lefebvre, Etienne Lehmann, Michaël Sicsic

23-4. The trickle-down theory: a reality in French sports?
Florian Moussi-Beylie

23.3. Robotization and unbalanced changes in high-skill employment
Lucas Parmentier

23.2. Knowledge transmission in the second part of careers: does formal training matter?
Pierre-Jean Messe, Nathalie Greenan

23-1. Phantom cycles
Arnaud Chéron, Bruno Decreuse

TEPP Working Papers 2022

22-21. Utility services poverty : addressing the problem of household deprivation in Mayotte
Dorothée Charlier, Bérangère Legendre, Olivia Ricci

22-20. The effects of disability benefits on the employment of low-skilled youth : evidence from France
Sylvain Chareyron, Naomie Mahmoudi

22-19. Does gender equality bargaining reduce child penality? Evidence from France
Pierre-Jean Messe, Jérémy Tanguy

22-18. The effect of pro diversity actions on discrimination in the recruitment of large companies : a field experiment
Laetitia Challe, Sylvain Chareyron, Yannick L'Horty, Pascale Petit

22-17. Impacts of quota policy and employer obligation to adapt workstations on discrimination against people with disabilities : lesson from an experiment
Sylvain Chareyron, Yannick L'Horty, Philomene Mbaye, Pascale Petit

22-16. Are real merchandise imports per capita a good predictor for the standard of living for the small island world : testing for the imports-led growth and the growth-led imports hypotheses in panels over the period 1970-2019
Jean-François Hoarau, Nicolas Lucic

22-15. Extracting the discrimination components from the callback rates
Emmanuel Duguet, Loïc Du Parquet, Pascale Petit

22-14. Strategic debt in a mixed duopoly: the limited liability effect
Armel Jacques

22-13. Short-time work policies during the COVID-19 pandemic
Julien Albertini, Xavier Fairise, Arthur Poirier, Anthony Terriau

22-12. Immigration and labour market flows
Andri Chassamboulli, Idriss Fontaine, Ismael Galvez-Iniesta

22-11. Short-term impact of tropical cyclones in Madagascar : evidence from nightlight data
Idriss Fontaine, Sabine Garabedian, Maël Jammes

22-10. The current and future costs of tropical cyclones: A case study of La Réunion
Idriss Fontaine, Sabine Garabedian, Helene Veremes

22-9. Wealth and income responses to dividend taxation : Evidence from France
Marie-Noëlle Lefebvre, Eddy Zanoutene

22-8. Soccer labour market equilibrium and efficient training of talents
Marnix Amand, Arnaud Chéron, Florian Pelgrin, Anthony Terriau

22.7. Using short-term jobs as a way to fin a regular job. What kind of role for local context?
Fabrice Gilles, Sabina Issehnane, Florent Sari

22-6. Gender and age diversity. Does it matter for firms' productivity?
Laetitia Challe, Fabrice Gilles, Yannick L'Horty, Ferhat Mihoubi

22-5. How wages respond to the job-finding and job-to-job transition rates? Evidence from New Zealand administrative data
Christopher Ball, Nicolas Groshenny, Özer Karagedikli, Murat Özbilgind, Finn Robinsona

22-4. Endogenous timing of technological choices of flexibility in a mixed duopoly
Armel Jacques

22-3. Reducing ethnic discrimination through formal warning : evidence from two combined field experiments
Sylvain Chareyron, Yannick L'Horty, Souleymane Mbaye, Pascale Petit

22-2. Cream skimming and Discrimination in access to medical care: a field experiment
Sylvain Chareyron, Yannick L'horty, Pascale Petit

22-1. Optimal taxation with multiple incomes and types
Kevin Spiritus, Etienne Lehmann, Sander Renes, Floris T. Zoutman

TEPP Working Papers 2021

21-11. Intermittent collusive agreements : antitrust policy and business cycles
Emilie Dargaud, Armel Jacques

