How insensitive: the effect of monetary policy on credit and income distribution in Brazil*

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Abstract

This paper investigates how monetary policy affects functional income distribution in Brazil through two main channels: real wage dynamics and credit-mediated effects on output and productivity. Using seven structural vector autoregressive (SVAR) models with monthly data from 2011 to 2024, we estimate the impact of changes in the benchmark SELIC interest rate on real wages, prices, employment, credit, and the wage share. Our findings highlight that the effects of monetary tightening are highly context-dependent and nonlinear. In low-interest rate environments, contractionary shocks often lead to cost-push inflation and temporary increases in employment, while in high-interest rate regimes, they produce significant declines in output and employment. Across models, a small but consistent increase in the wage share follows monetary shocks—primarily due to greater declines in productivity relative to real wages. The paper also identifies a robust credit channel affecting mortgage, personal, and durable goods loans, and shows that rent inflation contributes to the emergence of the price puzzle. These results underscore the importance of regime-dependent monetary policy effects in shaping income distribution and provide novel empirical insights for emerging economies.

Keywords: Monetary Policy, Brazil, SVAR

JEL Codes: E11, E21, E24, O54

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1 Introduction

The relationship between monetary policy and income distribution has emerged as a critical area of research, particularly in the context of persistent inequality and the debate over monetary policy effectiveness. In this context, high real interest rates, and a financial sector oriented toward rent extraction lead scholars to argue that conventional monetary tools have reinforced regressive distributive outcomes.

Recent literature highlights key gaps in understanding how monetary policy shapes functional income distribution (Kappes, 2023; Di Bucchianico and Lofaro, 2023). While early New Keynesian studies (e.g., Christiano et al., 1997) attributed short-run wage declines to nominal rigidities, later contributions reveals more complex and context-dependent effects. Some studies find that contractionary policy can paradoxically increase the labor share despite falling real wages (Cantore et al., 2021), while others document persistent profit increases under high rates (Gahn, 2024). Firm-level analyses show that monetary easing boosts profits but with ambiguous productivity effects (Lieberknecht and Hartwig, 2020). Cross-country evidence also points to competing channels: contractionary shocks initially raise the wage share via output contraction but later suppress it through real wage declines (Di Bucchianico and Lofaro, 2023).

This study contributes to this evolving literature by examining how changes in Brazil's benchmark SELIC rate influence functional income distribution through two primary transmission channels. The first operates through real wage dynamics, where monetary tightening triggers cost-push inflation - the well-documented price puzzle phenomenon (Cucciniello et al., 2022; Barbieri Góes, 2023; Di Bucchianico and Lofaro, 2023) - ultimately eroding real wages. As demonstrated by recent research, higher policy rates raise rental and mortgage costs, which propagate through consumer prices (Barbieri Góes, 2023) while nominal wages adjust more sluggishly (Di Bucchianico and Lofaro, 2023). The second channel works through credit-mediated output effects, where rate increases constrain semi-autonomous demand components, particularly mortgage-financed housing purchase, personal loans, and loans for durable goods consumption (Deleidi, 2018; Barbieri Góes and Deleidi, 2022; Barbieri Góes, 2023; Avritzer and Barbieri Góes, 2025). This demand contraction reduces output, which might lead to shifts in employment and productivity, with consequent effects on the wage share.

To systematically analyze these transmission channels, we estimate seven distinct structural VAR (SVAR) models, each designed to isolate specific mechanisms through which monetary policy affects functional income distribution. The novelty of this contribution is twofold: i. we investigate the real wage channel also directly incorporating nominal wage and prices as well as housing market dynamics to empirically assess the emergence of the price puzzle; ii. we also estimate the effect of monetary policy shocks on productivity-mediated effects via GDP-employment interactions, capturing how monetary policy reshapes functional income distribution through semi-autonomous demand components related to household credit.

The remainder of the paper is structured as follows. Section (2) reviews the theoretical and empirical literature on monetary policy transmission and functional income distribution. Section (3) outlines the data and methodology, detailing the structural VAR (SVAR) approach employed in our analysis. Section (4) presents the empirical results, including impulse response functions and an examination of regime-dependent effects. Finally, Section (5) concludes, summarizing our findings.

2 Literature Review

Di Bucchianico and Lofaro (2023) and Kappes (2023) highlight a significant gap in economic research regarding the impact of monetary policy shocks on functional income distribution arguing that this topic receives relatively less attention compared to studies on the impact on personal income distribution.

The little existing literature on the impact of monetary policy on labor and profit shares appears to also present divergent findings. For example, Cantore et al. (2021) argue that a contractionary monetary policy can increase the labor share, even if real wages fall or remain largely unaffected, based on evidence from the US, Euro area, UK, Australia and Canada. In a panel of 15 countries, Di Bucchianico and Lofaro (2023) find that contractionary monetary policy shocks negatively affect real wages. Initially, the labor share of income increases due to a decline in GDP, but as real wages drop, the labor share eventually returns to its original level. Avritzer and Barbieri Góes (2025) report that contractionary monetary policy shocks can lead to a temporary increase in the wage share for the US economy, likely explained by the response of GDP through its effect on autonomous credit-financed consumption. And finally, Gahn (2024) finds a persistent positive relationship between real interest rates and net profit margins in European economies.

Therefore, it is clear that the impact of monetary policy on functional income distribution is highly heterogeneous and context dependent, underscoring the need for country-specific empirical research to better understand the mechanisms at play. However, as far as we know, there is no empirical study on the effects of monetary policy on labor and profit shares for Brazil, which is precisely the gap in the literature that this paper intends to fill.[1]

Nonetheless, it is possible to find an extended literature that explores the overall effect of monetary policy shocks on functional income distribution through mechanisms identified on the components of the wage share. Building on this foundation, our contribution analyzes how SELIC hikes in Brazil affect functional income distribution through two interconnected pathways: real wage dynamics and productivity responses.

