

Monetary-Fiscal Regimes, Fiscal Financing, and Redistribution

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October 7, 2026

Abstract

This paper studies the monetary-fiscal trade-off between stabilising inflation and managing public debt in a unified framework with heterogeneous agents, real public debt, and money. Estimation on U.S. data (1966-2024) supports an Active Monetary-Passive Fiscal configuration, which we use as a baseline for counterfactual analysis. This regime is compared to a money-financed configuration implemented by replacing the Taylor rule with a debt-stabilisation condition, capturing the limiting case of passive monetary policy. We show that the financing of fiscal expansions affects redistribution: debt-financed expansions reduce borrowers' consumption, while seigniorage-based financing reverses this pattern through inflation-driven valuation effects.

Keywords: Monetary–fiscal regime; Seigniorage and money financing; Real public debt; Inflation-target shocks; Redistribution; Collateral constraints; Monetary policy transmission.

JEL codes: E52, E62, E63, E31, E41, D31, E44.

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[†]eCampus University, giulia.rivolta@uniecampus.it The authors are particularly grateful to Leonardo Melosi for valuable insights. The authors also thank Roberto Billi, Oliver Bush, Jordi Gali, Richard Harrison, Jamie Lenney, Tommaso Monacelli, Matthew Waldron and Tim Willems as well as participants to the Second Annual Czech National Bank Conference and the Liverpool and CEPR Workshop on Macroeconomics for useful comments. The views expressed are those of the authors and do not necessarily reflect those of the Bank of England.

1 Introduction

Monetary and fiscal authorities jointly determine the path of inflation and public debt. A central question is how the policy mix allocates the burden of adjustment following fiscal disturbances: does stabilisation occur primarily through policy rates and fiscal instruments (taxes and debt management), or through price-level adjustments and monetary financing (via inflation and seigniorage)? In the terminology of Leeper (1991), this corresponds to the distinction between active and passive policies, that is, which authority adjusts its instrument to ensure equilibrium, as defined by the model's optimality conditions and budget constraints. This choice governs not only macroeconomic stability, but also the distributional consequences of policy when money, debt, and heterogeneous balance sheets interact.

This paper re-examines the monetary-fiscal trade-off within a unified framework that nests the canonical regimes of Leeper (1991), namely Active Monetary-Passive Fiscal (AM-PF), where monetary policy stabilises inflation and fiscal policy stabilises debt, and Passive Monetary-Active Fiscal (PM-AF), where fiscal policy drives debt dynamics and monetary policy accommodates inflation. We show how these regimes can be embedded within a single monetary-fiscal structure, together with money-financed fiscal expansions in the spirit of Galí (2020), which we interpret as a limiting configuration in which the standard interest-rate rule is replaced by a debt-stabilisation condition. The presence or absence of an operative interest-rate rule, the strength of fiscal feedback to debt, and the role of money jointly determine whether fiscal expansions are financed through debt, taxes, seigniorage, or a combination thereof.

The key mechanism can be summarised as follows. In this class of models, equilibrium hinges on how the government's intertemporal budget constraint is closed: either (i) fiscal instruments adjust to stabilise real debt at given prices, or (ii) the price level adjusts so that the real value of nominal liabilities is consistent with fiscal plans. Leeper's determinacy taxonomy formalises this distinction in terms of feedback rules: an "active" monetary authority raises the policy rate sufficiently in response to inflation, while a "passive" fiscal authority adjusts primary surpluses to

stabilise debt. When fiscal adjustment is weak (active fiscal), the price level must instead perform the stabilisation role. In this context, money-financed fiscal expansions can be interpreted as a limiting case in which monetary policy no longer operates through an interest-rate rule and financing shifts toward seigniorage and price-level adjustments.

Our contributions are twofold. First, we provide a unified mapping between money-financed fiscal expansions and the determinacy taxonomy. We show how seigniorage-based financing logic can be embedded in a Leeper-style framework and clarify the policy-rule configurations that reproduce the canonical regimes. Second, we quantify how alternative regimes and financing mixes redistribute across heterogeneous balance sheets. We discipline the analysis using an estimated medium-scale DSGE model and use the empirically supported AM-PF configuration as a baseline to conduct controlled counterfactuals in which only the policy rules are modified. This approach isolates the role of monetary-fiscal interaction and financing choices, holding constant the underlying transmission mechanisms and heterogeneity.

A central insight of the paper is that the effects of fiscal expansions depend not only on their size, but on how they are financed. Whether expansions are accommodated through higher real interest rates, rising public debt, or seigniorage crucially shapes redistribution between borrowers and savers. When money enters household preferences as a store of value, movements in inflation and the valuation of nominal assets become key channels of redistribution. As a result, debt-financed and money-financed fiscal expansions generate fundamentally different distributional outcomes, even when their aggregate effects are similar.

Redistribution arises through two main channels. First, the standard lending channel operates through interest rates, borrowing constraints, and housing collateral, affecting borrowers more than savers. Second, when money is valued as a store of value, inflation alters the real value of nominal assets and liabilities, redistributing wealth between savers and borrowers. In this environment, inflation reduces the real burden of debt and benefits borrowers, while monetary tightening increases borrowing costs and depresses their consumption. The progressivity or regressivity of policy therefore depends on the interaction between monetary responses and fiscal

financing.

To quantify these mechanisms, we extend the Iacoviello and Neri (2010) two-agent New Keynesian framework to incorporate a fiscal authority, real public debt, and preferences for real money balances. The model features patient (lender) and impatient (borrower) households, with housing serving as the primary collateral asset. This structure captures the joint dynamics of money, debt, inflation, and asset prices, while preserving tractability. Importantly, the model allows for shocks to the central bank’s inflation target, which we interpret as temporary changes in inflation tolerance within a given regime, rather than structural regime shifts.

Our empirical strategy estimates the model on U.S. data from 1966 to 2024. The estimation supports an AM-PF configuration as the empirically relevant benchmark, characterised by a strong monetary response to inflation and a fiscal behaviour consistent with debt stabilisation. We use this configuration as a baseline for counterfactual analysis. Alternative regimes, including PM-AF and money-financed configurations, are implemented as changes in policy rules rather than as locally nested parameter variations. This distinction is important: the estimated steady state and parameterisation are disciplined by the data and support the AM-PF regime, so alternative configurations are best interpreted as distinct policy regimes rather than perturbations around the baseline.

Three main findings emerge. First, money plays a central role in shaping both the financing of fiscal expansions and their transmission. Under AM-PF, fiscal shocks increase real public debt and reduce borrowers’ consumption by more than that of savers. Under configurations in which monetary policy accommodates fiscal expansions or debt is stabilised through seigniorage, the adjustment occurs through inflation, reversing the redistribution pattern in favour of borrowers. Second, shocks to the inflation target, interpreted as changes in the central bank’s tolerance for inflation within a given regime, play a significant empirical role in driving both debt dynamics and consumption dispersion. Third, monetary policy affects redistribution not only through borrowing costs, but also through valuation effects on nominal assets. Ignoring the store-of-value role of money therefore misses an important channel through which policy affects inequality.

By combining a unified theoretical framework with an empirically disciplined model, this paper provides new evidence on how monetary-fiscal interactions shape both macroeconomic outcomes and redistribution. Our results show that policies that are equivalent in aggregate terms can have markedly different distributional consequences depending on how fiscal expansions are financed and how monetary policy responds. This highlights the importance of modelling money explicitly and of adopting an integrated perspective on monetary-fiscal policy that accounts for both stabilisation and distributional objectives.

2 Active Money-Financed Fiscal Policies

In this section, we provide a clear comparison between three policy regimes: (i) the money-financed fiscal stimulus proposed by Galí (2020), in which stabilizing real public debt replaces the traditional interest rate rule; (ii) the passive monetary-active fiscal regime described by Leeper (1991); and (iii) the standard active monetary-passive fiscal regime. We clarify the distinct mechanisms of each approach to monetary and fiscal coordination. This analysis allows us to develop a unified framework encompassing classic and recent approaches to evaluate the role of money in the economy.

In this Section, we present Leeper’s economic environment in its original static formulation, where variables such as government purchases and endowments are not time-indexed and remain constant. This setup serves as a benchmark for our subsequent analysis. When we examine the effects of a fiscal expansion in Section 2.5, we allow only those variables that are already dynamic in Leeper’s framework to adjust in response to the shock. The exercise is thus restricted to nominal adjustments within the government budget constraint, with no impact on real economic variables. This distinction ensures consistency to the original structure, focusing exclusively on nominal responses.

2.1 Leeper's Economic Environment

A representative infinitely-lived consumer receives an endowment of y units of the consumption good each period. The government extracts $g < y$ ¹ units of the good for government purchases that yield no utility to consumers.

Fiat currency earns no interest and real balances provide consumers with utility separably from consumption. Real balances, m_t , are the ratio of nominal balances, M_t , and the price level, p_t . Private agents may also save one-period nominal government debt, B_t , which has real value $b_t = B_t/p_t$ and earns interest at the risk-free gross nominal rate R_t .

The consumer discounts utility at rate $\beta \in (0, 1)$, pays t_t units of the consumption good in direct lump-sum taxes each period, and chooses the decision vector (c_t, m_t, b_t) to solve:

$$\max E_0 \sum_{t=0}^{\infty} \beta^t [\log(c_t) + \log(m_t)] \quad (1)$$

subject to:

$$c_t + M_t/p_t + B_t/p_t + t_t = y_t + M_{t-1}/p_t + R_{t-1}B_{t-1}/p_t \quad (2)$$

The consumer takes the inherited variables from period -1 and the stochastic processes $\{y_t, t_t, R_t, p_t\}_{t=0}^{\infty}$ as given. To solve their optimization problem, individuals must forecast future endowments, prices, interest rates and taxes. We assume they know the probability distributions.

The equilibrium real interest rate is constant. Let the gross rate of inflation be $\pi_t = p_t/p_{t-1}$. After imposing the feasibility condition $c_t = y - g$,² the first-order necessary conditions for the consumer reduce to the Fisher and money-demand

¹As in Leeper (1991), a representative infinitely-lived consumer receives a constant endowment of y units of the consumption good each period. The government extracts $g < y$ units of the good for government purchases that yield no utility to consumers.

²For this reason, we do not incorporate redistributive dynamics in this Section. Since aggregate consumption is treated as exogenous and households are not assumed to optimize their consumption decisions, the redistributive effects across the three regimes become indistinguishable. Here, our focus is exclusively on assessing the overall impact of a fiscal shock under three different regimes.

relations:

$$1/R_t = \beta E_t \left[1/\pi_{t+1} \right] \quad (3)$$

$$m_t = c \left(\frac{R_t}{R_t - 1} \right) \quad (4)$$

plus (2). The conditional expectation in (3) is taken with respect to an information set containing all current and past individual and aggregate variables. Besides satisfying conditions (2)-(4) and feasibility, an optimal solution must satisfy transversality conditions for real balances and real debt.

The government uses direct lump-sum taxes, money creation, and debt to finance the constant level of purchases each period subject to the following budget constraint, given the inherited variables:

$$B_t/p_t + M_t/p_t + t_t = g + M_{t-1}/p_t + R_{t-1}B_{t-1}/p_t \quad (5)$$

The monetary authority sets the nominal interest rate as a function of current inflation:

$$R_t = r_\pi \pi_t \quad (6)$$

while the fiscal authority adjusts direct lump-sum taxes in response to the level of real government debt outstanding:

$$t_t = \gamma b_{t-1} \quad (7)$$

Finally, unlike Leeper, we do not consider error terms, as they are not relevant for the purposes of our analysis.

2.2 Passive Monetary and Active Fiscal Policy Regime

Leeper defines the passive monetary and active fiscal region as the case in which $|r_\pi \beta| < 1$ and $|\beta^{-1} - \gamma| > 1$.

In this regime, monetary policy responds weakly to inflation ($|r_\pi\beta| < 1$), and taxes respond weakly to government debt ($|\beta^{-1} - \gamma| > 1$).³

Because direct taxes do not adjust to rising debt, any increase in real debt must eventually be financed through higher money creation. If future money creation is expected to finance a current fiscal expansion, nominal interest rates would typically need to rise to persuade households to absorb the additional government liabilities. However, when $r_\pi = 0$, the central bank prevents rates from increasing by expanding the money supply immediately and generating enough revenue from the inflation tax to balance the budget.

2.3 The Galí (2020) Money-Financed Fiscal Stimulus

Recently, Galí (2020) introduced the money-financed regime by replacing Equation (6) with the condition $b_t = 0$. In this regime, the monetary authority adjusts seigniorage, defined as $\Delta M/p_t = M_t/p_t - M_{t-1}/p_t$, in each period to ensure that real government debt remains constant.

This assumption, when combined with Equation (7), implies that under the money-financed regime, taxes do not need to adjust in response to an increase in government spending, neither in the short run nor in the long run, relative to their initial level. In other words, fiscal expansions can be accommodated without raising taxes or issuing additional debt.

However, this comes at the cost of monetary policy autonomy: monetary policy has to give up control of the nominal interest rate in order to meet the government's financing needs through money creation.

³Leeper revisits, in this context, the policies studied by Woodford (1994): pegged nominal interest rates and exogenous direct taxes. Leeper interprets a 'pegged' interest rate as arising when $r_\pi = 0$, so that nominal interest rates are exogenous. Although the term "pegged" is commonly understood to mean that the nominal interest rate remains unchanged over time, what is technically required in this regime is not a strict peg but rather an insufficient response to fiscal spending shocks - specifically, a failure to satisfy the Taylor principle. Setting $r_\pi = 0$ ensures that interest rates do not respond to fiscal disturbances but, more broadly, the regime encompasses cases where the central bank's response to inflation is too weak to stabilise the price level in the face of fiscal expansion. Thus, the defining feature is under-response to fiscal shocks, rather than absolute constancy of the nominal rate.