21-10. Endogenous breadth of collusive agreements : an application to flexible technological choices
Emilie Dargaud, Armel Jacques

21-9. How to tax different incomes?
Laurence Jacquet, Etienne Lehmann

21-8. Does optimal capital taxation under stochastic returns to savings
Eddy Zanoutene

21-7. Does the gender mix influence collective bargaining on gender equality? Evidence from France
Anne-Sophie Bruno, Nathalie Greenan, Jérémy Tanguy

21-6. The effects of the non-financial component of business accelerators
Fabrice Gilles, Yannick L'Horty, Ferhat Mihoubi

21-5. Organisational changes and long term sickness absence and injury leave
Mohamed Ali Ben Halima, Nathalie Greenan, Joseph Lanfranchi

21-4. The unexplored discriminations towards youth : equal access to goods and services
David Gray, Yannick L'Horty, Souleymane Mbaye, Pascale Petit

21-3. The zero effect of income tax on the timing of birth: some evidence on French data
Nicolas Moreau

21-2. Tropical cyclones and fertility : new evidence from Madagascar
Idriss Fontaine, Sabine Garabedian, David Nortes-Martinez, Hélène Vérèmes

21-1. On the heterogeneous impacts of the COVID-19 lockdown on US unemployment
Malak Kandoussi, François Langot

TEPP Working Papers 2020

20-8. COVID-19 mortality and health expenditures across European countries: The positive correlation puzzle
Serge Blondel, Radu Vranceanu

20-7. Measuring discrimination in the labour market
Emmanuel Duguet

20-6. The effects of age on educational performances at the end of primary school: cross-sectional and regression discontinuity approach applications from Reunion Island
Daniel Rakotomalala

20-5. Slowdown antitrust investigations by decentralization
Emilie Dargaud, Armel Jacques

20-4. Is international tourism responsible for the pandemic of COVID19? A preliminary cross-country analysis with a special focus on small islands
Jean-François Hoarau

20-3. Does labor income react more to income tax or means tested benefit reforms?
Michaël Sicsic

20-2. Optimal sickness benefits in a principal-agent model
Sébastien Ménard

20-1. The specific role of agriculture for economic vulnerability of small island spaces
Stéphane Blancard, Maximin Bonnet, Jean-François Hoarau

TEPP Working Papers 2019

19-8. The impact of benefit sanctions on equilibrium wage dispersion and job vacancies
Sebastien Menard

19-7. Employment fluctuations, job polarization and non-standard work: Evidence from France and the US
Olivier Charlot, Idriss Fontaine, Thepthida Sopraseuth

19-6. Counterproductive hiring discrimination against women: Evidence from French correspondence test
Emmanuel Duguet, Loïc du Parquet, Yannick L'Horty, Pascale Petit

19-5. Inefficient couples: Non-minimization of the tax burden among French cohabiting couples
Olivier Bargain, Damien Echevin, Nicolas Moreau, Adrien Pacifico

19-4. Seeking for tipping point in the housing market: evidence from a field experiment
Sylvain Chareyron, Samuel Gorohouna, Yannick L'Horty, Pascale Petit, Catherine Ris

19-3. Testing for redlining in the labor market
Yannick L'Horty, Mathieu Bunel, Pascale Petit

19-2. Labour market flows: Accounting for the public sector
Idriss Fontaine, Ismael Galvez-Iniesta, Pedro Gomes, Diego Vila-Martin

19-1. The interaction between labour force participation of older men and their wife: lessons from France
Idriss Fontaine

TEPP Working Papers 2018

18-15. Be healthy, be employed: a comparison between the US and France based on a general equilibrium model
Xavier Fairise, François Langot, Ze Zhong Shang

18-14. Immigrants' wage performance in the routine biased technological change era: France 1994-2012
Catherine Laffineur, Eva Moreno-Galbis, Jeremy Tanguy, Ahmed Tritah

18-13. Welfare cost of fluctuations when labor market search interacts with financial frictions
Elini Iliopulos, François Langot, Thepthida Sopraseuth