Early studies, such as those by Christiano et al. (1997, 2005) and Sims and Zha (2006), found that contractionary monetary policy shocks typically cause a short-run decline in real wages. These effects were primarily attributed to nominal rigidities, including both price and wage stickiness. However, subsequent research has produced mixed results. For instance, Altig et al. (2011) find no significant response of real wages to monetary policy shocks, suggesting that the relationship may not be as robust or universal as previously thought. More recently, the real wage channel has been studied through the emergence of the price puzzle (or Gibson paradox), where contractionary policy paradoxically leads to an increase in prices. As shown by Cucciniello et al. (2022), rate hikes engender an increase in prices also leading to an increase in nominal wages, which are not enough to avoid the drop in real wages.[2] Barbieri Góes (2023) also shows that a positive monetary policy shock leads to higher prices through mortgage costs embedded in landlord/producer pricing and/or the re-alignment of returns from house property to the return from other types of financial and real investment. The decrease in real wages is also the dominant effect of monetary policy shock on distribution according to Di Bucchianico and Lofaro (2023)'s cross-country evidence. In the present paper, this corresponds to the cost-push channel where SELIC increases raise rental costs, propagating to the CPI and ultimately determining real wages (W_t^{real}) also depending on the reaction of nominal wages (see

[1] All empirical papers for Brazil seem to focus on the impact of monetary policy on personal income distribution. Modenesi et al. (2023) and Meried (2025) analyze the impact of SELIC (the interest rate set by the Brazilian Central Bank) on the gini coefficient, and find that a contractionary monetary policy has a positive impact in increasing inequality.

[2] A few empirical studies have investigated the emergence of the price puzzle in the Brazilian economy (see for instance Cysne, 2004 and Ferreira and Castelar, 2008), finding that the price puzzle is short-lived, typically lasting about one quarter. More recently, Queiroz Ferreira and de Mattos (2022) find that the emergence of the price puzzle is a feature of the Brazilan economy in periods of activity slowdown, leading them to conclude that the Brazilian Central Bank should only employ a monetary policy contraction in periods of economic "boom".

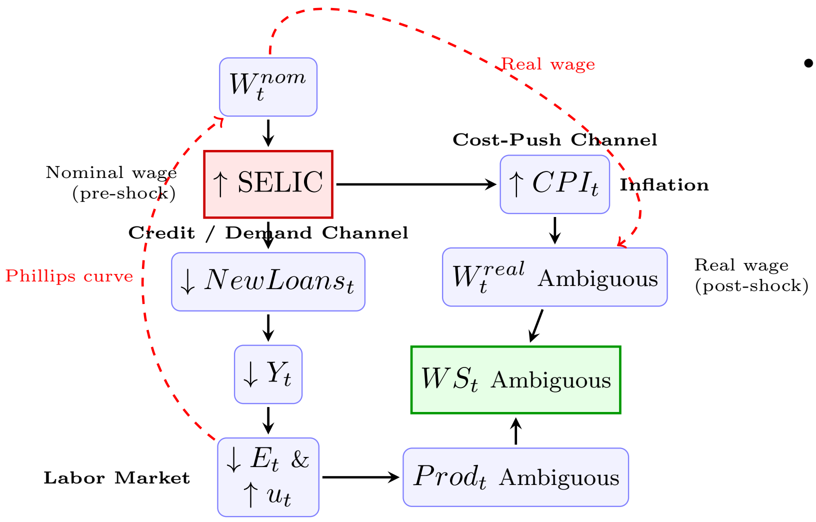
Figure 1).[3]

Simultaneously, the productivity channel in this paper operates through credit-mediated output effects. Post-Keynesian research establishes that policy rates primarily affect output through semi-autonomous demand components rather than traditional investment channels. For instance, Deleidi (2018) demonstrates how interest rate shocks affect loans for the purchase of houses, whereas it has no direct effect on productive investment. Barbieri Góes and Deleidi (2022) and Barbieri Góes (2023) also show that monetary policy affects output through private residential investment. More recently, Avritzer and Barbieri Góes (2025) also find that policy rates affects output through residential investment, consumer credit and durable goods consumption. In the context of the Brazilian economy, the effects of monetary policy on autonomous demand has been investigated in Centro Internacional Celso Furtado de Políticas para o Desenvolvimento (2025), showing the negative impact of monetary policy on some types of household credit-financed consumption.

Our model captures this credit/demand channel in Figure (1), which shows that hikes in the base rate ($SELIC$) are expected to lead to a contraction in new loans ($Loans_t$), output (Y_t), and thus on employment (E_t), which would then determine the overall effect on productivity ($Prod_t$). In the case of the housing sector, we would further expect that monetary contraction will increase the own rate of interest on new mortgage loans (i.e. $OwnRate_t = (1 + IR_t^M)/(1 + \pi_{housing}) - 1$), the channel through which increases in the base rate would result in the reduction of new mortage loans.[4]

[3]These dynamics connect closely with the Brazilian literature on the Phillips curve and distributive conflict. As Summa and Serrano (2018) and Summa and Braga (2020) show analyzing Brazil's inflation-targeting regime, inflation is not a neutral or purely technical process, but one that is deeply shaped by wage bargaining, labor market institutions, and distributive struggles.

[4]The own-rate of interest on housing, expressed as $OwnRate_t = \frac{1+IR_t^M}{1+\pi_{housing}} - 1$, represents the real rate of return on housing as an asset, adjusted for housing-specific inflation. This concept first appears in Sraffa's 1932 analysis of commodity markets and was later developed by Keynes in Chapter 17 of *The General Theory of Employment, Interest and Money* 1936. For a concise definition of the concept of own rates of interest see Eatwell (2018).In the context of housing markets, the own rate of interest captures whether real estate provides competitive returns relative to other assets by measuring the real interest rate specific to housing, accounting for the unique inflationary pressures affecting property markets and their role in monetary policy transmission mechanisms. For an application of the own rate of interest in the housing market see Teixeira (2015); Barbieri Góes (2023); Petrini and Teixeira (2023) and Teixeira and Petrini (2023).



- **Transmission Mechanism:**
  - Credit Channel: SELIC → Loans → Output → Employment
  - Labor Market: Loans → Output → Employment → Wages
  - Cost-Push: Rates → CPI → Real Wages
  - Final Effect: Real wages + Productivity → Wage share

Figure 1: **Schematic of monetary policy transmission channels to functional income distribution:** How SELIC rate hikes impact the wage share through credit/demand and cost-push channels

In the real wage channel, also captured in Figure 1, we would expect increases in the base rate ($SELIC$) to positively affect prices (CPI_t) through cost-push inflation. In the housing market, this channel can be further tested through increases in rent. Finally, since the effect on nominal wages is unclear, or perhaps not significant, the final effect on real wages remains ambiguous. These competing channels converge to ultimately determine the wage share ($WS_t = W_t^{real}/Prod_t$), with the net effect remaining theoretically ambiguous due to countervailing forces between credit contraction, inflation pressure, and productivity responses.