2.4 The MF-PM-AF Equation

Galí (2020) defines the money-financed regime as the case in which an increase in government purchases is fully absorbed through seigniorage, $g_t = \Delta M/p_t$. Incorporating this condition into the government budget constraint yields the following law of motion for real debt:

$$b_t = (R_{t-1}/\pi_t - \gamma)b_{t-1} \quad (8)$$

This reveals that Leeper’s framework serves as a general model, within which both Galí (2020) and Leeper explore distinct and particular cases. Galí focuses on the case where real debt remains constant over time, $b_t = 0$ for all t , thereby enforcing Equation (8) through a permanent constraint on real public debt. In contrast, Leeper and the subsequent literature concentrate on the dynamics captured by the term inside the parentheses. Specifically, the expression R_{t-1}/π_t corresponds to the “fiscal” root in Leeper’s model, which equals β^{-1} under the assumption of constant consumption. According to Leeper, fiscal policy is classified as active when the absolute value of the term in parentheses exceeds one.

Galí’s approach stands in contrast to Leeper’s by imposing a constant real debt condition, which inherently precludes the amplification mechanisms found in Leeper’s active fiscal scenarios. Notably, if Equation (8) is satisfied, it does not necessarily follow that the nominal money supply must adjust upward in response to increased government spending. Instead, this adjustment can be realized entirely, or in part, through variations in the price level. This interpretation aligns not only with Leeper’s analysis but also with related literature, such as the dominant fiscal regime described in Sargent and Wallace (1981) and Aiyagari and Gertler (1985)’s non-Ricardian regime.

What role does Leeper’s passive monetary policy condition, $|r_\pi\beta| < 1$, play within the MF regime of Galí (2020)? As discussed previously, this parameter restriction is rendered moot in Galí’s setting due to the absence of an explicit interest rate rule. Within Galí’s framework, the real public debt constraint takes the place of the monetary policy rule, effectively consolidating Leeper’s two separate requirements,

one for fiscal policy and one for monetary policy, into a single condition concerning real debt.

Yet, the AF-PM regime in Leeper’s framework remains conceptually compatible with Galí’s MF regime. Both models feature active fiscal policy. With regard to monetary policy, although Galí does not specify an interest rate rule, this omission serves a functionally equivalent purpose: it mirrors Leeper’s passive monetary policy scenario, in which the policy rate does not respond to inflation. In this sense, the MF regime can be interpreted as limiting configuration of the PM-AF region, although in quantitative applications it is most naturally implemented via a modification of the policy rule rather than as a parameter limit. Thus, in both frameworks, monetary policy refrains from actively offsetting fiscal dynamics, underscoring a shared foundation between the two theoretical approaches.

We now use this unified framework to illustrate, within Leeper’s original static environment, how a fiscal expansion is financed across regimes when only nominal variables are allowed to adjust. This ”toy” exercise provides clean intuition for the financing mix (debt, taxes, and seigniorage) before we move to the full estimated DSGE model in Section 3, where fiscal expansions affect real activity and redistribution.

2.5 Evidence from a Simple Model

To clarify the distinctions between Leeper (1991) and Galí (2020), we illustrate the effects of a 1% increase in government expenditure using the model described above.

Figure 1 illustrates the effects of a 1% increase in government spending under three different policy regimes: (i) Active monetary–passive fiscal policy (AM–PF), represented by the solid blue line, with $r_\pi = 1.06$ and $\gamma = 0.02$, satisfying the conditions $|r_\pi\beta| > 1$ and $|\beta^{-1} - \gamma| < 1$ as in Leeper (1991); (ii) Passive monetary–active fiscal policy (PM–AF), shown by the dotted green line, with $r_\pi = 1$ and $\gamma = 0.005$, such that $|r_\pi\beta| < 1$ and $|\beta^{-1} - \gamma| > 1$;⁴ (iii) Money-financed fiscal stimulus (MFFS),

⁴A calibration of $r_\pi = 1$ places the economy exactly on the boundary of policy regimes. More conventional values for passive monetary policy are $r_\pi = 0$ or $r_\pi = 0.5$, as in Leeper and Leith (2016). However, setting $r_\pi = 0$ makes the PM-AF regime indistinguishable from the moneyfinanced

depicted by the dashed red line, where the standard interest rate rule is replaced by the condition $b_t = 0$ and $\gamma = 0.02$, following Galí (2020).

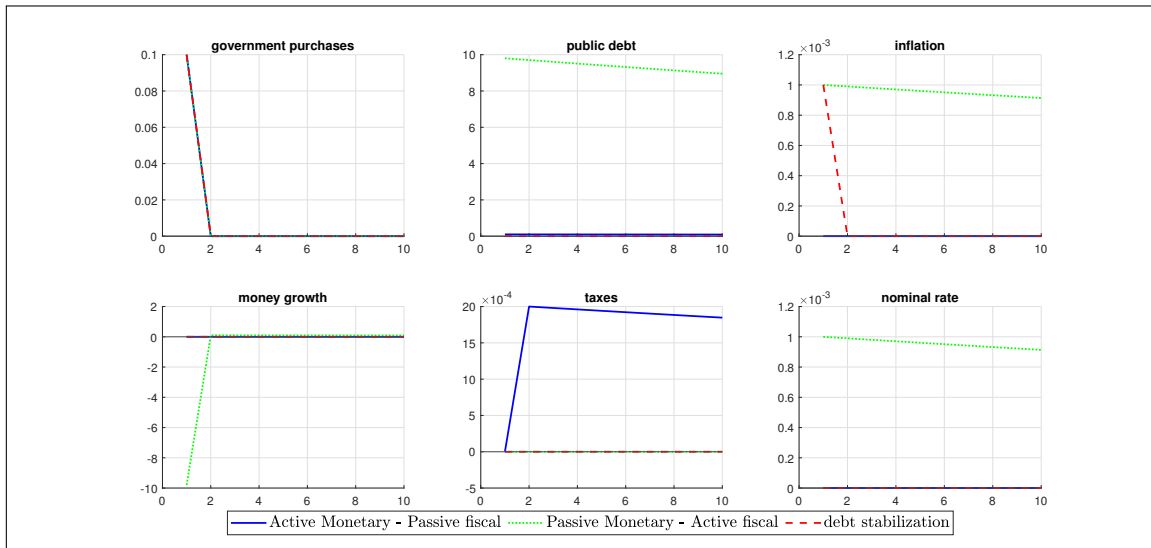


Figure 1: Impulse Response to a 1 % government expenditure increase

In the AM–PF regime,⁵ a 1% increase in government expenditure results in a 1% increase in public debt. The passive fiscal policy, with $\gamma = 0.02$, gradually reduces this debt over time. In this regime, the expansion has no impact on variables other than public debt and taxes.

In contrast, under the PM–AF regime, the same 1% increase in government spending results in a temporary 10% increase in public debt. This increase not only covers the fiscal expansion but also offsets a 10% initial decline in equilibrium money growth. The decline is driven by a modest rise in interest rates, due to a monetary policy that, while passive, still exists and responds, albeit weakly, to inflation.

Under Galí’s money-financed regime, public debt, and hence taxes, cannot increase by assumption. The stimulus must therefore be entirely financed through regime, since the interest rate rule no longer links nominal rates to inflation. To avoid this overlap, we adopt an intermediate calibration that sits between the absence of inflation targeting and an active inflation-targeting regime. We refer to this intermediate case as the PM-AF regime.

⁵This corresponds to the debt-financed fiscal stimulus regime in Galí (2020).

seigniorage, defined as the purchasing power of newly issued money. Seigniorage can be decomposed into two components: the change in purchasing power (i.e., inflation) and the real value of new money issued. As illustrated by the dashed red line, in this toy model, the seigniorage effect comes from inflation and from the increase in the nominal money supply.

In summary, when fiscal policy is active, the presence of an operative interest-rate rule (i.e. r_π as defined in (6)) limits the extent to which a fiscal expansion can be absorbed through seigniorage. The case $r_\pi = 0$ is a convenient knife-edge example of this logic: by shutting down the inflation feedback entirely, it collapses, within our static setup, the debt-financed PM-AF configuration into the money-financed benchmark. More generally, however, Leeper’s passive-monetary region encompasses the full set of parameter values satisfying $|r_\pi\beta| < 1$, not only $r_\pi = 0$. Conceptually, this region admits a continuum, as the relative contribution of debt and seigniorage depends on the strength of the monetary response to inflation. As discussed below, however, this continuum does not map into a set of locally implementable parameterisations in the estimated model, where alternative configurations correspond to distinct regime specifications.

The monetary-fiscal regimes described in this Section are operationalised explicitly in the estimated DSGE model presented in the following Section. Monetary policy follows a Taylor-type rule in which the response to inflation determines whether the regime is *active* or *passive*, while fiscal policy is governed by a debt-stabilisation rule that similarly distinguishes active from passive fiscal behaviour. These coefficients map directly into the determinacy regions characterised in Leeper (1991) and discussed above. In the estimated model, deviations from the inflation target are allowed, consistent with the theoretical discussion above, and the behaviour of taxes, transfers, and money creation jointly determine the fiscal stance. Importantly, however, the model considers a single, time-invariant policy specification, so that the posterior distribution of the policy parameters identifies one prevailing determinacy region for the entire sample (AM-PF in our baseline; see Section 4.2.1 for the posterior-based regime classification). The other regimes discussed in Section 2 enter the empirical analysis as *counterfactual* configurations: we implement them by

reparameterising the same policy rules and then recomputing model dynamics, rather than by estimating multiple regimes simultaneously via an explicit regime-switching specification.

3 A Quantitative Model

This section develops the quantitative laboratory used to operationalise the conceptual mapping in Section 2 and to quantify the distributional implications of alternative monetary-fiscal regimes. The modelling and estimation choices are therefore guided by a single objective: to discipline the baseline transmission mechanism (including housing collateral, nominal liabilities, and money demand) so that regime comparisons can be implemented as clean policy-rule re-parameterisations rather than as separate re-estimated models.

In this model, housing plays a dual role as both as a consumption good and the primary collateral asset against which borrowing occurs, making it the key channel through which monetary policy, inflation, and fiscal shocks redistribute between borrowers and savers. The main advantage of using the Iacoviello and Neri (2010) framework for our purposes is that, once augmented with real public debt and money preferences, it contains the key ingredients needed to study regime-dependent fiscal financing and redistribution in a relatively tractable medium-scale DSGE setting. We discuss this more extensively in the next section.⁶ In Appendix A, we summarize the equations describing the equilibrium of the model.

3.1 Why the Iacoviello and Neri (2010) Framework?

Our objective is to quantify how monetary policy, inflation targeting, and fiscal financing interact with households' balance sheets to generate redistribution. Because these effects operate through wealth, collateral, and liquidity channels, the model backbone must satisfy several requirements.

⁶Richer heterogeneous-agent models with idiosyncratic income risk may be more empirically plausible in some dimensions, but they are substantially more expensive to solve and would make estimation and counterfactual regime comparisons far less transparent.

First, it must feature explicit household heterogeneity and borrowing constraints. The Iacoviello and Neri (2010) setup provides a tractable TANK environment where impatient households face collateral constraints based on the market value of housing. This allows fiscal expansions, changes in inflation, and interest-rate movements to propagate asymmetrically across borrowers and savers, central for our redistributive focus.

Second, the model must incorporate an asset that empirically anchors household leverage dynamics. In the U.S., housing is the dominant collateral asset and a key driver of credit cycles. Incorporating a housing sector ensures that the model captures the empirically documented sensitivity of borrowing, debt accumulation, and consumption to housing prices. As monetary-fiscal regime changes shift inflation, real rates, and asset valuations, this collateral channel becomes the primary mechanism linking policy to distributional outcomes.

Third, the Iacoviello and Neri (2010) structure is particularly well-suited for integrating money and public debt. Because patient households hold both nominal bonds and money balances, introducing preferences for real balances and a fiscal authority with a debt rule is straightforward and preserves the internal logic of the framework. This produces a unified model in which public debt, seigniorage, and money demand jointly determine redistributive dynamics under different policy regimes.

Finally, the framework has been widely used and estimated in the literature and has been shown to replicate key macroeconomic and housing/credit moments, such as the co-movement of house prices, mortgage debt, and consumption, that are central to our mechanisms. This established track record provides an empirical benchmark for our extensions and supports the credibility of the estimated model and the counterfactual policy experiments that follow.

3.2 The Economic Structure

On the supply side, the model distinguishes between two sectors: housing and non-housing. The non-housing sector uses capital and labour to produce consumption goods and business capital, which serve both itself and the housing sector. The

housing sector constructs new homes by combining business capital, labour and land.

On the demand side, the model includes two household types: patient households (lenders) and impatient households (borrowers), each defined by distinct discount factors and collateral constraints linked to housing values. Patient households participate in the labour market, consume, and accumulate real assets such as housing, money balances, and public bonds. They also own the productive capital and supply funds to firms and impatient households. Impatient households, while also working and consuming, borrow subject to a binding housing collateral constraint and maintain only the minimum equity required for homeownership.