18-12. Accounting for labor gaps
François Langot, Alessandra Pizzo

18-11. Unemployment fluctuations over the life cycle
Jean-Olivier Hairault, François Langot, Thepthida Sopraseuth

18-10. Layoffs, Recalls and Experience Rating
Julien Albertini, Xavier Fairise

18-9. Environmental policy and health in the presence of labor market imperfections
Xavier Pautrel

18-8. Identity mistakes and the standard of proof
Marie Obidzinski, Yves Oytana

18-7. Presumption of innocence and deterrence
Marie Obidzinski, Yves Oytana

18-6. Ethnic Discrimination in Rental Housing Market: An Experiment in New Caledonia
Mathieu Bunel, Samuel Gorohouna, Yannick L'Horty, Pascale Petit, Catherine Ris

18-5. Evaluating the impact of firm tax credits. Results from the French natural experiment CICE
Fabrice Gilles, Yannick L'Horty, Ferhat Mihoubi, Xi Yang

18-4. Impact of type 2 diabetes on health expenditure: an estimation based on individual administrative data
François-Olivier Baudot , Anne-Sophie Aguadé,Thomas Barnay, Christelle Gastaldi-Ménager, Anne Fargot-Campagna

18-3. How does labour market history influence the access to hiring interviews?
Emmanuel Duguet, Rémi Le Gall, Yannick L'Horty, Pascale Petit

18-2. Occupational mobility and vocational training over the life cycle
Anthony Terriau

18-1. Retired, at last? The short-term impact of retirement on health status in France
Thomas Barnay, Eric Defebvre

TEPP Working Papers 2017

17-11. Hiring discrimination against women: distinguishing taste based discrimination from statistical discrimination
Emmanuel Duguet, Loïc du Parquet, Pascale Petit

17-10. Pension reforms, older workers' employment and the role of job separation and finding rates in France
Sarah Le Duigou, Pierre-Jean Messe

17-9. Healthier when retiring earlier? Evidence from France
Pierre-Jean Messe, François-Charles Wolff

17-8. Revisting Hopenhayn and Nicolini's optimal unemployment insurance with job search monitoring and sanctions
Sebastien Menard, Solenne Tanguy

17-7. Ethnic Gaps in Educational Attainment and Labor-Market Outcomes: Evidence from France
Gabin Langevin, David Masclet, Fabien Moizeau, Emmanuel Peterle

17-6. Identifying preference-based discrimination in rental market: a field experiment in Paris
Mathieu Bunel, Yannick L'Horty, Loïc du Parquet, Pascale Petit

17-5. Chosen or Imposed? The location strategies of households
Emilie Arnoult, Florent Sari

17-4. Optimal income taxation with composition effects
Laurence Jacquet, Etienne Lehmann

17-3. Labor Market Effects of Urban Riots: an experimental assessment
Emmanuel Duguet, David Gray, Yannick L'Horty, Loic du Parquet, Pascale Petit

17-2. Does practicing literacy skills improve academic performance in first-year university students? Results from a randomized experiment
Estelle Bellity, Fabrices Gilles, Yannick L'Horty

17-1. Raising the take-up of social assistance benefits through a simple mailing: evidence from a French field experiment
Sylvain Chareyron, David Gray, Yannick L'Horty

TEPP Working Papers 2016

16-8. Endogenous wage rigidities, human capital accumulation and growth
Ahmed Tritah

16-7. Harder, better, faster...yet stronger? Working conditions and self-declaration of chronic diseases
Eric Defebvre

16-6. The influence of mental health on job retention
Thomas Barnay, Eric Defebvre

16-5. The effects of breast cancer on individual labour market outcomes: an evaluation from an administrative panel
Thomas Barnay, Mohamed Ali Ben Halima, Emmanuel Duguet, Christine Le Clainche, Camille Regaert

16-4. Expectations, Loss Aversion, and Retirement Decisions in the Context of the 2009 Crisis in Europe
Nicolas Sirven, Thomas Barnay