3 Data and Methods

In this Section the data used in the estimation of the models is presented (Section 3.1), followed by a discussion of the methodology employed (Section 3.2).

3.1 Data

This study employs monthly time-series data for Brazil spanning from 2011m3 to 2024m12 to estimate seven SVAR models and examine the transmission channels of monetary policy to the wage share. The data is sourced from the Brazilian Central Bank (*Banco Central do Brasil* - BCB), the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE), the Institute for Applied Economic Research (*Instituto de*

Pesquisa Econômica Aplicada - IPEA), and the Economic Research Institute Foundation (*Fundação Instituto de Pesquisas Econômicas* - FIPE).

The core variables include the SELIC rate as the monetary policy indicator, distributional variables (nominal wages, real wages, and wage share), real activity measures (GDP, employment, unemployment), price indicators (CPI, housing and rent prices), credit variables (new mortgage loans, personal loans, and durable goods loans), and labor productivity (output per worker). The monthly data on labor market (employed population, unemployment rate, and nominal wages) which is used to construct the time-series of the wage share and labor productivity was generated using data from the National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios* - PNAD Continua) conducted and released on a quarterly basis by IBGE.[5] Monthly data was then generated relying on the National Household Sample Survey and microdata (see Hecksher 2020 for more details on the methodology). Since monthly data from PNAD is available from 2012m1 to 2024m12 it was combined with data from Monthly Employment Research (*Pesqusia Mensal de Emprego* - PME) for 2011m3 to 2011m12, so as to allow for the longest possible observation.

All nominal variables are deflated using the CPI. We build the own rate of interest on new mortgage loans deflating the interest rate on new mortgage loans using the monthly inflation rate of residential real estate collateral value following the formular presented in Section (2) - $OwnRate_t = (1+IR_t^M)/(1+\pi_{housing})-1$. Real activity variables (GDP, employment, unemployment, new loans), price indices, and credit variables are transformed into natural logarithms. All series are seasonally adjusted.[6] Figure 2 below illustrates the behavior of SELIC, the interest rate set by the Brazilian Central Bank (BCB).

[5]The wage share is computed as the ratio of total labor compensation to GDP, following standard distributional accounts methodology ($\frac{Nom.Wages*EmployedPop.}{GDP}*100$). As a robustness test, we generate an alternative measure for the wage share using the Denton-cholette disaggregation method (see Sax and Steiner 2013 for more details on this) to create monthly data for wage-share from low-frequency data retrieved from the national accounts relying on the high-frequency labor market data described above.

[6]For a comprehensive summary of variables, with their corresponding acronyms and data sources, see Table (1) in Appendix (A).

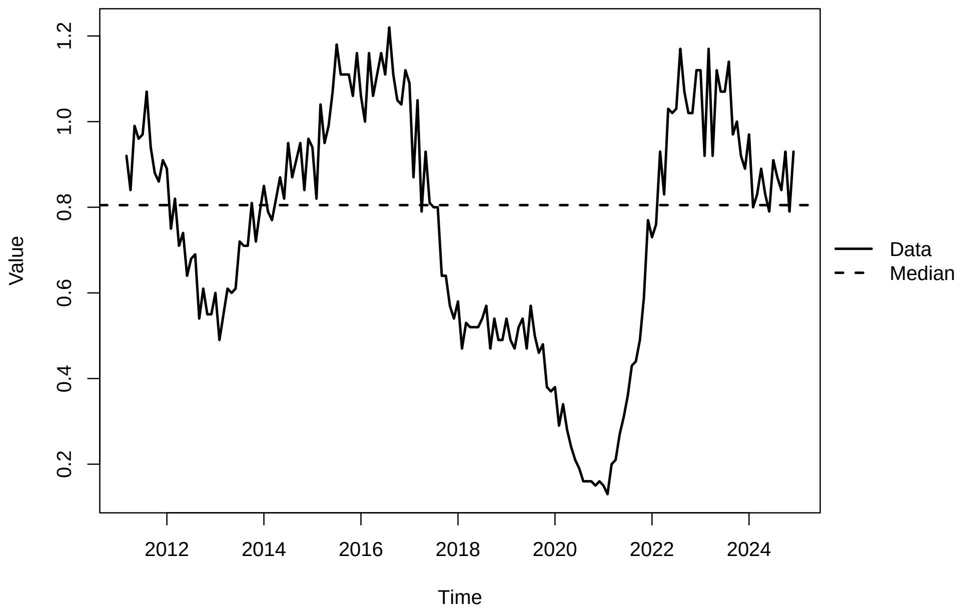


Figure 2: Time series of the SELIC interest rate and its median (2011–2024)

Since the effect of monetary policy on economic outcomes might be regime-dependent (see, among others, Tenreyro and Thwaites, 2016; Wu and Xia, 2016; Borio and Hofmann, 2017 and Ahmed et al., 2024) we also investigate the possibility of different outcomes in regimes of low SELIC, versus high SELIC.[7] For these tests, we calculate the median SELIC, as illustrated in the graph above, and define the two regimes by SELICs lower than or higher than the median. By partitioning the sample into high- and low-rate regimes, we assess whether the transmission of monetary policy shocks varies systematically with the level of interest rate.

3.2 Methods

Before estimating the structural models and calculating the underling impulse response functions (IRFs here after), we estimate reduced-form VAR models, as specified in equation (1). Let y_t be a $k \times 1$ vector of endogenous variables, A_i a $k \times k$ coefficient matrix, c a constant term, and u_t a $k \times 1$ vector of reduced-form disturbances. The lag order is determined by minimizing the Akaike Information Criterion (AIC), with diagnostic tests confirming the absence of serial correlation and ensuring model stability.[8]

[7] See, for example, Pozo and Rojas (2024) for a discussion of the nonlinear effects of monetary policy for latin american countries.