3.3 Integration of Fiscal Authority and Money

The Iacoviello and Neri (2010) framework is extended to incorporate a fiscal authority and money as follows:

1. *Households.* There is a continuum of measure 1 in both patient and impatient groups. The economic size of each group is measured by its wage share, which is assumed to be constant through a unit elasticity of substitution production function. Each representative household maximizes utility over consumption, housing, hours worked in both sectors, and real balances.

$$E_0 \sum_{t=0}^{\infty} (\beta G_C)^t z_t \left(\Gamma_c \ln(c_t - \varepsilon c_{t-1}) + j_t \ln h_t - \frac{\tau_t}{1+\eta} (n_{c,t}^{1+\xi} + n_{h,t}^{1+\xi})^{\frac{1+\eta}{1+\xi}} - \frac{1}{1+\sigma} \left(\bar{\chi} - \frac{m_t}{c_t} \right)^{1+\sigma} \right) \quad (9)$$

$$E_0 \sum_{t=0}^{\infty} (\beta' G_C)^t z_t \left(\Gamma'_c \ln(c'_t - \varepsilon' c'_{t-1}) + j_t \ln h'_t - \frac{\tau_t}{1+\eta'} ((n'_{c,t})^{1+\xi'} + (n'_{h,t})^{1+\xi'})^{\frac{1+\eta}{1+\xi}} - \frac{1}{1+\sigma} \left(\bar{\chi} - \frac{m'_t}{c'_t} \right)^{1+\sigma} \right) \quad (10)$$

Variables without (with) a prime refer to patient (impatient) households. c, h, n_c, n_h, m are consumption, housing, hours in the consumption sector, hours in the housing sector and holdings of real money balances. The discount factors are β and β' ($\beta' < \beta$). The terms z_t and τ_t capture shocks to intertemporal preferences and to labor supply, while j_t is a housing preference shock. The shocks evolve according to the following equations:

$$\ln z_t = \rho_z \ln z_{t-1} + u_{z,t}, \quad (11)$$

$$\ln \tau_t = \rho_\tau \ln \tau_{t-1} + u_{\tau,t}, \quad (12)$$

$$\ln j_t = (1 - \rho_j) \ln j + \rho_j \ln j_{t-1} + u_{j,t}, \quad (13)$$

where $u_{z,t}, u_{\tau,t}$ and $u_{j,t}$ are independently and identically distributed processes with variances $\sigma_z^2, \sigma_\tau^2$, and σ_j^2 . Above, ε measures habits in consumption, and G_C is the growth rate of consumption in the balanced growth path. The scaling factors $\Gamma_c = (G_C - \varepsilon)/(G_C - \beta_\varepsilon G_C)$ and $\Gamma'_c = (G_C - \varepsilon')/(G_C - \beta'_\varepsilon G_C)$ ensure that the marginal utilities of consumption are $1/c$ and $1/c'$ in the steady state.

The log-log specification of preferences for consumption and housing reconciles the trend in the relative housing prices and the stable nominal share of expenditures on household investment goods, as in Davis and Heathcote (2005) and Fisher (2007).

The specification of the disutility of labor ($\xi, \eta \geq 0$) follows Horvath (2000) and allows for less than perfect labor mobility across sectors. If ξ and ξ' equal zero, hours in the two sectors are perfect substitutes. Positive values of ξ and ξ' (as Horvath found) allow for some degree of sector specificity and imply that relative hours respond less to sectoral wage differentials.

Following English et al. (2017), the final term of the utility function implies that real balances, expressed as a ratio to consumption, are valued at the margin until reaching a stochastic bliss point of $\bar{\chi}$. The scaling factor is aggregate consumption of each type of agents, c and c' , which is taken as given by households; this formulation

implies that the consumption Euler equation does not depend on the level of real balances, consistent with most empirical analysis. As a result, the money-supply shock primarily shifts the exogenous path of money balances and affects money growth/real balances. However, given the additive separability and the scaling by consumption, it does not feed back into the core real allocations and price dynamics of the model.

Patient households accumulate capital, houses and money and extend loans to impatient households. They rent capital to firms, choose utilisation rates, and manage assets and liabilities, including public bonds and real balances.

$$\begin{aligned}
c_t + \frac{k_{c,t}}{A_{k,t}} + k_{h,t} + k_{b,t} + q_t h_t + p_{l,t} l_t + b_t + b_t^h + m_t = \\
\frac{w_{c,t} n_{c,t}}{X_{wc,t}} + \frac{w_{h,t} n_{h,t}}{X_{wh,t}} + \left(R_{c,t} z_{c,t} + \frac{1 - \delta_{kc}}{A_{k,t}} \right) k_{c,t-1} \\
+ (R_{h,t} z_{h,t} + 1 - \delta_{kh}) + p_{b,t} k_{b,t} + \frac{R_{t-1} b_{t-1}}{\pi_t} + \frac{R_{t-1} b_{t-1}^h}{\pi_t} \\
+ (p_{l,t} + R_{l,t}) l_{t-1} + q_t (1 - \delta_h) h_{t-1} + Div_t - \phi_t \\
+ \frac{a(z_{c,t}) k_{c,t-1}}{A_{k,t}} + a(z_{h,t}) k_{h,t-1} + \frac{m_{t-1}}{\pi_t} - t_t
\end{aligned} \tag{14}$$

Patient agents choose consumption c_t , capital in the consumption sector $k_{c,t}$, capital $k_{h,t}$ and intermediate inputs $k_{b,t}$ (priced at $p_{b,t}$) in the housing sector, housing h_t (priced at q_t), land l_t (priced at $p_{l,t}$), hours $n_{c,t}$ and $n_{h,t}$, capital utilization rates $z_{c,t}$ and $z_{h,t}$, borrowing b_t (loans if b_t is negative), public bonds b_t^h and holding of real balances m_t ⁷ to maximize utility subject to (14). The term $A_{k,t}$ captures investment-specific technology shocks, thus representing the marginal cost (in terms of consumption) of producing capital used in the nonhousing sector. Loans are set in nominal terms and yield a riskless nominal return of R_t . Real wages are denoted by $w_{c,t}$ and $w_{h,t}$, real rental rates by $R_{c,t}$ and $R_{h,t}$, and depreciation rates by δ_{kc} and δ_{kh} . The terms $X_{wc,t}$ and $X_{wh,t}$ denote the markup (due to monopolistic competition in

⁷The central bank sets an exogenous path for the money supply.

the labor market) between the wage paid by the wholesale firm and the wage paid to the household, which accrues to the labor unions. Finally, π_t is the money inflation rate in the consumption sector, Div_t are lump-sum profits from final good firms and from labor unions, t_t are per-capita lump-sum taxes, ϕ_t denotes convex adjustment costs for capital, z is the capital utilization rate that transforms physical capital k into effective capital zk and $a(\cdot)$ is the convex cost of setting the capital utilization rate to z .

Impatient households, by contrast, do not accumulate capital or own firms/land; their dividends derive solely from labor unions, and their borrowing b'_t is capped by the expected present value of their home times the loan-to-value (LTV) ratio m :

$$c'_t + q_t h'_t = \frac{w'_{c,t}}{X'_{wc,t}} n'_{c,t} + \frac{w'_{h,t}}{X'_{wh,t}} n'_{h,t} + b'_t - \frac{R_{t-1}}{\pi_t} b'_{t-1} + q_t(1 - \delta_h) h'_{t-1} + Div' - t_t \quad (15)$$

$$b'_t \leq m E_t \left(\frac{q_{t+1} h'_t \pi_{t+1}}{R_t} \right) \quad (16)$$

The assumption that impatient households are more impatient (lower discount factor) ensures that their collateral constraint binds near the steady state, making them highly responsive to policy shocks.

2. *The Fiscal Authority.* The fiscal authority finances its expenditure through a mix of lump-sum taxes, money creation and risk-free one-period bonds held only by lenders with a nominal yield, R_t . Government expenditure, g_t , follows an exogenous stochastic process and therefore constitutes a fiscal shock in the model. Specifically, we assume that government spending follows an AR(1) process. A fiscal rule is specified, whereby tax variations respond endogenously to deviations of debt from its long-run target.

$$\frac{B_t}{p_t} + \frac{M_t}{p_t} + t_t = g_t + \frac{M_{t-1}}{p_t} + R_{t-1} \frac{B_{t-1}}{p_t} \quad (17)$$

$$t_t = \gamma b_{t-1} \quad (18)$$

$$\log(g_t) = \rho_g \log(g_{t-1}) + \epsilon_t^g \quad (19)$$

where ϵ_t^g is an i.i.d shock.

3.4 Implementation of Monetary-Fiscal Regimes in the Estimated Model

This subsection clarifies how the regime taxonomy in Section 2 maps into the estimated DSGE model and, in turn, how the empirical regime is identified from the posterior distribution of the policy-rule parameters. The goal is therefore not to introduce additional model mechanisms, but to make explicit the parameter restrictions that correspond to AM-PF, PM-AF, and money-financed configurations in our empirical specification (see Section 4.2.1 for the posterior-based regime classification). The model features two policy authorities, monetary and fiscal, whose behaviours are explicitly parameterised to mirror the theoretical interactions discussed above.⁸

Monetary policy is governed by a forward-looking Taylor-type rule, so the estimated inflation-response coefficient r_π provides the key statistic that places the posterior in either an active or passive monetary region.

Fiscal behaviour is captured by Equation 18, with the parameter γ governing the strength of tax (or primary-surplus) feedback to lagged real public debt. In the Leeper (1991) classification used throughout the paper, fiscal policy is *passive* when the implied fiscal root is stable, i.e. $|\beta^{-1} - \gamma| < 1$, and it is *active* when this condition

⁸Regime-switching or time-varying parameter (TVP) approaches could in principle capture shifts in monetary-fiscal behaviour over time. We deliberately abstract from those extensions and estimate a single, stable policy configuration. Our rationale is to maintain identification and focus: confining the model to a specific Leeper-style determinacy region avoids the observational equivalence issues that arise when one allows multiple regimes in a medium-scale DSGE. Time variation in the effective policy stance is instead captured via shocks to the central bank's inflation target, which we interpret as temporary within-regime adjustments rather than a structural transition across determinacy regions. Accordingly, the alternative regimes considered in the paper enter the analysis only as controlled counterfactual re-parameterisations of the policy rules, ensuring that comparisons across regimes reflect differences in the financing mix and policy behaviour rather than the additional assumptions required by explicit regime-switching estimation.

fails, i.e. $|\beta^{-1} - \gamma| > 1$ (so taxes adjust too weakly to stabilise debt on their own).⁹ The model also accommodates money-financed fiscal interventions through the joint determination of money balances and public debt.

The regimes described in Section 2 map into distinct configurations of the policy rules. In the estimated model, AM-PF and PM-AF correspond to parameter regions of the Taylor rule and fiscal feedback, while the money-financed configuration is implemented by replacing the Taylor rule with a debt-stabilisation condition.

- Active monetary policy, passive fiscal policy: $r_\pi > 1$, γ high;
- Passive monetary policy, active fiscal policy: $r_\pi < 1$, γ low;
- Money-financed fiscal expansions: these occur when increases in government spending are financed through money creation rather than taxes or debt issuance; in the estimated model, such episodes are identified by a relevant rise in real money balances that co-moves with government spending shocks, indicating that expenditure is being financed via seigniorage.

These parameter conditions ensure that the estimated model reflects the determinacy properties outlined in the conceptual framework.

While the model does not estimate discrete regime switches, the estimated parameters fall within one of the theoretical regimes. This allows empirical results to be interpreted using the regime taxonomy from Section 2. Thus, the model structurally embeds the conceptual regimes rather than relying on an explicit regime-switching specification.

4 Inference

This section brings the model to the data to construct a disciplined empirical benchmark for our regime and redistribution analysis. The goal is not to position estimation as a separate contribution, but to pin down a plausible baseline (policy-rule

⁹We run a robustness check estimating the model under priors that concentrate mass on values of γ in the active-fiscal region and, jointly, on r_π in the passive-monetary region (and without altering the cut-off conditions) to assess whether the data still push the posterior back toward AM-PF.

parameters, shock processes, and heterogeneity) that anchors the counterfactual comparisons across monetary-fiscal configurations developed in Section 2 and studied in Section 5.

We estimate the model over the period 1966 to 2024, thus capturing both the Great Financial Crisis (GFC) and the Covid period. The original dataset used by Iacoviello and Neri (2010) is extended accordingly.

The models are log-linearized around the steady state and estimated using Bayesian methods. As is standard practice, the likelihood function is evaluated via the Kalman filter and combined with the prior distributions to derive the posterior distributions. These are then sampled using Markov Chain Monte Carlo methods. Specifically, we employ a Metropolis-Hastings algorithm with 200,000 iterations for each of two chains, discarding 25% of the initial draws as burn-in (see An and Schorfheide (2007), for further details on the estimation techniques).

Details on the model calibration and the prior distributions are provided in Appendix C.

4.1 Data and Shocks

The models are estimated on US data and for the more general model with money and debt our set of observables consists of 12 variables at a quarterly frequency. We update the 10 macroeconomic variables used by Iacoviello and Neri (2010), i.e. real consumption, real business investment, real residential investment, real house prices, inflation, the nominal interest rate, and hours worked and wage inflation in both the consumption and in the housing sector, and we add real money and real public debt which are treated consistently with the other variables. Money is the monetary aggregate M2, debt is the total public debt. We rely on M2, as it represents the most appropriate monetary aggregate for our purposes: it encompasses agents' monetary holdings while excluding financial investments.¹⁰ In addition, we use total federal

¹⁰This choice reflects the role of money in the estimated model as a liquid asset held by the private sector and entering the money-demand block, rather than as a measure of central-bank liabilities used to finance government expenditure. Accordingly, M2 should not be interpreted as a measure of seigniorage-generating money. The latter concept becomes relevant only in the money-

public debt that includes all marketable and non-marketable treasury securities but it excludes agency securities. The rationale is that we want to capture the stock of liabilities that the government must refinance, making this comprehensive measure of debt the most appropriate. Appendix B illustrates the series and the transformation applied. The estimation sample is 1966Q1 - 2024Q4 as debt data are not available before 1966. To address the unusual volatility in the data during the Covid-19 quarters, we scale up the shock innovation variance in the first three quarters of 2020 by common scaling factors as suggested by Lenza and Primiceri (2022).¹¹

The model with money and debt includes 11 structural shocks: two productivity shocks, one in the housing sector and one in the consumption sector, a housing preference shock, an investment shock, a cost-push shock, an interest rate shock, a central bank inflation target shock, a wage shock, a consumption preference shock, a fiscal shock, a money supply shock.¹² As in Iacoviello and Neri (2010), we allow for measurement errors in hours worked and wage inflation in the housing sector. Finally, we introduce a measurement error also for inflation.¹³

In our analysis, the shock to the central bank’s inflation target plays an important role. It captures temporary changes in the central bank’s tolerance for inflation within a given monetary policy regime. A positive shock to the inflation target there-

financed counterfactual of Section 5, for which base money is the natural empirical counterpart. As a robustness check, we re-estimate the model using the monetary base instead of M2; the posterior estimates and our main conclusions are virtually unchanged.