16-3. How do product and labor market regulations affect aggregate employment, inequalities and job polarization? A general equilibrium approach
Julien Albertini, Jean-Olivier Hairault, François Langot, Thepthida Sopraseuth

16-2. Access to employment with age and gender: results of a controlled experiment Laetitia Challe, Florent Fremigacci, François Langot, Yannick L'Horty, Loïc Du Parquet, Pascale Petit

16-1. An evaluation of the 1987 French Disabled Workers Act: Better paying than hiring
Thomas Barnay, Emmanuel Duguet, Christine Le Clainche, Yann Videau

TEPP Working Papers 2015

15-10. Optimal Income Taxation with Unemployment and Wage Responses: A Sufficient Statistics Approach
Kory Kroft, Kavan Kucko, Etienne Lehmann, Johannes Schmieder

15-9. Search frictions and (in) efficient vocational training over the life-cycle
Arnaud Chéron, Anthony Terriau

15-8. Absenteeism and productivity: the experience rating applied to employer contributions to health insurance
Sébastien Ménard, Coralia Quintero Rojas

15-7. Take up of social assistance benefits: the case of homeless
Sylvain Chareyron

15-6. Spatial mismatch through local public employment agencies. Answers from a French quasi-experiment
Mathieu Bunel, Elisabeth Tovar

15-5. Transmission of vocational skills at the end of career: horizon effect and technological or organisational change
Nathalie Greenan, Pierre-Jean Messe

15-4. Protecting biodiversity by developing bio-jobs: A multi-branch analysis with an application on French data
Jean De Beir, Céline Emond, Yannick L'Horty, Laetitia Tuffery

15-3. Profit-Sharing and Wages: An Empirical Analysis Using French Data Between 2000 and 2007
Noélie Delahaie, Richard Duhautois

15-2. A meta-regression analysis on intergenerational transmission of education: publication bias and genuine empirical effect
Nicolas Fleury, Fabrice Gilles

15-1. Why are there so many long-term unemployed in Paris?
Yannick L'Horty, Florent Sari

TEPP Working Papers 2014

14-14. Hiring discrimination based on national origin and the competition between employed and unemployed job seekers
Guillaume Pierné

14-13. Discrimination in Hiring: The curse of motorcycle women
Loïc Du Parquet, Emmanuel Duguet, Yannick L'Horty, Pascale Petit

14-12. Residential discrimination and the ethnic origin: An experimental assessment in the Paris suburbs
Emmanuel Duguet, Yannick L'Horty, Pascale Petit

14-11. Discrimination based on place of residence and access to employment
Mathieu Bunel, Yannick L'Horty, Pascale Petit

14-10. Rural Electrification and Household Labor Supply: Evidence from Nigeria
Claire Salmon, Jeremy Tanguy

14-9. Effects of immigration in frictional labor markets: theory and empirical evidence from EU countries
Eva Moreno-Galbis, Ahmed Tritah

14-8. Health, Work and Working Conditions: A Review of the European Economic Literature
Thomas Barnay

14-7. Labour mobility and the informal sector in Algeria: a cross-sectional comparison (2007-2012)
Philippe Adair, Youghourta Bellache

14-6. Does care to dependent elderly people living at home increase their mental health?
Thomas Barnay, Sandrine Juin

14-5. The Effect of Non-Work Related Health Events on Career Outcomes: An Evaluation in the French Labor Market
Emmanuel Duguet, Christine le Clainche

14-4. Retirement intentions in the presence of technological change: Theory and evidence from France
Pierre-Jean Messe, Eva Moreno-Galbis, Francois-Charles Wolff

14-3. Why is Old Workers' Labor Market more Volatile? Unemployment Fluctuations over the Life-Cycle
Jean-Olivier Hairault, François Langot, Thepthida Sopraseuth