[8] Full diagnostic results, including lag-order selection criteria, and stability tests based on eigenvalue analysis, are omitted for brevity but available upon request.

$$y_t = c + \sum_{i=1}^{p} A_i y_{t-i} + u_t \tag{1}$$

The structural VAR (SVAR) representation can be derived from the reduced-form model through the relationships $A_i = B_0^{-1} B_i$ and $u_t = B_0^{-1} \omega_t$, where B_0 denotes a $k \times k$ matrix capturing contemporaneous interactions among variables, B_i represents the $k \times k$ matrix of structural autoregressive coefficients, and ω_t is a $k \times 1$ vector of structural shocks. This yields the structural form shown in equation (2).

$$B_0 y_t = c + \sum_{i=1}^{p} B_i y_{t-i} + \omega_t \tag{2}$$

The identification of structural shocks requires orthogonalization of the reduced-form residuals. This is achieved by imposing a lower triangular structure on B_0, ensuring that the structural innovations ω_t are mutually uncorrelated. Given the five distinct model specifications outlined in the preceding section, seven corresponding identification schemes are implemented. These are formally expressed through the systems of equations (3)–(9) presented below. The identification strategy relies on a recursive SVAR structure guided by theoretical considerations (Kilian and Lütkepohl, 2017) and recent empirical literature (Deleidi, 2018; Cucciniello et al., 2022; Barbieri Góes and Deleidi, 2022; Barbieri Góes, 2023; Di Bucchianico and Lofaro, 2023).

$$B_0 z_t = \begin{bmatrix} - & 0 & 0 & 0 \\ - & - & 0 & 0 \\ - & - & - & 0 \\ - & - & - & - \end{bmatrix} \begin{bmatrix} \text{SELIC}_t \\ \text{Real Wages}_t \\ \text{Productivity}_t \\ \text{Wage Share}_t \end{bmatrix} \tag{3}$$

$$B_0 z_t = \begin{bmatrix} - & 0 & 0 & 0 & 0 \\ - & - & 0 & 0 & 0 \\ - & - & - & 0 & 0 \\ - & - & - & - & 0 \\ - & - & - & - & - \end{bmatrix} \begin{bmatrix} \text{Nom. Wages}_t \\ \text{SELIC}_t \\ \text{CPI}_t \\ \text{GDP}_t \\ \text{Employed Pop.}_t \end{bmatrix} \tag{4}$$

In the first model (see system of equations 3), the SELIC rate is treated as exogenously set by the Central Bank, in accordance with Post-Keynesian endogenous money theory and supported by empirical studies (Deleidi, 2018; Barbieri Góes and Deleidi, 2022; Barbieri Góes, 2023; Avritzer and Barbieri Góes, 2025). This implies that monetary policy can affect real wages, labor productivity and the wage share contemporaneously within the monthly observation, while the reverse effect occurs with a delay. In line with Fontanari and Palumbo (2023), Fontanari (2024) and Deleidi et al. (2025), we assume that real wages contemporaneously influence both labor productivity and the wage share, whereas the feedback from the wage share and labor productivity to real wages occurs only with a lag. Labor productivity is assumed to be affected by the SELIC and real wages within the same period, but it only influences these variables with a delay. Following Di Bucchianico and Lofaro (2023) and the recent SSM literature on the endogeneity of distribution (Morlin and Pariboni, 2022), the wage share is considered the most endogenous variable, responding contemporaneously to changes in the interest rate, real wages, and productivity.[9]

In model 2 (see system of equations 4), we decompose real wages into nominal wages and the consumer price index (CPI), and labor productivity into GDP and employment. Nominal wages are assumed to contemporaneously affect both the SELIC rate and the CPI, while being influenced by them only with a lag. This reflects a wage-setting process shaped by institutional factors, information delays, and nominal rigidities, as highlighted by Cucciniello et al. (2022). The SELIC rate and CPI respond immediately to changes in nominal wages, whereas GDP and employment are treated as the most endogenous variables in the model, reacting contemporaneously to all other variables. This structure captures the dynamic interactions between wage formation, price dynamics, and monetary policy, in line with theoretical foundations and empirical evidence from the related literature.

$$B_0 z_t = \begin{bmatrix} - & 0 & 0 & 0 & 0 & 0 \\ - & - & 0 & 0 & 0 & 0 \\ - & - & - & 0 & 0 & 0 \\ - & - & - & - & 0 & 0 \\ - & - & - & - & - & 0 \\ - & - & - & - & - & - \end{bmatrix} \begin{bmatrix} SELIC_t \\ Ownrate_t \\ NewLoans_t \\ GDP_t \\ Unemployment_t \\ WageShare_t \end{bmatrix} \tag{5}$$

$$B_0 z_t = \begin{bmatrix} - & 0 & 0 & 0 & 0 \\ - & - & 0 & 0 & 0 \\ - & - & - & 0 & 0 \\ - & - & - & - & 0 \\ - & - & - & - & - \end{bmatrix} \begin{bmatrix} Nom.Wages_t \\ SELIC_t \\ Rent_t \\ CPI_t \\ WageShare_t \end{bmatrix} \tag{6}$$

In model 3 (see system of equations 5), following Barbieri Góes (2023), we assume

[9] To assess the robustness of our findings, we re-estimate model 1 replacing the original wage share series with an alternative measure constructed using the Denton-Cholette temporal disaggregation method (as described in Section 3.1). The results—included in B (see Figure 10)—confirm that our key findings remain qualitatively unchanged under this alternative specification. In addition, we re-estimate model 1 with an alternative identification scheme that reverses the ordering of the $SELIC$. This approach aligns with established empirical studies on monetary policy transmission mechanisms (see Castelnuovo and Surico, 2010, among others). The revised estimates—which permit contemporaneous responses of the benchmark interest rates to real wages, productivity, and the wage share are similar to those found in the original model estimations. The impulse response functions (IRFs) generated under this alternative ordering are presented in B (see Figure 11).

that new mortgage loans ($NewLoans$) follow movements in the nominal rate of interest (on mortgage loans -IR^M_t-) deflated using the monthly inflation rate of residential real estate collateral value ($\pi_{housing}$), determining contemporaneously higher or lower GDP levels while not depending on the current level of the latter, in accordance with demand-led growth models with semi-autonomous demand. Finally, $Unemployment$ and the $WageShare$ are contemporaneously affected by all other variables in the system, whereas they can affect them only with a delay.

In model 4, (see system of equations 6) we try to access the role of rent prices ($Rent$) in the emergence of the price puzzle assuming that rent prices contemporaneously affect the CPI since housing is considered within the consumer price index.