¹¹This treatment is deliberately agnostic about the structural origin of the pandemic disturbance. Covid-19 combined disruptions to supply, demand, sectoral composition, and policy implementation that are not fully captured by any single structural shock in a medium-scale DSGE. Rather than forcing the model to map these quarters into a specific primitive innovation, we follow the common practice of allowing for temporarily larger forecast errors, thereby limiting the influence of the exceptional observations on the posterior for the policy-rule parameters and on the inferred monetary-fiscal configuration.

¹²The money supply shock affects only the money supply and does not influence the model’s dynamics.

¹³This term captures the wedge between observed and model-implied inflation, allowing for a more accurate assessment of the contribution of monetary policy. It also helps prevent stochastic singularity when matching a relatively rich set of observables: in the absence of measurement error, the model would impose an exact mapping between structural shocks and observed series (conditional on the state vector), which is empirically implausible given discrepancies in definitions and short-run noise in measured inflation.

fore reflects a higher tolerance for inflation and a temporarily less aggressive monetary stance. This interpretation is consistent with Bianchi and Melosi (2014), who show that changes in beliefs about policy behaviour may generate persistent inflationary dynamics even without an explicit structural break in policy-rule parameters.

This interpretation helps reconcile the post-GFC, pre-Covid period of low inflation. In the model, the shock acts as a wedge that makes policy more accommodative than implied by the systematic Taylor rule, rather than reflecting a literal increase in the announced target. As a result, it can be estimated as positive even when inflation is low, due to strong disinflationary forces or because the policy rate understates accommodation during the ZLB and unconventional policy period.

Crucially, these shocks are distinct from structural regime changes in the sense of Leeper (1991) and ?. While alternative approaches model regimes via Markov switching, here regimes correspond to determinacy regions in the policy-parameter space. The model is therefore estimated under a single, time-invariant policy specification, and inflation-target shocks capture within-regime variation in effective inflation tolerance, not transitions across regimes.

Accordingly, the inflation-target shock reflects *within-regime adjustments* in the central bank’s effective objective. By contrast, Sections 2 and 5 analyze alternative regimes (AM–PF vs. PM–AF) through counterfactual reparameterizations of the policy rules, which alter the transmission of all shocks. The estimated inflation-target shock, instead, operates within the empirically supported AM–PF regime and does not represent a regime change.

4.2 Results

Our results show that the shock to the central bank inflation target is empirically relevant in driving the dynamics of both real public debt and agents’ consumption, and that its estimated contribution lines up with broad historical episodes of monetary-policy re-optimisation over the sample. Here, we comment on the main contributions coming from the empirical model.

The posterior distributions of the model parameters are discussed in detail in

Appendix C.

To understand the main transmission mechanisms, in Appendix D we present the impulse response functions of some selected variables to three key disturbances from the model with money: a fiscal shock, a conventional monetary policy shock, and a shock to the central bank’s inflation target. These shocks are central to our analysis of public debt dynamics, redistribution, and the role of money.

4.2.1 The Estimated Baseline Configuration

We begin by reporting the posterior-implied baseline policy configuration that disciplines the counterfactual regime comparisons in Section 5. The estimated model can replicate the monetary-fiscal configurations described in Section 2 in the sense that different values of the monetary reaction to inflation (r_π) and the fiscal response to debt (γ) place the economy in different determinacy regions.

The fiscal feedback parameter γ is calibrated at 0.02 (Table 1)¹⁴, while the inflation coefficient in the Taylor rule is estimated and has posterior mean 1.57 (Table 2). Taken together, these values imply that the estimated model lies in the AM-PF region over the estimation sample. We emphasise, however, that this reflects the disciplined baseline specification, combining the estimated monetary policy rule with the calibrated fiscal feedback, rather than an unconstrained identification of regime changes. The estimated model therefore serves as an empirically reasonable benchmark, which we use as a baseline to conduct counterfactual experiments under alternative monetary-fiscal configurations.

To assess whether our results are driven by the calibration and prior distribution on the relevant parameter, we re-estimated the model using priors centered on a

¹⁴We calibrate γ because this fiscal feedback coefficient is weakly identified in our medium-scale specification once we allow for persistent fiscal shocks, measurement errors, and multiple nominal disturbances, and because our objective is to construct a reasonable benchmark rather than to conduct fiscal-rule estimation. The calibrated value follows standard magnitudes used in the DSGE and monetary-fiscal literature to ensure debt stabilisation under passive fiscal behaviour, while leaving the key monetary parameter (r_π) and the shock processes to be disciplined by the likelihood. Crucially, the qualitative interpretation of the decomposition and the regime comparisons is robust to alternative fiscal-rule specifications and prior reweighting exercises (Appendix E.1-E.2), which we use to verify that the main conclusions are not an artefact of this calibration.

PM-AF configuration. Specifically, we imposed a prior on the inflation coefficient in the Taylor rule centered at zero and set the fiscal feedback parameter to 0.001. Despite these PM-AF-oriented priors, the posterior distribution shifts back toward the AM-PF region, and the marginal data density deteriorates substantially relative to the baseline specification. The results of this robustness check are illustrated in Appendix E. These results indicate that the sample does not provide empirical support for an indeterminate or fiscally dominant regime.

This result is consistent with the identification insights in Leeper and Leith (2016), who show that post-1990 U.S. data more clearly support a determinate AM-PF configuration than the more ambiguous pre-1990 data.

For this reason, our empirical analysis focuses on the AM-PF baseline configuration supported by the data under our maintained, time-invariant specification, while PM-AF and money-financed configurations are examined as structural counterfactuals. This strategy preserves empirical discipline while allowing us to evaluate the redistributive implications of alternative monetary-fiscal interactions.

4.2.2 Public Debt

Figures 2 and 3 present the historical decomposition of real public debt under two model specifications: one including money in the government budget constraint and one without. Our focus is on the contribution of three structural shocks: the fiscal shock, the interest rate shock, and the central bank inflation target shock. The latter captures variation in inflation that is not accounted for by the model’s standard structural drivers, and is therefore interpreted as shifts in the central bank’s inflation objective within the model.

The model with money assigns a significantly more prominent and interpretable role to the central bank inflation target shock. As shown in Figure 2, this shock, along with the interest rate shock, displays a fluctuating yet predominantly negative contribution to real public debt dynamics since the early 1980s.

A closer look at the decomposition reveals distinct patterns. From the beginning of 1981, the inflation target shock starts to contribute positively to real public

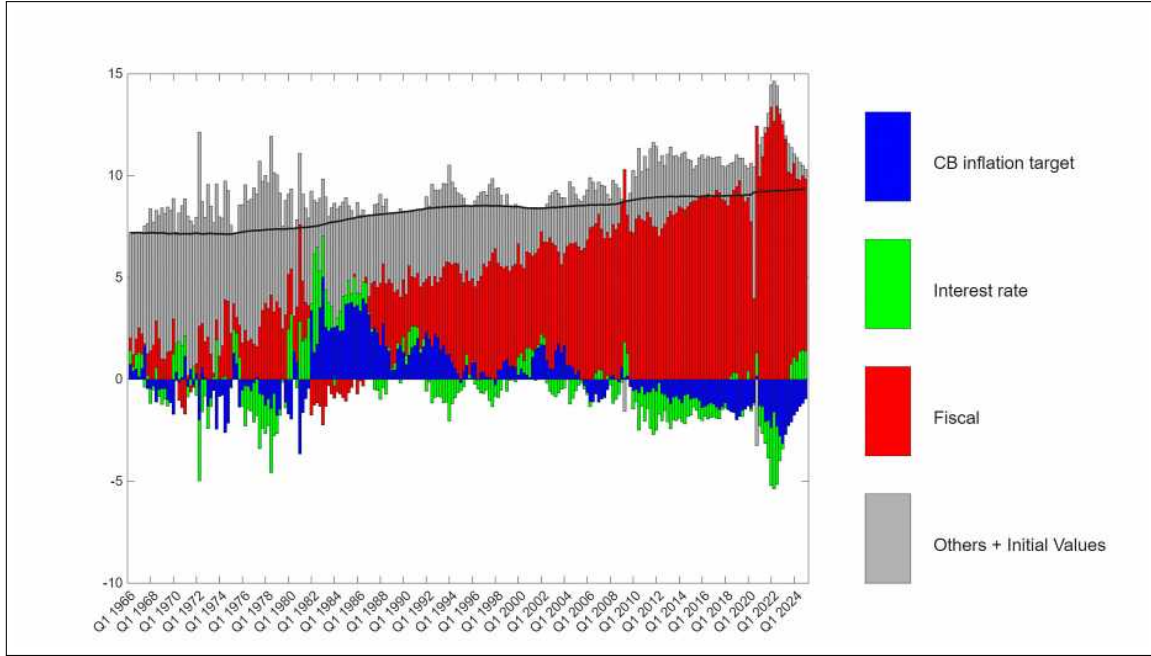


Figure 2: Historical decomposition of net real public debt issuance (log) in the model with money

debt, a period that coincides with the sharp increase in the federal funds rate under Fed Chairman Paul Volcker. In the logic of our estimated AM-PF benchmark, this pattern is consistent with a sharp tightening in the effective monetary stance (a lower inferred tolerance for inflation), rather than with a structural switch across determinacy regions. Similarly, the interest rate shock also registers a positive contribution during this phase, reinforcing the notion of a decisive and contractionary stance by monetary authorities. During the 1990s, the contribution of the inflation target shock becomes more volatile and generally less dominant, while the interest rate shock turns largely negative, reflecting a more predictable and rules-based monetary environment typical of the so-called *Great Moderation*. Starting around 2005, however, a marked change in the inferred monetary stance occurs: the inflation target shock begins to exert a persistently negative effect on real public debt, a trend that intensifies following the GFC. This pattern should be interpreted in light of the

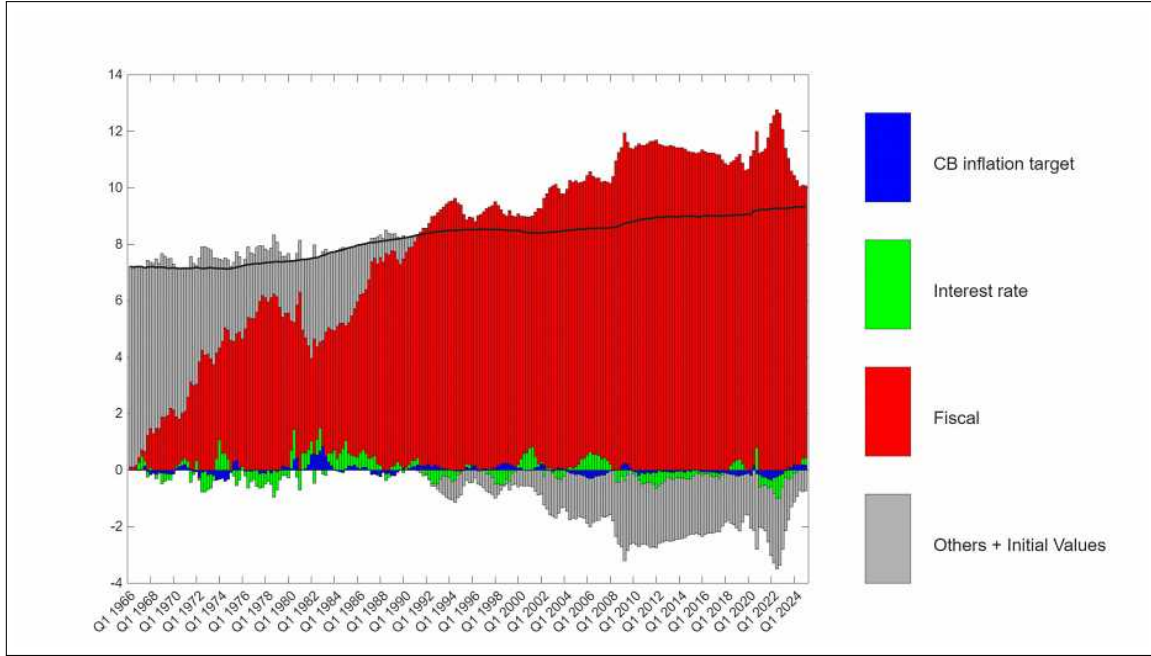


Figure 3: Historical decomposition of net real public debt issuance (log) in the model without money

model's representation of monetary policy: the shock captures changes in effective inflation tolerance within the AM–PF framework, likely reflecting the interaction of unconventional policies and the zero lower bound. Over the same period, the contribution of the interest rate shock remains negative but gradually declines in magnitude. Between 2016 and 2020, the interest rate shock becomes almost negligible, whereas the inflation target shock continues to push public debt downward. The onset of the Covid-19 crisis marks a renewed easing in the inferred stance, with both shocks contributing negatively and increasingly to debt dynamics, signaling a phase of strong monetary accommodation.¹⁵ This evidence on the relevance of the

¹⁵Importantly, this does not require realised inflation to be high in the post-GFC, pre-Covid period. In our estimated model, the inflation target shock reflects accommodation relative to a counterfactual path in which the central bank would have stabilised inflation more aggressively. When disinflationary forces dominate and the policy rate is constrained, the model can assign a positive inflation-target shock even as observed inflation remains below target.

central bank inflation target shock is consistent with the findings and interpretations of Bianchi et al. (2023), Barro and Bianchi (2024), Giannone and Primiceri (2024), and Mori (2025).

Fiscal shocks, by contrast, consistently contribute positively across the entire sample. Their role becomes increasingly prominent over time, pointing to a growing role of public spending, reflecting both macroeconomic stabilisation episodes and broader structural trends over the sample. The only exception occurs in the early 1980s, when the fiscal contribution briefly turns negative, mirroring the decline in government spending observed in the data and consistent with fiscal consolidation during the Volcker disinflation period.