14-2. Participation, Recruitment Selection, and the Minimum Wage
Frédéric Gavrel

14-1. Disparities in taking sick leave between sectors of activity in France: a longitudinal analysis of administrative data
Thomas Barnay, Sandrine Juin, Renaud Legal

TEPP Working Papers 2013

13-9. An evaluation of the impact of industrial restructuring on individual human capital accumulation in France (1956-1993)
Nicolas Fleury, Fabrice Gilles

13-8. On the value of partial commitment for cooperative investment in buyer-supplier relationship
José de Sousa, Xavier Fairise

13-7. Search frictions, real wage rigidities and the optimal design of unemployment insurance
Julien Albertini, Xavier Fairise

13-6. Tax me if you can! Optimal nonlinear income tax between competing governments
Etienne Lehmann, Laurent Simula, Alain Trannoy

13-5. Beyond the labour income tax wedge: The unemployment-reducing effect of tax progressivity
Etienne Lehmann, Claudio Lucifora, Simone Moriconi, Bruno Van Der Linden

13-4. Discrimination based on place of residence and access to employment
Mathieu Bunel, Emilia Ene Jones, Yannick L'Horty, Pascale Petit

13-3. The determinants of job access channels: evidence from the youth labor market in France
Jihan Ghrairi

13-2. Capital mobility, search unemployment and labor market policies: The case of minimum wages
Frédéric Gavrel

13-1. Effort and monetary incentives in Nonprofit et For-Profit Organizations
Joseph Lanfranchi, Mathieu Narcy

The TEPP Institute

The CNRS **Institute for Theory and Evaluation of Public Policies** (the TEPP Institute, FR n°2024 CNRS) gathers together research centres specializing in economics and sociology:

- L'**Equipe de Recherche sur l'Utilisation des Données Individuelles en lien avec la Théorie Economique** (Research Team on Use of Individuals Data in connection with economic theory), **ERUDITE**, University of Paris-Est Créteil, University of Gustave Eiffel;
- Le **Centre d'Etudes des Politiques Economiques** (Research Centre focused on the analysis of economic policy and its foundations and implications), **EPEE**, University of Evry Paris-Saclay ;
- Le **Centre Pierre Naville** (Research on Work and Urban Policies), **CPN**, University of Evry Paris-Saclay
- Le **Groupe d'Analyse des Itinéraires et des Niveaux Salariaux** (Group on Analysis of Wage Levels and Trajectories), **GAINS**, Le Mans University
- Le **Centre de Recherches en Economie et en Management**, (Research centre in Economics and Management), **CREM**, University of Rennes 1, University of Caen Basse-Normandie ;
- Le **Groupe de Recherche ANgevin en Économie et Management** (Angevin Research Group in Economics and Management), **GRANEM**, University of Angers ;
- Le **Centre de Recherche en Economie et Droit** (Research centre in Economics and Law) **CRED**, University of Paris II Panthéon-Assas ;
- Le **Laboratoire d'Economie et de Management Nantes-Atlantique** (Laboratory of Economics and Management of Nantes-Atlantique) **LEMNA**, Nantes University ;
- Le **Laboratoire interdisciplinaire d'étude du politique Hannah Arendt – Paris-Est**, **LIPHA-PE**, University of Paris-Est Créteil and University of Gustave Eiffel ;
- Le **Centre d'Economie et de Management de l'Océan Indien**, **CEMOI**, University of La Réunion ;
- Le **Laboratoire d'économie de Poitiers**, **LéP**, University of Poitiers ;
- L'UMR **Structures et marchés agricoles, ressources et territoires**, **SMART**, INRAE, Agro Rennes-Angers Institute ;
- Le **Centre de recherche en économie et en droit sur le développement insulaire**, **CREDDI**, University of the Antilles.

TEPP brings together 230 teacher-researchers and 100 doctoral students. It is both one of the main academic operators in the evaluation of public policies in France, and the largest multidisciplinary federation of research on work and employment. It responds to the demand for impact assessment of social programs using advanced technologies combining theoretical and econometric modeling, qualitative research techniques and controlled experiences.