In models 5, 6 and 7 (see systems of equations 7, 8 and 9), we investigate the effect of monetary policy shocks on new mortgage loans also substituting it by new personal loans (see system of equations 8) and by new loans for durable goods consumption (see system of equations 9), following the discussion on credit and semi-autonomous demand in Avritzer and Barbieri Góes (2025).

$$B_0 z_t = \begin{bmatrix} - & 0 & 0 & 0 \\ - & - & 0 & 0 \\ - & - & - & 0 \\ - & - & - & - \end{bmatrix} \begin{bmatrix} SELIC_t \\ New(Mortgage)Loans_t \\ GDP_t \\ WageShare_t \end{bmatrix} \tag{7}$$

$$B_0 z_t = \begin{bmatrix} - & 0 & 0 & 0 \\ - & - & 0 & 0 \\ - & - & - & 0 \\ - & - & - & - \end{bmatrix} \begin{bmatrix} SELIC_t \\ New(Personal)Loans_t \\ GDP_t \\ WageShare_t \end{bmatrix} \tag{8}$$

$$B_0 z_t = \begin{bmatrix} - & 0 & 0 & 0 \\ - & - & 0 & 0 \\ - & - & - & 0 \\ - & - & - & - \end{bmatrix} \begin{bmatrix} SELIC_t \\ New(DurableGoods)Loans_t \\ GDP_t \\ WageShare_t \end{bmatrix} \tag{9}$$

Following the estimation of the SVAR models, the dynamic effects of monetary policy shocks are analyzed through IRFs normalized to represent a one percentage point innovation in the policy rate (SELIC). These IRFs trace the responses of key macroeconomic variables to a contractionary monetary policy shock. The responses are computed over a 12-month horizon, obtained via a moving block bootstrap procedure with 1000 replications.[10]

[10] Supplementary estimations for model 2 implement regime-dependent specifications by partitioning the sample into low and high interest rate environments (see Figure 2 in Section 2). This approach follows the threshold VAR literature to test for nonlinearities in monetary policy transmission.

4 Results

The empirical findings of Models 1, 2, 3, 4, 5, 6, and 7 are reported in this Section, drawing particular attention to the analysis of IRFs. Figures (3, 4, 5, 6, 7, 8, and 9) display elasticities of considered variables to a 1 percentage point monetary policy shock in the benchmark rate ($SELIC$) in Brazil.

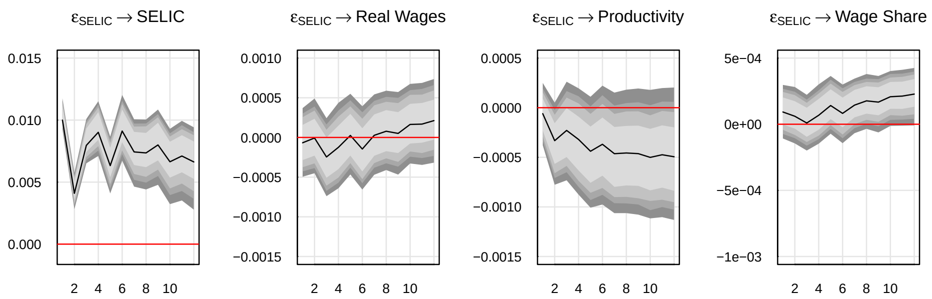
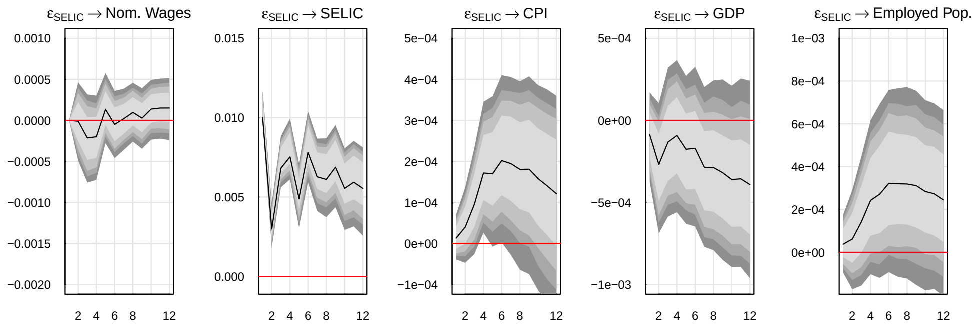
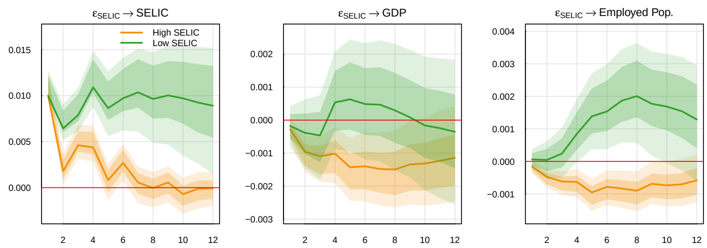


Figure 3: **Impulse Response Functions (IRFs), Model 1:** Figures display IRFs of SELIC, Real Wages, Productivity, and Wage Share to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

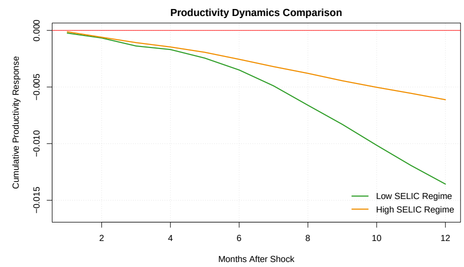
The IRFs presented in Figure (3) show the dynamic effects of a SELIC (monetary policy) shock on real wages, productivity, and wage share in Brazil. Following a SELIC hike, the third panel indicates a persistent and statistically significant (at the 84% level) negative effect on productivity, while the fourth panel demonstrates an increase in the wage share, reflecting the dominance of the productivity decline over the real wage effect after a monetary policy shock. Given this initial result, we move on to further breakdown productivity into output (GDP) and total employed labor ($EmployedPop.$) and real wages into nominal wages ($Nom.Wages$) and prices (CPI) also splitting these into two different scenarios (i.e. low and high $SELIC$ environments). The result is presented in Figure (4) below.