The prominent role of fiscal shocks in explaining the long-run evolution of public debt is a direct implication of the estimated AM–PF configuration, where fiscal policy is directly responsible for stabilizing the government budget constraint while monetary and inflation-target shocks affect debt only indirectly through interest rate and inflation channels. Persistent movements in debt are therefore naturally attributed to fiscal innovations, especially given that fiscal shocks are estimated to be highly persistent. In particular, the posterior mean of the autoregressive coefficient governing the government spending shock is close to unity (0.99), implying that fiscal disturbances have long-lasting effects and directly influence the primary balance.¹⁶

Taken together, the results from the model with money allow us to distinguish three broad subperiods in the behavior of the central bank inflation target shock: (i) the pre-Volcker era, characterized by a weak and often negative contribution; (ii) the Great Moderation period, marked by rising central bank independence and a positive, though volatile, contribution; and (iii) the post-GFC and Covid era, when central banks adopted more flexible and supportive stances, reflected in the persistently

¹⁶The dynamics around 2020 reflect a distinct mechanism related to the timing and composition of shocks during the Covid-19 crisis. In 2020Q1, the economy was primarily hit by large real and financial disturbances, including a sharp contraction in output and significant monetary interventions. As a result, the initial increase in debt is attributed mainly to non-fiscal shocks and initial-condition components in the historical decomposition. By contrast, 2020Q2 corresponds to the implementation of large discretionary fiscal packages, which enter the model through highly persistent fiscal shocks that directly affect the government budget constraint. Consequently, the decomposition assigns a substantial share of the debt increase in that quarter to fiscal innovations.

negative contribution of the inflation target shock to public debt dynamics.

This interpretation is further supported by the evolution of the identified structural shocks in the model with money, as illustrated in Figures 4, 5 and 6. The Central Bank inflation target shock ¹⁷ exhibits high volatility until the mid-1980s, is predominantly negative until around 2004, and turns mostly positive thereafter. This pattern aligns well with the evidence from the historical decompositions, reinforcing the idea of an evolving monetary policy stance over time. In contrast, the interest rate rule shock ¹⁸ remains highly volatile throughout the entire sample period, but its trajectory appears broadly consistent with major monetary policy events. Finally, the fiscal shock¹⁹ also supports the interpretation derived from the historical decomposition: it is largely negative in the early 1980s and becomes mostly positive in the latter half of the sample, suggesting an increasing reliance on fiscal policy to support economic activity.

Overall, these results support the interpretation that, over the past two decades, central banks may have exhibited greater accommodation of fiscal expansions within the prevailing monetary regime. In particular, following the GFC and again during the Covid-19 pandemic, the historical decomposition assigns a larger role to shocks that are consistent with a temporarily higher inflation tolerance within the estimated AM-PF benchmark, thereby mechanically easing the real burden of public debt through higher realised inflation in the model. In the language of the regime taxonomy, these episodes are qualitatively closer to a PM-AF configuration in which monetary policy does not fully offset fiscal disturbances, but we emphasise that our estimation does not identify regime switches: the PM-AF case enters the analysis as a counterfactual re-parameterisation of the policy rules.

In contrast, the model without money largely attributes the evolution of real public debt to fiscal shocks alone. While the contribution of the interest rate shock remains broadly in line with the monetary model, the inflation target shock plays only a marginal role and its dynamics appear less consistent with the narrative of

¹⁷The Central Bank inflation target shock enters the model as ε_s in $a_{s,t} = 0.975a_{s,t-1} + \varepsilon_s$ where $a_{s,t}$ is the log-linearized version of s_t in Equation (A.36), divided by 100.

¹⁸The interest rate shock is the log-linearized version of $u_{R,t}$ in Equation (A.36).

¹⁹The fiscal shock is ϵ_t^g in Equation (19).

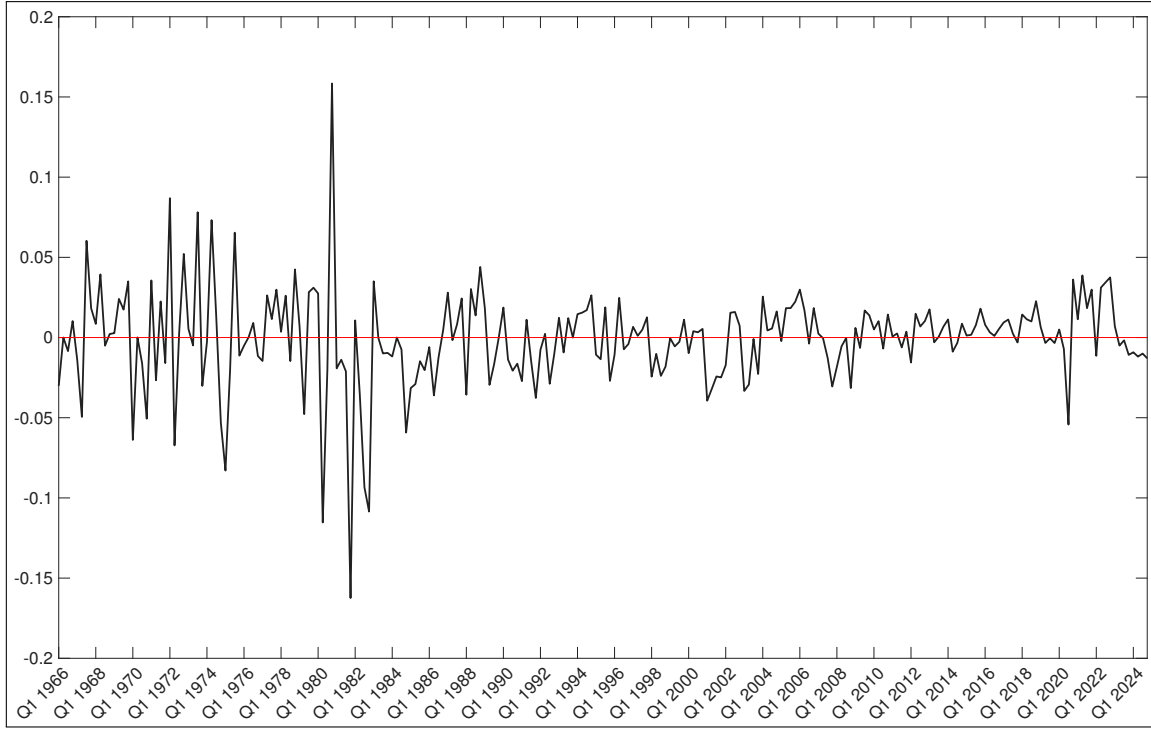


Figure 4: Central Bank inflation target shock

key macroeconomic turning points. This suggests that omitting money from the model may obscure the strategic interplay between monetary and fiscal authorities, particularly during episodes of major policy shifts and macroeconomic turning points.

4.2.3 Redistribution

Our empirical model features two types of households: patient lenders who work, consume, and accumulate housing, real balances, and public bonds, they own the economy's productive capital and provide funds to both firms and impatient households, and impatient households who work, consume, and accumulate housing. Due to their high level of impatience, they only accumulate the necessary net worth to cover the down payment on their home and, in equilibrium, face a housing collateral constraint. The parameter λ captures the share of labor income accruing to

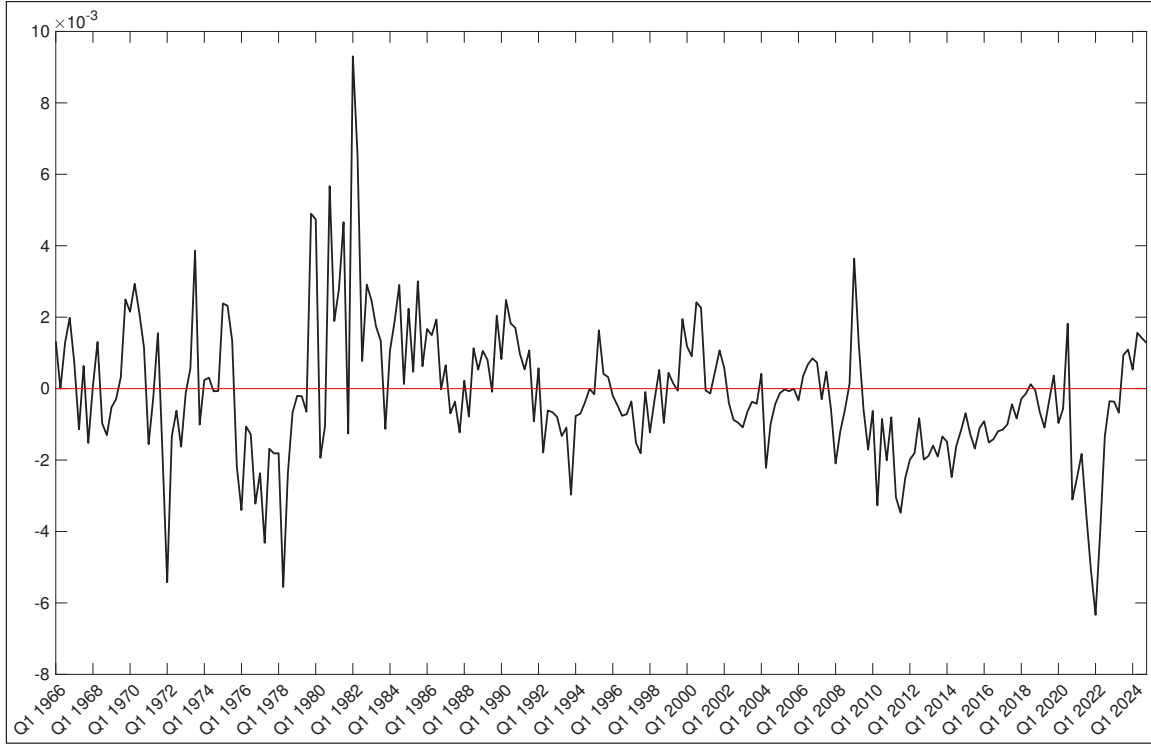


Figure 5: Interest rate rule shock

unconstrained (i.e., lending) households.

The data are informative about the posterior distribution of λ , as its estimated mean is significantly higher than the prior (see Table 2 in Appendix B). Specifically, the posterior mean of λ is 0.76 in the model with public debt and 0.93 in the model that includes both public debt and money. These estimates imply that the labor income share of credit-constrained households is 24% and 7%, respectively. Not only are these values below the prior, but the estimate in the model with money is also lower than the benchmark value found by Iacoviello and Neri (2010), who report a share of 21%. This suggests that incorporating a fiscal authority and money into the model significantly affects this structural parameter, as money enters the set of observables and helps pin down the underlying shocks through the money demand equation, operating purely through an identification channel rather than

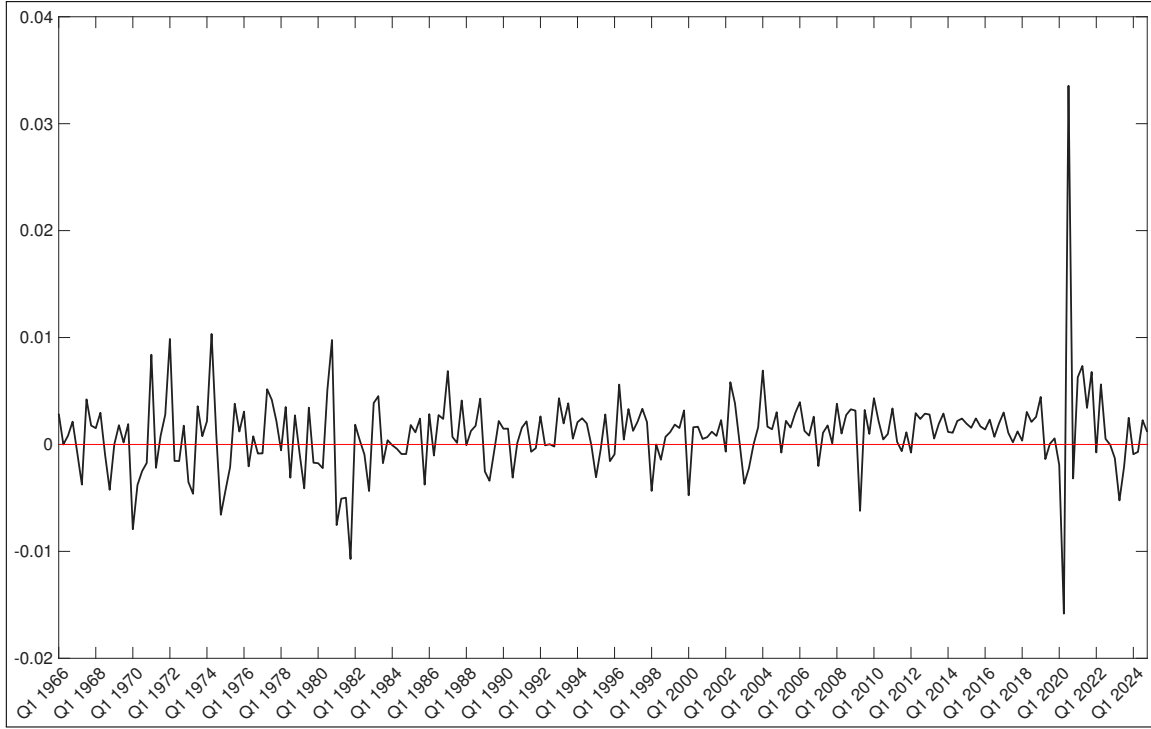


Figure 6: Fiscal shock

through direct effects on real allocations, which remain unchanged due to the additive separability of real balances. Interestingly, the presence of money appears to reduce the share of borrowers in the economy. This result is consistent with the mechanism in Punzo and Rossi (2023), where fiscal expansions financed through liquidity creation (rather than debt issuance) reduce consumption inequality. The intuition is that liquidity injections relax borrowing constraints and increase the effective resources available to constrained households, thereby supporting their consumption relative to savers.

Further insights come from analysing the consumption dynamics of the two types of households. Figure 7 presents the historical decomposition of consumption growth for borrowers, focusing on the contribution of three key shocks: the central bank inflation target shock, the interest rate shock, and the fiscal shock.

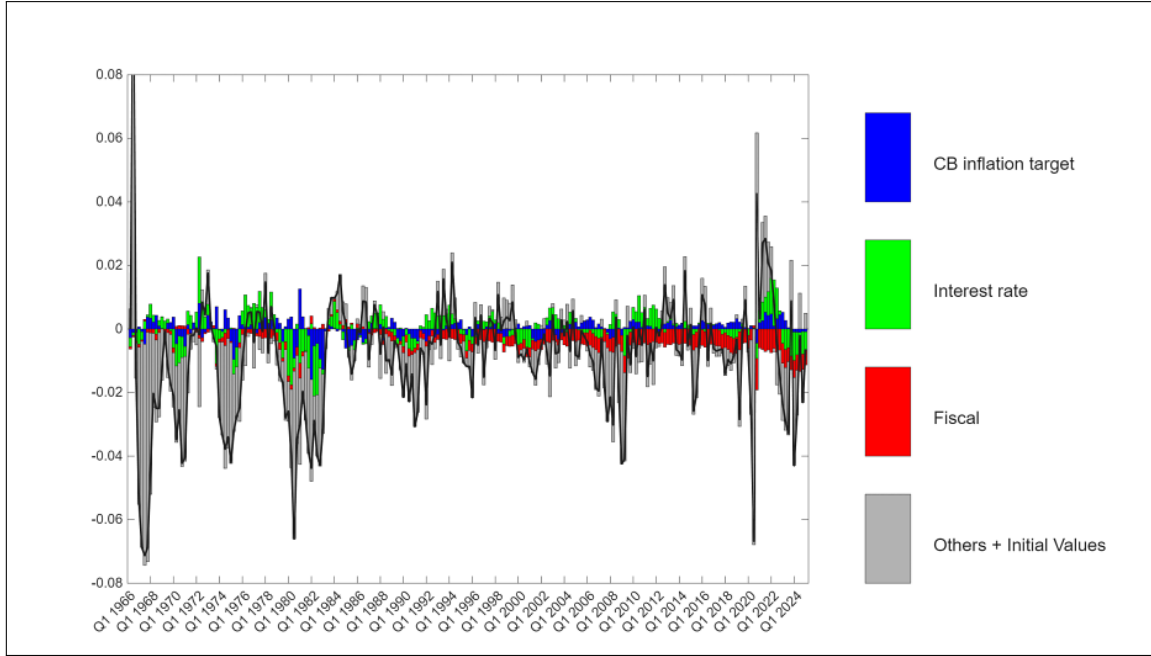


Figure 7: Historical decomposition of borrower's consumption in the model with money

All three shocks significantly influence the consumption of borrowers. The interest rate shock fluctuates over the sample period, with negative contributions during episodes of monetary tightening, such as the early 1980s and the post-2022 period, and positive contributions during expansionary phases like the GFC and the Covid-19 shock. This confirms the role of accommodative monetary policy in supporting household consumption during downturns. Similarly, the inflation target shock contributes positively to borrowers' consumption, particularly from the GFC until the end of 2021, suggesting that a higher implicit inflation target also helped sustain consumption.

In contrast, these two shocks have a much smaller impact on the consumption of savers. The interest rate shock plays a marginal role, although its direction is consistent with the patterns observed for borrowers. The inflation target shock, however, is almost entirely irrelevant for savers, except for a few isolated episodes

in the early 1980s. This asymmetry highlights the potential redistributive effects of monetary policy: shocks to the inflation target benefit borrowers, thereby helping to mitigate consumption inequality.

Finally, the fiscal shock contributes negatively to consumption in most periods, suggesting limited direct benefits for household demand. We explore this issue in more details in the next section, where we compare the model estimated with money with the same model in which the Taylor rule is replaced, following Galí (2020), by a complete stabilisation of real public debt.

5 The Distributional Impact of Monetary and Fiscal Policy Regimes

Building on the previous sections, this section examines the trade-off between stabilizing inflation and managing real public debt, with the aim of clarifying how monetary-fiscal interactions shape redistribution.

We compare the impulse responses to a 1% increase in government spending under two configurations: (i) the estimated model with an operative Taylor rule, and (ii) a counterfactual configuration in which the Taylor rule is replaced by a debt-stabilisation condition à la Galí (2020).

While the latter is not intended as an empirically realistic regime, it provides a useful benchmark that isolates the implications of financing fiscal expansions through seigniorage rather than debt. Consistent with our identification strategy, we hold fixed all estimated and calibrated parameters and modify only the policy rule required to implement the counterfactual. Differences in dynamics therefore reflect changes in the policy configuration rather than re-estimation of the model.

Figure 8 reports the responses of key macroeconomic variables. The solid blue lines represent the responses in the estimated model with money, while the dashed red lines correspond to the responses in the model under the assumption of complete debt stabilisation à la Galí (2020). The results echo the qualitative intuition developed in the analytical model of Section 2.5. Under the estimated monetary regime, a 1%

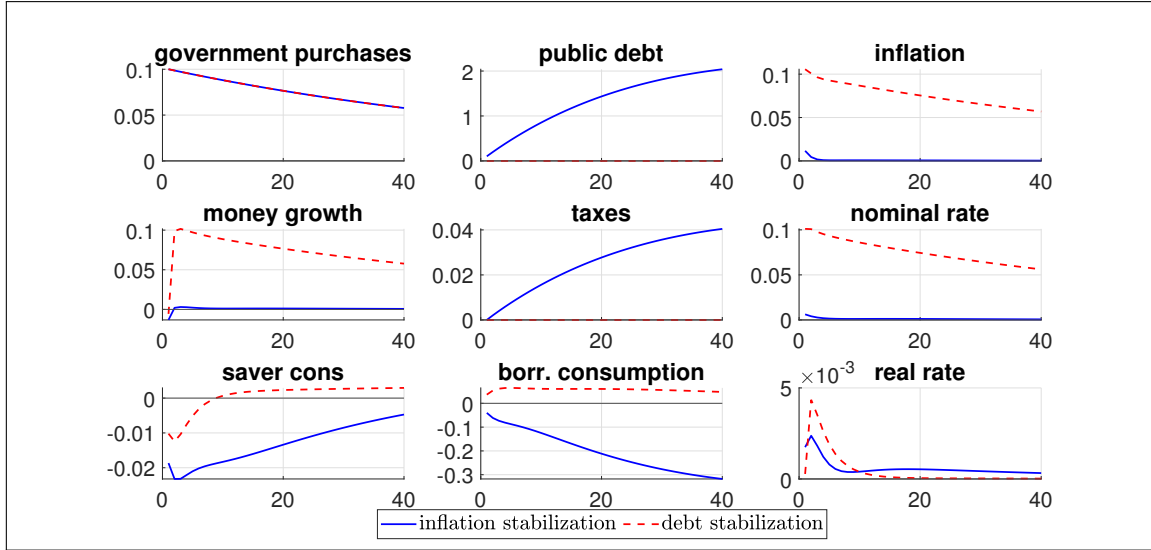


Figure 8: Impulse Response to a 1 % government expenditure increase

increase in government spending leads to a persistent increase in real public debt, which accommodates the higher level of government spending. By contrast, in the debt-stabilisation configuration, public debt is held constant by construction, so the expansion must be financed entirely through seigniorage. This occurs through a combination of higher inflation, which erodes the real value of existing liabilities, and an increase in the real value of newly issued money. As illustrated by the red dashed lines, both components symmetrically finance the fiscal stimulus under this regime.

The conceptual discussion in Section 2.5 highlights that, within Leeper's framework, passive-monetary configurations can be ordered in conceptual terms according to the strength of the monetary response to inflation, with the money-financed case representing an extreme configuration. In the quantitative model, however, this ordering cannot be explored by varying policy parameters while keeping the rest of the model unchanged. This is because the steady state and estimated parameterisation are disciplined by the data and support an AM-PF configuration, so alternative regimes are not locally nested around the baseline.

For this reason, our counterfactual analysis compares the estimated AM-PF regime with a configuration that proxies the extreme case of a passive monetary-active fiscal regime. Specifically, we replace the Taylor rule with a debt-stabilisation condition, which forces fiscal expansions to be absorbed through seigniorage rather than debt issuance. This provides a tractable way to approximate the limiting PM-AF case within a medium-scale DSGE model, without re-estimating the full set of structural parameters under an alternative regime.

The comparison highlights stark differences in redistribution. Under the estimated monetary regime, the increase in interest rates required to stabilise inflation raises borrowing costs and reduces borrowers' consumption more sharply than that of savers. Fiscal expansions are therefore associated with a contraction in borrowers' relative consumption.

By contrast, when fiscal expansions are financed through money creation, inflation reduces the real value of nominal liabilities and increases borrowers' net worth. This relaxes their effective borrowing constraints and leads to a relative increase in their consumption. As a result, the same fiscal expansion generates a more progressive redistribution when financed through seigniorage rather than debt.

These results underscore that the distributional effects of fiscal policy depend not only on the size of government spending, but on how it is financed and on the monetary policy response. Policies that are equivalent in aggregate terms can have markedly different effects across households, depending on whether adjustment occurs through interest rates, debt accumulation, or inflation.²⁰

²⁰Since the effects hinge on a credit constraint, it would obviously be possible to add a third policymaking (or policy instrument), the macroprudential one, to the model that can move the credit constraint around. The inclusion of a macroprudential policy instrument would allow the model to capture variations in credit accessibility driven by regulatory or supervisory interventions, providing a richer framework for analysing the interplay between monetary, fiscal, and financial stability objectives.

6 Concluding Remarks

This paper revisits the joint conduct of monetary and fiscal policy through a unified framework that embeds money, public debt, and heterogeneous household balance sheets within an empirically disciplined DSGE model. By integrating the determinacy taxonomy of Leeper (1991) with money-financed fiscal expansions in the spirit of Galí (2020), we show that the financing of fiscal policy, whether through debt issuance, tax adjustment, or seigniorage, is central to both macroeconomic dynamics and redistribution.

A key result is that the effects of fiscal expansions cannot be assessed independently of their financing and of the monetary policy response. In the empirically supported AM-PF configuration, fiscal expansions are accommodated through higher real public debt, while monetary policy stabilises inflation. This adjustment raises borrowing costs and reduces borrowers' consumption by more than that of savers. By contrast, when fiscal expansions are absorbed through seigniorage, captured in our framework by replacing the Taylor rule with a debt-stabilisation condition, adjustment occurs through inflation and valuation effects on nominal liabilities. In this case, the redistribution pattern is reversed, with borrowers benefiting from the erosion of real debt.

These findings highlight that redistribution is governed by two interacting channels. The first operates through interest rates and borrowing constraints, amplifying the effects of monetary tightening on borrowers. The second operates through the valuation of nominal assets and liabilities, as inflation redistributes wealth between savers and borrowers. Accounting for money as a store of value is therefore essential to capture how monetary-fiscal interactions affect inequality.

A second contribution concerns the empirical role of inflation-target shocks. Interpreted as temporary changes in the central bank's tolerance for inflation, and therefore of the policy stance, within a given regime, these shocks help explain the joint dynamics of inflation, public debt and household consumption, particularly in the post-GFC and pandemic periods.

More broadly, the analysis clarifies that alternative monetary-fiscal configurations

are best interpreted as distinct regime specifications rather than as local perturbations around the estimated baseline. The steady state and parameterisation are disciplined by the data and support an AM-PF regime, so counterfactual configurations, such as the money-financed case, are implemented through changes in policy rules rather than through marginal parameter variation. This distinction is central for interpreting the counterfactual exercises and for understanding the role of policy design.

Taken together, the results show that policies that are equivalent in aggregate terms can have markedly different distributional consequences depending on how fiscal expansions are financed and how monetary policy responds. This underscores the importance of modelling money explicitly and of adopting an integrated perspective on monetary and fiscal policy that accounts for both stabilisation and redistribution.

The analysis is subject to several limitations. In particular, the framework abstracts from long-term government debt, richer heterogeneity in liquid asset holdings, and endogenous expectation formation. Extending the model along these dimensions would provide an even more detailed characterisation of the interaction between policy, balance sheets, and redistribution. These extensions are left for future research.

Acknowledgments

The authors are particularly grateful to Leonardo Melosi for valuable insights. The authors also thank Roberto Billi, Oliver Bush, Jordi Galí, Richard Harrison, Jamie Lenney, Tommaso Monacelli, and Matthew Waldron.