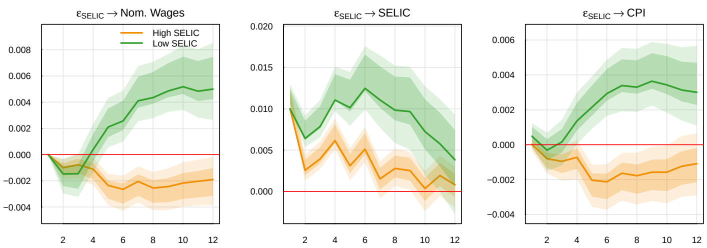
(a) Full sample



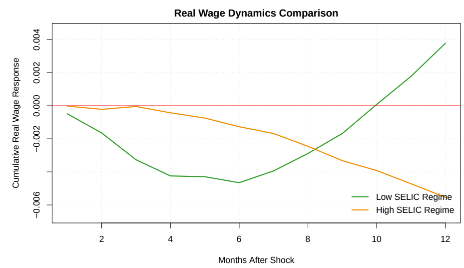
(b) (Productivity Breakdown)



(c) (Productivity Effect)



(d) (Real Wage Breakdown)



(e) (Real Wage Effect)

Figure 4: **Impulse Response Functions (IRFs), Model 2:** Figures display IRFs of SELIC, Nominal Wages, CPI, GDP, and Employed Population to monetary policy (SELIC) shocks. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs). Panels (4b)-(4d) further decompose productivity and real wages into their respective components. Results are presented for two regimes: low interest rate (green) and high interest rate (yellow). Shaded green and yellow areas denote 90% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

In the full sample (Figure 4a), a SELIC hike generates an unclear response in nominal wages ($Nom.Wages$) and positive and statistically significant effect (at the 90% level) on the price level (CPI) lasting for the first seven months after the shock, consistent with the cost-push channel described in Section (2). Output (GDP) declines (statistically significant effect at the 68% level from the 6th until the 12th month after the shock), whereas employed population ($EmployedPop.$) seems to increase (statistically significant effect at the 84% level from the 5th until the 9th month after the shock). To better understand the effects on real wages and labor productivity, we split our estimations into low and high SELIC environments (see Figures 4b, 4c, 4d and 4e).[11] In particular, when

[11] To avoid loosing too many observations splitting the sample below and above the median of $SELIC$ in the period, we divide our estimations in two separate models, whereas in the first model we assess the effect of a $SELIC$ hike on labor productivity (see Figures 4b and 4c), in the second we estimate the effect of a rate hike on real wages (see Figures 4d and 4e).

analyzing the effect of a positive monetary policy shock on output and employment (see Figures 4b and 4c), we can see that whereas in a low interest rate scenario the response of GDP is not statistically significant and employed population temporarily increases (from the 4th until the 10th month after the shock), in a high interest rate scenario the response of both output and employment are negative and (highly) persistent(statistically significant at the 90% level from the 1st until the 9th month after the shock) with output decreasing more than the employed population (see Figure 4c). When analyzing the effect of a monetary policy shock on nominal wages ($Nom.Wages$) and the level of prices (CPI), we can see that, in a low interest rate scenario, both nominal wages and the CPI show a positive and persistent response (statistically significant from the 1st until the 12th month after the shock at the 90% level), with the latter increasing more than nominal wages until the 10th month after the shock (see Figure 4e). Conversely, in a high $SELIC$ scenario, the CPI and nominal wage responses are negative and persistent (statistically significant at the 90% level from the 1st until the 10th and the 12th months after the shock, respectively), with nominal wages falling more than prices (see Figure 4e). These findings point to a non-linear transmission of monetary policy, with significantly more adverse effects on output, employment, and on nominal and real wages in high-interest rate scenarios. These findings, are in line with Queiroz Ferreira and de Mattos (2022) given that the emergence of the price puzzle is conditioned to low SELIC scenarios, on the contrary, when the SELIC is already high, a monetary policy shock is followed by a reduction in prices. This empirical result empirical can also be explained by Cynamon et al.'s 2013 and Kriesler and Lavoie's 2007 argument that the intended effect of contractionary monetary policy in reducing prices will only take place as a result of severe economic pain.

4.1 Credit financing results

We now turn to the actual incorporation of the households' credit channels in our investigation of the relationship between monetary policy and income distribution. In this analysis, we will focus exclusively on three types of credit: i) Home financing; ii) personal loans; iii) durable goods financing (e.g.: auto-loans). We chose to to examine only these three categories because, as discussed in a recent report from Centro Internacional Celso Furtado de Políticas para o Desenvolvimento (2025), these three categories of household credit have been identified as the most autonomous forms of credit, whereas others (such as credit cards) are more strongly determined by household income.

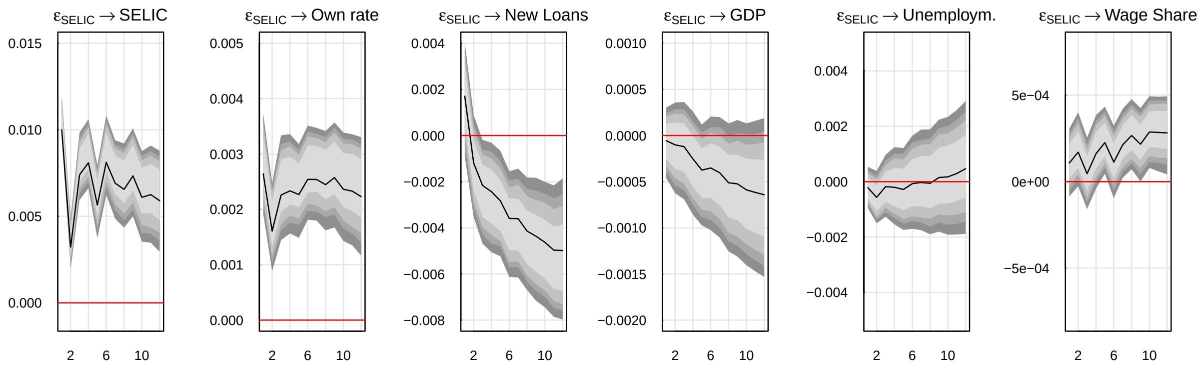


Figure 5: **Impulse Response Functions (IRFs), Model 3:** Figures display IRFs of SELIC, Own rate of interest, New Mortgage Loans, GDP, Unemployment, and Wage Share to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

In model 3 (Figure 5), a positive SELIC shock, leads to a significant and persistent rise in the own rate of interest, this is accompanied by a decline in new mortgage lending and GDP. While we do not observe any statistically significant effects on unemployment, the wage share increases—albeit by a very small magnitude. In fact, this overall effect on functional income distribution represented by this modest rise in the wage share (starting only in the 7th month after the shock) is likely driven by the GDP contraction.