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A The Model Equations

Here, we summarize the equations describing the equilibrium of the model. Let u_c denote the marginal utility of consumption, u_{nc} (u_{nh}) the marginal disutility of working in the goods (housing) sector, and u_h the marginal disutility of housing (with analogous definitions holding for impatient households). We drop the t subscript to denote the steady-state value of a particular variable. The budget constraint for patient households is:

$$\begin{aligned}
c_t + \frac{k_{c,t}}{A_{k,t}} + k_{h,t} + k_{b,t} + q_t h_t + p_{l,t} l_t + b_t + b_t^h + m_t &= \frac{w_{c,t} n_{c,t}}{X_{wc,t}} + \frac{w_{h,t} n_{h,t}}{X_{wh,t}} \\
+ \left(R_{c,t} z_{c,t} + \frac{1 - \delta_{kc}}{A_{k,t}} \right) k_{c,t-1} + (R_{h,t} z_{h,t} + 1 - \delta_{kh}) k_{h,t-1} + p_{b,t} k_{b,t} + \frac{R_{t-1} b_{t-1}}{\pi_t} + \frac{R_{t-1} b_{t-1}^h}{\pi_t} \\
+ (p_{l,t} + R_{l,t}) l_{t-1} + q_t (1 - \delta_h) h_{t-1} + Div_t - \phi_t + \frac{a(z_{c,t}) k_{c,t-1}}{A_{k,t}} + a(z_{h,t}) k_{h,t-1} + \frac{m_{t-1}}{\pi_t} - t_t
\end{aligned} \tag{A.1}$$

The first-order conditions for patient households are:

$$\left(\bar{\chi} - \frac{m_t}{c_t} \right)^\sigma = \frac{R_t}{1 + R_t} \tag{A.2}$$

$$u_{c,t} q_t = u_{h,t} + \beta G_C E_t (u_{c,t+1} q_{t+1} (1 - \delta_h)) \tag{A.3}$$

$$u_{c,t} = \beta G_C E_t \left(u_{c,t+1} \frac{R_t}{\pi_{t+1}} \right) \tag{A.4}$$

$$\begin{aligned}
& u_{c,t} \left(\frac{1}{A_{k,t}} + \frac{\partial \phi_{c,t}}{\partial k_{c,t}} \right) \\
& = \beta G_C E_t u_{c,t+1} \left(R_{c,t+1} z_{c,t+1} - \frac{a(z_{c,t+1}) + 1 - \delta_{kc}}{A_{k,t+1}} - \frac{\partial \phi_{c,t+1}}{\partial k_{c,t}} \right)
\end{aligned} \tag{A.5}$$

$$u_{c,t} \left(1 + \frac{\partial \phi_{h,t}}{\partial k_{h,t}} \right) = \beta G_C E_t u_{c,t+1} \left(R_{h,t+1} z_{h,t+1} - a(z_{h,t+1}) + 1 - \delta_{kh} - \frac{\partial \phi_{h,t+1}}{\partial k_{h,t}} \right) \quad (\text{A.6})$$

$$u_{c,t} w_{c,t} = u_{nc,t} X_{wc,t} \quad (\text{A.7})$$

$$u_{c,t} w_{h,t} = u_{nh,t} X_{wh,t} \quad (\text{A.8})$$

$$u_{c,t}(p_{bt} - 1) = 0 \quad (\text{A.9})$$

$$R_{ct} A_{kt} = a'(z_{ct}) \quad (\text{A.10})$$

$$R_{ht} A_{kt} = a'(z_{ht}) \quad (\text{A.11})$$

$$u_{c,t} p_{l,t} = \beta G_C E_t u_{c,t+1} (p_l, t + 1 + R_{l,t+1}). \quad (\text{A.12})$$

The budget and borrowing constraint for impatient households are:

$$c'_t + q_t h'_t = \frac{w'_{c,t}}{X'_{wc,t}} n'_{c,t} + \frac{w'_{h,t}}{X'_{wh,t}} n'_{h,t} + b'_t - \frac{R_{t-1}}{\pi_t} b'_{t-1} + q_t (1 - \delta_h) h'_{t-1} + Div' - t_t \quad (\text{A.13})$$

$$b'_t = m E_t \left(q_{t+1} h'_t \frac{\pi_{t+1}}{R_t} \right) \quad (\text{A.14})$$

The first-order conditions are:

$$u_{c',t} q_t = u_{h',t} + \beta' G_C E_t (u_{c',t+1} (q_{t+1} (1 - \delta_h))) + E_t \left(\lambda'_t \frac{m q_{t+1} \pi_{t+1}}{R_t} \right) \quad (\text{A.15})$$

$$u_{c',t} = \beta' G_C E_t \left(u_{c',t+1} \frac{R_t}{\pi_{t+1}} \right) + \lambda'_t \quad (\text{A.16})$$

$$u_{c',t} w'_{c,t} = u_{nc',t} X'_{wc,t} \quad (\text{A.17})$$

$$u_{c',t} w'_{h,t} = u_{nh',t} X'_{wh,t} \quad (\text{A.18})$$

where λ'_t denotes the multiplier on the borrowing constraint, which is greater than zero in a neighborhood of the equilibrium.

To introduce price rigidity in the consumption sector, Iacoviello and Neri (2010) differentiate between competitive flexible price/wholesale firms that produce wholesale consumption goods and housing using two technologies, and a final good firm that operates in the consumption sector under monopolistic competition. Wholesale firms hire labor and capital services, and purchase intermediate goods to produce wholesale goods Y_t and new houses IH_t . X_t is the markup of final goods over wholesale goods.

The production technologies are:

$$Y_t = (A_{c,t} (n_{c,t}^\alpha n_{c,t}'^{1-\alpha}))^{1-\mu_c} (z_{c,t} k_{c,t-1})^{\mu_c} \quad (\text{A.19})$$

$$IH_t = (A_{h,t} (n_{h,t}^\alpha n_{h,t}'^{1-\alpha}))^{1-\mu_h-\mu_l-\mu_b} k_{b,t}^{\mu_b} (z_{h,t} k_{h,t-1})^{\mu_h} l_{t-1}^{\mu_l}. \quad (\text{A.20})$$

The terms $A_{c,t}$ and $A_{h,t}$ measure productivity in the nonhousing and housing sector, respectively.

The first-order conditions for the wholesale goods firms are:

$$(1 - \mu_c) \alpha Y_t = X_t w_{c,t} n_{c,t} \quad (\text{A.21})$$

$$(1 - \mu_c)(1 - \alpha) Y_t = X_t w'_{c,t} n'_{c,t} \quad (\text{A.22})$$

$$(1 - \mu_h - \mu_l - \mu_b)\alpha q_t I H_t = w_{h,t} n_{h,t} \quad (\text{A.23})$$

$$(1 - \mu_h - \mu_l - \mu_b)(1 - \alpha)q_t I H_t = w'_{h,t} n'_{h,t} \quad (\text{A.24})$$

$$\mu_c Y_t = X_t R_{c,t} z_{c,t} k_{c,t-1} \quad (\text{A.25})$$

$$\mu_h q_t I H_t = R_{h,t} z_{h,t} k_{h,t-1} \quad (\text{A.26})$$

$$\mu_l q_t I H_t = R_{l,t} l_{t-1} \quad (\text{A.27})$$

$$\mu_b q_t I H_t = p_{b,t} k_{b,t}. \quad (\text{A.28})$$

The Phillips curve is:

$$\ln \pi_t - \iota_\pi \ln \pi_{t-1} = \beta G_C(E_t \ln \pi_{t+1} - \iota_\pi \ln \pi_t) - \epsilon_\pi \ln \left(\frac{X_t}{X} \right) + u_{p,t}. \quad (\text{A.29})$$

Denote with $\omega_{i,t}$ nominal wage inflation, that is, $\omega_{i,t} = (w_{i,t} \pi_t) / (w_{i,t-1})$ for each sector/household pair. The four wage equations are:

$$\ln \omega_{c,t} - \iota_{wc} \ln \pi_{t-1} = \beta G_C(E_t \ln \omega_{c,t+1} - \iota_{wc} \ln \pi_t) - \epsilon_{wc} \ln(X_{wc,t} / X_{wc}) \quad (\text{A.30})$$

$$\ln \omega'_{c,t} - \iota_{wc} \ln \pi_{t-1} = \beta' G_C(E_t \ln \omega'_{c,t+1} - \iota_{wc} \ln \pi_t) - \epsilon'_{wc} \ln(X_{wc,t} / X_{wc}) \quad (\text{A.31})$$

$$\ln \omega_{h,t} - \iota_{wh} \ln \pi_{t-1} = \beta G_C(E_t \ln \omega_{h,t+1} - \iota_{wh} \ln \pi_t) - \epsilon_{wh} \ln(X_{wh,t} / X_{wh}) \quad (\text{A.32})$$

$$\ln \omega'_{h,t} - \iota_{wh} \ln \pi_{t-1} = \beta' G_C (E_t \ln \omega'_{h,t+1} - \iota_{wh} \ln \pi_t) - \epsilon'_{wh} \ln (X_{wh,t}/X_{wh}) \quad (\text{A.33})$$

where $\epsilon_{wc} = (1 - \theta_{wc})(1 - \beta' G_C \theta_{wc})/\theta_{wc}$, $\epsilon'_{wc} = (1 - \theta_{wc})(1 - \beta' G_C \theta_{wc})/\theta_{wc}$,
 $\epsilon_{wh} = (1 - \theta_{wh})(1 - \beta' G_C \theta_{wh})/\theta_{wh}$, $\epsilon'_{wh} = (1 - \theta_{wh})(1 - \beta' G_C \theta_{wh})/\theta_{wh}$.

The government budget constraint is:

$$\frac{R_{t-1} b_{t-1}^h}{\pi_t} = b_t^h + t_t + m_t - \frac{m_{t-1}}{\pi_t} \quad (\text{A.34})$$

The fiscal rule is:

$$t_t = \gamma b_{t-1} \quad (\text{A.35})$$

The Taylor rule is:

$$R_t = (R_{t-1})^{r_R} \pi_t^{r_\pi(1-r_R)} \left(\frac{GDP_t}{G_C GDP_{t-1}} \right)^{r_Y(1-r_R)} \bar{r}^{1-r_R} \frac{u_{R,t}}{s_t} \quad (\text{A.36})$$

where GDP_t is the sum of the value added of the two sectors, that is $GDP_t = Y_t - k_{b,t} + \bar{q} IH_t$. Two market-clearing conditions are:

$$C_t + IK_{c,t}/A_{k,t} + IK_{h,t} + k_{b,t} = Y_t - \phi_t \quad (\text{A.37})$$

$$h_t + h'_t - (1 - \delta_h)(h_{t-1} + h'_{t-1}) = IH_t \quad (\text{A.38})$$

The goods market produces consumption, business investment, and intermediate inputs. The housing market produces new homes IH_t .

By Walras' law, $b_t + b'_t = 0$. Finally, total land is normalized to unity:

$$l_t = 1. \quad (\text{A.39})$$

In equilibrium, dividends paid to households equal, respectively:

$$Div_t = \frac{X_{t-1}}{X_t} Y_t + \frac{X_{wc,t-1}}{X_{wc,t}} w_{c,t} n_{c,t} + \frac{X_{wh,t-1}}{X_{wh,t}} w_{h,t} n_{h,t}$$

$$Div'_t = \frac{X'_{wc,t-1}}{X'_{wc,t}} w'_{c,t} n'_{c,t} + \frac{X'_{wh,t-1}}{X'_{wh,t}} w'_{h,t} n'_{h,t}$$

In addition, the functional forms for the capital adjustment cost and the utilization rate are:

$$\phi_t = \frac{\phi_{kc}}{2G_{IK_c}} \left(\frac{k_{c,t}}{k_{c,t-1}} - G_{IK_c} \right)^2 \frac{k_{c,t-1}}{(1+\gamma_{AK})^t} + \frac{\phi_{kh}}{2G_{IK_h}} \left(\frac{k_{h,t}}{k_{h,t-1}} - G_{IK_h} \right)^2 k_{h,t-1}$$

$$a(z_{c,t}) = R_c(\omega z_{c,t}^2/2 + (1-\omega)z_{c,t} + (\omega/2 - 1))$$

$$a(z_{h,t}) = R_h(\omega z_{h,t}^2/2 + (1-\omega)z_{h,t} + (\omega/2 - 1))$$

where R_c and R_h are the steady-state values of the rental rates of the two types of capital.

Equations A.1 to A.39, together with the values for $IK_c, IK_h, GDP_t, \phi_t, a(z), Div_t$ and Div'_t , and the laws of motion for the exogenous shocks, define a system of 39 equations in the following variables: $c, h, k_c, k_h, k_b, n_c, n_h, b, l, z_c, z_h, c', h', n'_c, n'_h, b', IH, Y, q, R, \pi, \lambda', X, w_c, w_h, w'_c, w'_h, X_{wc}, X_{wh}, X'_{wc}, X'_{wh}, R_c, R_h, p_b, p_l, t, m_t$ and b_t^h .

After detrending the variables by their balanced growth trends, we linearize the resulting system around the non-stochastic steady-state.

B Data and Sources

Most of the data series we use are available in the FRED database of the St. Louis Fed. Here we describe how we computed the series to estimate our models. Figure 9 displays the series used as observables.

Aggregate Consumption: Real Personal Consumption Expenditure (seasonally adjusted, billions of chained 2017 dollars, BEA table 1.1.6), divided by the Civilian Non-institutional Population (Source: Bureau of Labor Statistics). Series ID: PCECC96 and CNP16OV in FRED.

Business Fixed Investment: Real Private Nonresidential Fixed Investment is computed as the ratio between Nominal Private Nonresidential Fixed Investment (seasonally adjusted, billions of dollars, BEA table 1.1.6) and the Nonresidential Chain-type Price Index (index 2017=100, seasonally adjusted), then divided by CNP16OV. Series ID: PNFI and B008RG3Q086SBEA in FRED.

Residential Investment: Real Private Residential Fixed Investment is computed as the ratio between Nominal Private Residential Fixed Investment (seasonally adjusted, billions of dollars, BEA table 1.1.6) and the Residential Chain-type Price Index (index 2017=100, seasonally adjusted), then divided by CNP16OV Series ID: PRFI and B011RG3Q086SBEA in FRED.

Inflation: Quarter on quarter log differences in the implicit price deflator for the non-farm business sector (Source: BLS), demeaned. Series ID: IPDNBS in FRED.

Nominal Short-term Interest Rate: 3-month Treasury Bill Rate (Secondary Market Rate), expressed in quarterly units, demeaned (Source: Board of Governors of the Federal Reserve System). Series ID: DTB3 in FRED.

Real House Prices: Census Bureau House Price Index (new one-family houses sold including value of lot) deflated with the implicit price deflator for the non-farm business sector.

Hours in Consumption Sector: Total Nonfarm Payrolls less all employees in the construction sector times Average Weekly Hours of Production Workers (Source: BLS, code CES0500000007), divided by CNP16OV. Demeaned. Series ID: PAYEMS, USCONS and AWHNONAG in FRED.