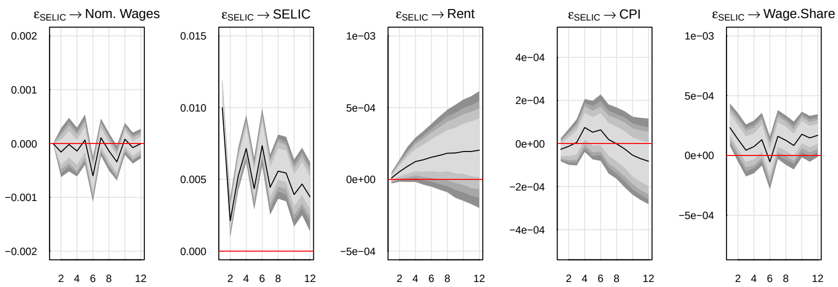


Figure 6: **Impulse Response Functions (IRFs), Model 4:** Figures display IRFs of Nominal Wages, SELIC, Rent, CPI, and Wage Share to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

In model 4 (Figure 6) a SELIC shock leads to modest and short-lived increase in the consumer price index (CPI) referred to as the "price puzzle". The IRFs also show that rent prices respond positively to a SELIC shock, increasing in the first eight months (statistically significant at the 84% level) following the policy change. This pattern is consistent with the findings of Dias and Duarte (2019) and Barbieri Góes (2023) for the US, who shows that rent dynamics can drive a temporary increase in measured inflation, which explains at least part of the emergence of a price puzzle. The likely mechanism is that higher interest rates raise the cost of financing home purchases, increasing demand in the rental market and thus pushing up rental prices and/or the re-alignment of returns from house property to the return from other types of financial and real investment.

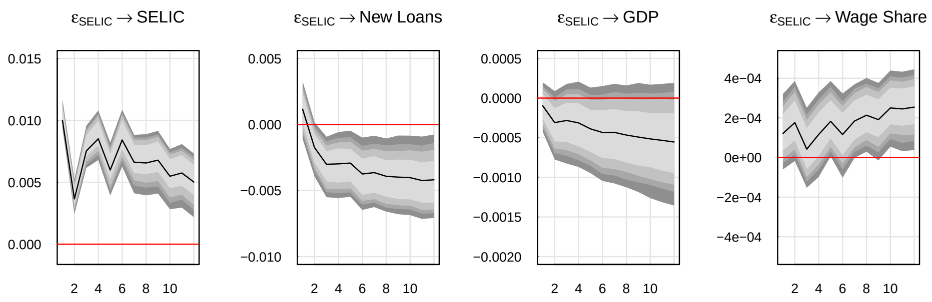


Figure 7: **Impulse Response Functions (IRFs), Model 5:** Figures display IRFs of SELIC, New Mortgage Loans, GDP, and Wage Share to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

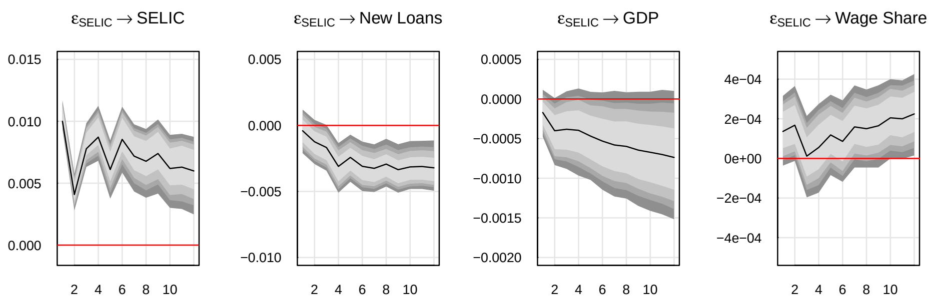


Figure 8: **Impulse Response Functions (IRFs), Model 6:** Figures display IRFs of SELIC, New Personal Loans, GDP, and Wage Share to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

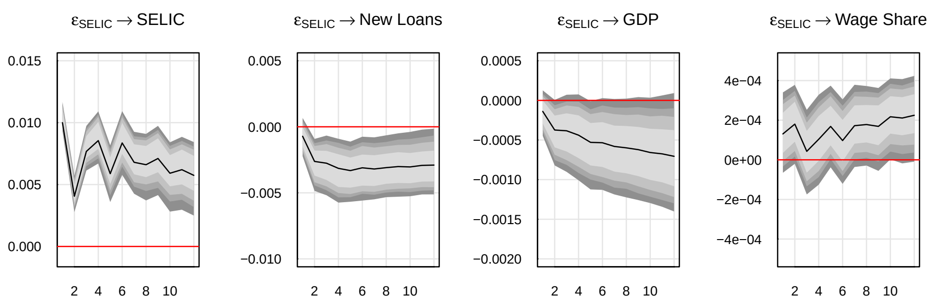


Figure 9: **Impulse Response Functions (IRFs), Model 7:** Figures display IRFs of SELIC, New Loans for Durable Goods Consumption, GDP, and Wage Share to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

Finally, we estimate models 5, 6 and 7 to separately assess the effect of a monetary policy shock on three different household credit variables (namely, new mortgage loans, new personal credit loans, and new loans for durable goods consumption). As shown in Figures (7, 8, and 9), SELIC shocks similarly affects mortgage loans, personal loans, and durable goods financing, with the earlier being slightly more negatively affected. In fact, the negative effect on household credit also leads to a negative response in output, which contributes to the observed increase in the wage-share through the labor productivity channel.

5 Conclusion

This study provides comprehensive evidence on the complex relationship between monetary policy and functional income distribution in Brazil, revealing that there is no mechanical relationship between monetary policy and the wage share. Instead, our findings demonstrate that the effects are highly context-dependent and operate through multiple interconnected channels.

Our analysis reveals significant non-linear transmission effects of monetary policy across different interest rate environments. High-SELIC regimes results in strong adverse economic effects, generating GDP and employed population contractions. However, this is also the scenario in which contractionary monetary policy obtains its intended result of price reduction. Meanwhile, in low-SELIC scenarios contractionary monetary policy seems to have the opposite effect on prices, and even on employed population. This asymmetric transmission mechanism has important implications for policy design, suggesting that the same monetary policy action can have dramatically different economic consequences depending on the prevailing interest rate level. It also provides further evidence for the price puzzle, as well as the Post-Keyneisan argument (Cynamon et al. (2013) and Kriesler and Lavoie (2007)) of the high economic cost that is necessary for monetary policy to achieve is intended outcome.

The distribution channel emerges as a particularly robust finding across all model specifications. We document a persistent, yet very small, increase in the wage share following contractionary monetary policy shocks, with effects materializing approximately six months after the initial policy action. This increase is primarily driven by larger productivity drops relative to transitory real wage declines.

Our investigation of credit-market mechanisms reveals a unified credit channel affecting multiple types of household borrowing. Mortgage loans, personal loans, and durable goods financing all respond negatively to SELIC rate increases, demonstrating the broad-based nature of credit transmission. Additionally, we identify a rent inflation channel that explains part of the observed price puzzle through two mechanisms: substitution from ownership to rental markets as financing costs increase, and asset return rebalancing as investors seek to align returns across different asset classes. This rent channel provides new insights into the inflationary consequences of monetary tightening, particularly relevant for inflation targeting frameworks.

These results align with recent Post-Keynesian critiques of monetary neutrality while providing novel empirical evidence from an emerging market context. The findings complement work by Di Bucchianico and Lofaro (2023) and Barbieri Góes (2023) by demonstrating that monetary policy effects on distribution operate through specific channels that vary in intensity depending on economic conditions.

The Brazilian case illustrates three key mechanisms through which monetary policy affects income distribution: transitory real wage effects that dissipate over time, credit-rent channels that create persistent adjustments in housing and credit markets, and regime-dependence that amplifies or dampens these effects depending on the interest rate environment.

Acknowledgments

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A Data Sources

Acronyms	**Description**	**Source**
$SELIC$	Brazil's benchmark interest rate set by the Central Bank Monthly Data	BACEN (Brazilian Central Bank)
$Nom.Wages$	Nominal Wages Monthly Data	PNAD (National Household Sample Survey)[b] PME (Monthly Employment Survey)
$EmployedPop.$	Employed Population in number of people, Seasonally Adjusted, Monthly Data [c]	PNAD (National Household Sample Survey)[b] PME (Monthly Employment Survey)
$Unemployment$	Rate of unemployment Rate, Seasonally Adjusted, Monthly Data [c]	PNAD (National Household Sample Survey)[b] PME (Monthly Employment Survey)
CPI	Broad National Consumer Price Index (*Índice Nacional de Preços ao Consumidor Amplo* - IPCA) Index, Seasonally Adjusted, Monthly Data	BACEN (Brazilian Central Bank)
GDP	Gross Domestic Product in of Reais, Seasonally Adjusted, Monthly Data [a]	BACEN (Brazilian Central Bank)
$New(Housing)Loans$	Billions of Reais, Seasonally Adjusted, Monthly Data [a]	BACEN (Brazilian Central Bank)
$New(Personal)Loans$	Billions of Reais, Seasonally Adjusted, Monthly Data [a]	BACEN (Brazilian Central Bank)
$New(DurableGoods)Loans$	Billions of Reais, Seasonally Adjusted, Monthly Data [a]	BACEN (Brazilian Central Bank)
$Nominalinterestrate_{New(Housing)Loans}$	Seasonally adjusted, Monthly Data	BACEN (Brazilian Central Bank)
$IVG-R$	Guarantee Value Index for Financed Residential Real Estate Seasonally adjusted, Monthly Data	BACEN (Brazilian Central Bank)
$Rent$	FIPE-Zap Rental Index Seasonally adjusted, Monthly Data	FIPE (Economic Research Institute Foundation)
$Productivity$	Labor Productivity Seasonally Adjusted, Monthly Data	Author's calculation: $(Productivity = \frac{GDP}{EmployedPop.})$
$RealWages$	Real Wages Seasonally Adjusted, Monthly Data	Author's calculation: $(RealWages = \frac{Nom.Wages}{CPI} * 100)$
$WageShare$	Real Wages Seasonally Adjusted, Monthly Data	Author's calculation: $(WageShare = \frac{Nom.Wages * EmployedPopulation}{GDP} * 100)$
$Ownrate$	Own rate of interest Seasonally adjusted, Monthly Data	Author's calculation: $(Ownrate = \frac{1+Nominalinterestrate_{New(Housing)Loans}}{1+Monthlyinflationrate_{IVG-R}} - 1)$

[a]Deflated using the Implicit Price Deflator for Gross Private Residential Domestic Investment, Seasonally Adjusted,
[b]Monthly data was produced from the microdata available in the quarterly survey of PNAD Continua, using the methodology described in Hecksher (2020).

Table 1: Variables used in the Empirical Model presented in Section (4): Acronyms, Descriptions and Data Sources

B Robustness

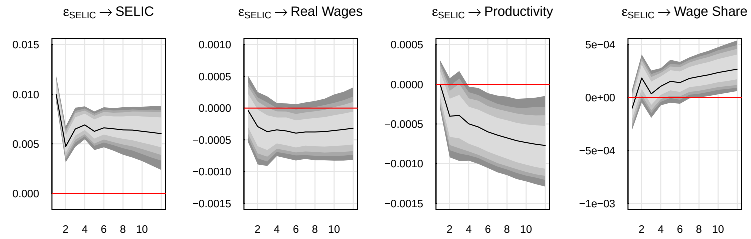

Figure 10: **Impulse Response Functions (IRFs), Model 1 (Alternative Measure for the Wage Share):** Figures display IRFs of SELIC, Real Wages, Productivity, and Wage Share to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).

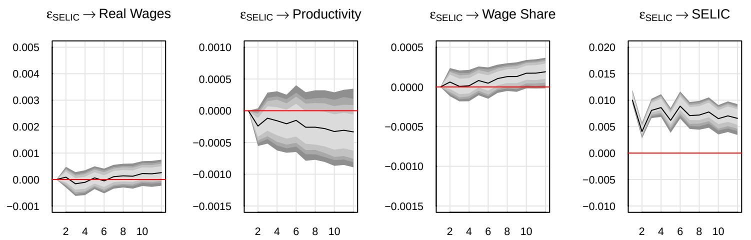

Figure 11: **Impulse Response Functions (IRFs), Model 1 (Alternative Ordering - Taylor Rule):** Figures display IRFs of Real Wages, Productivity, Wage Share, and SELIC to monetary policy (SELIC) shocks. Quarters on x-axis. Shaded grey areas denote 95%, 90%, 84% and 68% confidence bands calculated through m.b. bootstrapping (1000 runs).