Hours in Housing Sector: All Employees in the Construction Sector times Average Weekly Hours of Construction Workers (Source: BLS, code CES2000000007), divided by CNP16OV. Demeaned. Series ID: USCONS and CES2000000007 in FRED.

Wage Inflation in Consumption-good Sector: Quarterly log-changes in Average Hourly Earnings of Production/Nonsupervisory Workers on Private Nonfarm Payrolls, Total Private (Source: BLS, code CES0500000008). Demeaned. Series ID: AHETPI in FRED.

Wage Inflation in Housing Sector: Quarterly log-changes in Average Hourly Earnings of Production/Nonsupervisory Workers in the Construction Industry ((Source: BLS, code CES2000000008). Demeaned. Series ID: CES2000000008 in FRED.

Public Debt: Federal Debt, Total Public Debt (millions of dollars) deflated with the implicit price deflator for the non-farm business sector, divided by CNP16OV. The series consists of public debt securities, as described in the Treasury Bulletin

and the Monthly Statement of the Public Debt of The United States. It includes all treasury securities and excludes agency securities and money. Series ID: GFDEBTN in FRED.

Money: Nominal M2 (billions of dollars, seasonally adjusted) deflated with the implicit price deflator for the non-farm business sector, divided by CNP16OV. Series ID: M2SL in FRED.

C Priors and Posteriors

C.1 Priors

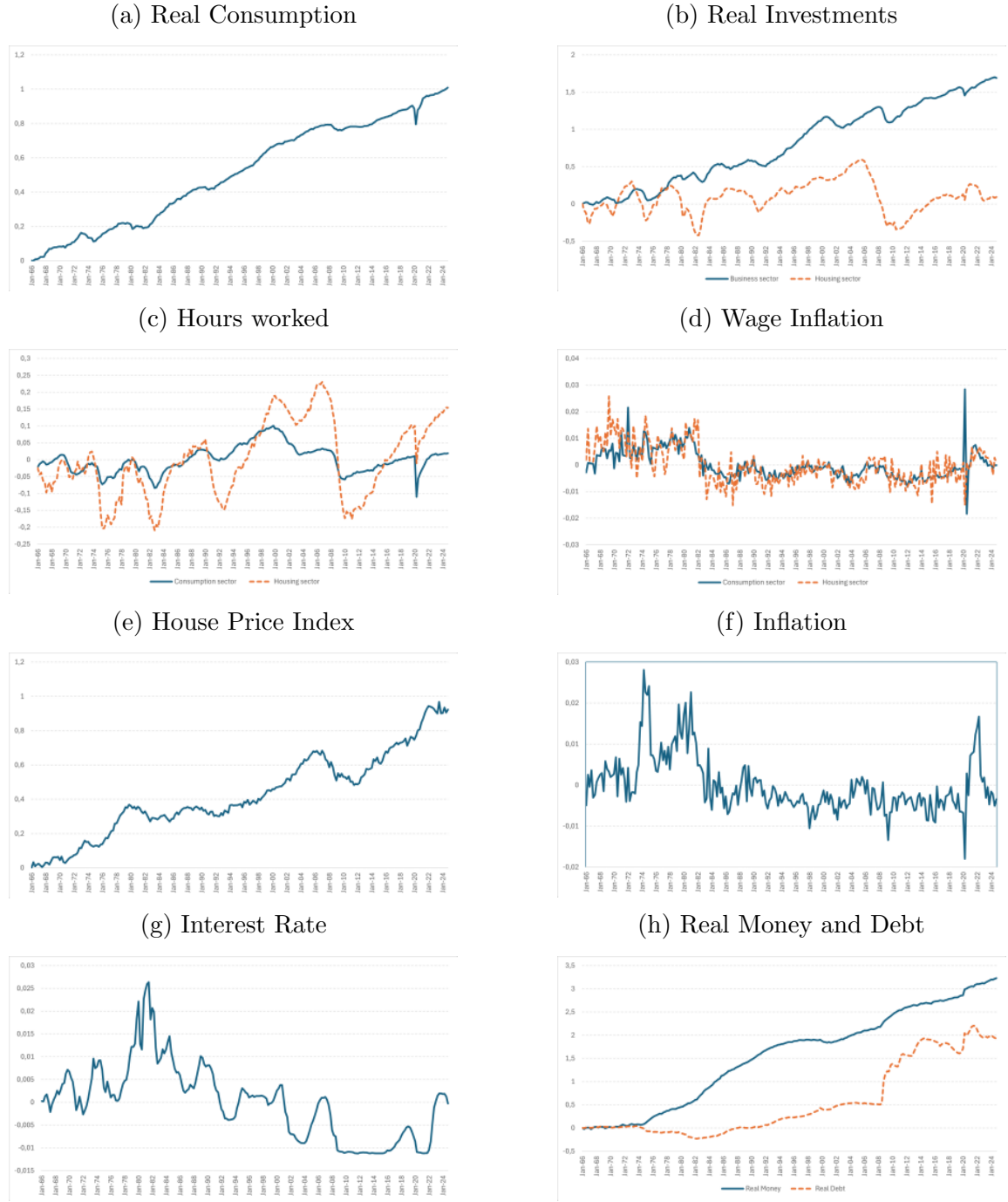
Following Iacoviello and Neri (2010), we calibrate several parameters: the discount factors β and β' ; the weight on housing in the utility function j ; the technology parameters; the steady-state gross price and wage markups, X_{wc} and X_{wh} ; the loan-to-value (LTV) ratio m ; and the persistence of the inflation objective shock. These parameters are either notoriously difficult to estimate (e.g., the markups) or are better identified using external information (such as the factor shares and discount factors).

However, unlike Iacoviello and Neri (2010), we also exclude from the estimation the habit parameters in consumption (ε and ε'), the disutility of labor parameters (η , η'), and the parameters governing the inverse elasticity of substitution of hours across sectors (ξ , ξ'). This choice allows us to focus on the impact of money and public debt on the estimation while keeping the utility-related parameters fixed.

Similarly, we calibrate the rates of technological progress in business investment, consumption, and housing, so as to isolate the effects of money and public debt while holding technological dynamics constant. Finally, we also calibrate the public debt feedback coefficient, ϕ_B , and the stochastic bliss point, $\bar{\chi}$.

Our priors are in Tables (2) and (3). Overall, they are set in accordance with Iacoviello and Neri (2010). The only prior that we add is the one concerning the semi-elasticity of money demand. We set it according to English et al. (2017).

Figure 9: Data



Notes: The series are transformed as described in Appendix B.

Table 1: Calibrated Parameters

Parameter	Value
β	0.9925
β'	0.97
j	0.12
μ_c	0.35
μ_h	0.10
μ_l	0.10
μ_b	0.10
δ_h	0.01
δ_{kc}	0.025
δ_{kh}	0.03
X, X_{wc}, X_{wh}	1.15
m	0.85
ρ_s	0.975
ε	0.31423
ε'	0.56897
η	0.52381
η'	0.50602
ξ	0.6833
ξ'	0.96538
ψ_{AC}	0.0032
ψ_{AH}	0.0008
ψ_{AK}	0.00275
γ	0.02
$\bar{\chi}$	1

Table 2: Prior and Posterior Distribution of Structural Parameters

	shape	Priors		Model with debt			Model with money and debt			IN(2010)
		mean	st. dev.	post. mean	90% HPD int		post. mean	90% HPD int		post.mean
λ	Beta	0.65	0.05	0.76	0.70	0.81	0.93	0.91	0.95	0.79
$\phi_{k,c}$	Gamma	10	2.5	21.81	19.37	24.33	14.62	11.91	17.39	14.25
$\phi_{k,h}$	Gamma	10	2.5	10.81	6.95	14.81	11.74	7.46	16.16	10.90
ι	Beta	0.5	0.2	0.37	0.26	0.47	0.06	0.01	0.12	0.69
$\iota_{w,c}$	Beta	0.5	0.2	0.16	0.03	0.28	0.05	0.01	0.09	0.08
$\iota_{w,h}$	Beta	0.5	0.2	0.89	0.79	0.98	0.26	0.15	0.36	0.40
θ	Beta	0.667	0.05	0.87	0.86	0.89	0.46	0.41	0.51	0.83
$\theta_{w,c}$	Beta	0.667	0.05	0.94	0.93	0.95	0.84	0.80	0.88	0.79
$\theta_{w,h}$	Beta	0.667	0.05	0.97	0.96	0.97	0.954	0.947	0.961	0.91
r_R	Beta	0.75	0.1	0.53	0.48	0.59	0.66	0.62	0.71	0.59
r_π	Normal	1.5	0.1	1.79	1.68	1.90	1.57	1.44	1.69	1.44
r_Y	Normal	0	0.1	0.17	0.13	0.22	0.68	0.62	0.75	0.52
ζ	Beta	0.5	0.2	0.96	0.92	0.99	0.93	0.88	0.99	0.69
σ	Normal	2.5	0.75	-	-	-	2.55	1.40	3.70	

Table 3: Prior and Posterior Distribution of Shock Processes

		Priors		Model with debt			Model with money and debt			IN(2010)
shape		mean	st. dev.	post. mean	90% HPD int		post. mean	90% HPD int		post.mean
Shocks persistence										
ρ_{AC}	Beta	0.8	0.1	0.93	0.91	0.94	0.96	0.95	0.98	0.95
ρ_{AH}	Beta	0.8	0.1	0.998	0.996	0.999	0.9988	0.9978	0.9998	1.00
ρ_{AK}	Beta	0.8	0.1	0.96	0.95	0.97	0.95	0.93	0.97	0.92
ρ_j	Beta	0.8	0.1	0.96	0.95	0.97	0.96	0.95	0.97	0.96
ρ_z	Beta	0.8	0.1	0.91	0.89	0.93	0.96	0.95	0.98	0.96
ρ_τ	Beta	0.8	0.1	0.39	0.30	0.48	0.98	0.97	0.99	0.92
ρ_g	Beta	0.8	0.1	0.998	0.997	0.9997	0.986	0.974	0.999	-
ρ_m	Beta	0.8	0.1	-	-	-	0.992	0.991	0.993	-
σ_{AC}	Inv.gamma	0.001	0.01	0.011	0.010	0.012	0.013	0.012	0.015	0.0100
σ_{AH}	Inv.gamma	0.001	0.01	0.022	0.020	0.023	0.023	0.021	0.025	0.0193
σ_{AK}	Inv.gamma	0.001	0.01	0.015	0.014	0.017	0.014	0.012	0.015	0.0104
σ_j	Inv.gamma	0.001	0.01	0.06	0.05	0.07	0.06	0.04	0.07	0.0416
σ_R	Inv.gamma	0.001	0.01	0.0016	0.0015	0.0018	0.0021	0.0018	0.0024	0.0034
σ_z	Inv.gamma	0.001	0.01	0.022	0.019	0.024	0.016	0.013	0.019	0.0178
σ_τ	Inv.gamma	0.001	0.01	0.72	0.53	0.95	0.06	0.04	0.07	0.0254
σ_p	Inv.gamma	0.001	0.01	0.0003	0.0002	0.0004	0.004	0.002	0.006	0.0039
σ_s	Inv.gamma	0.001	0.01	0.04	0.03	0.05	0.034	0.025	0.043	0.0004
σ_g	Inv.gamma	0.001	0.01	0.0018	0.0016	0.0019	0.005	0.003	0.007	-
σ_m	Inv.gamma	0.001	0.01	-	-	-	0.027	0.024	0.029	-
$\sigma_{n,h}$	Inv.gamma	0.001	0.01	0.18	0.17	0.19	0.18	0.17	0.20	0.1218
$\sigma_{w,h}$	Inv.gamma	0.001	0.01	0.0049	0.0045	0.0054	0.0054	0.0049	0.0058	0.0071
σ_p^m	Inv.gamma	0.001	0.01	0.0046	0.0043	0.0050	0.0067	0.0061	0.0074	-

C.2 Posterior Distributions

Tables 2 and 3 report the posterior mean and 95 probability intervals for the structural parameters, together with the mean and the standard deviation of the prior distributions. We present the results for our two models and the mean of the posteriors in Iacoviello and Neri (2010), for sake of comparison.

One of the key parameter relates to the labor income share of credit unconstrained agents. Data are informative for the posterior distribution of λ since the mean of the posterior is significantly higher than its prior value. The posterior mean is 0.76 in the model with debt and 0.93 in the model with both debt and money. These

numbers imply a share of labor income accruing to credit-constrained agents of 24% and 7%, respectively. The share of credit-constrained agents is not only lower than its prior, but it is also lower than the one estimated by Iacoviello and Neri (2010), i.e. 21 %, indicating that the presence money in the model largely affects this structural parameter, reducing it by as much as 14%. Interestingly, money is effective in reducing the share of borrowers in the economy. In our model, price dynamics is much more rigid than in Iacoviello and Neri (2010) as the related parameter is $\theta = 0.46$ in the model with money and debt. In details, the presence of money significantly decreases price stickiness since the parameter θ is 0.83 in Iacoviello and Neri (2010) and 0.87 in the model in which only public debt is included. This is justified by the fact that liquidity allows prices to more easily adjust to the business cycle.

Finally, money amplifies the measurement error of inflation since the parameter σ_p^m is 0.0067 in the model with money and 0.0046 in the model without money.

D Impulse Responses and Transmission Mechanisms

To understand the transmission mechanisms underlying the estimated model, we report impulse response functions (IRFs) to three key disturbances: a fiscal shock, a conventional monetary policy shock, and a shock to the central bank’s inflation target from the model with money. These shocks are central to our analysis of public debt dynamics, redistribution, and the role of money.

Figure 10 reports the responses to a positive fiscal shock. The shock generates a persistent increase in output and a substantial and persistent rise in real public debt. Consumption responds heterogeneously across agents: borrowers’ consumption decreases persistently while the negative effect on savers’ consumption is more muted and temporary. This redistribution channel is a key mechanism in the model. Inflation rises moderately, prompting a monetary tightening that partially offsets the expansionary effects. However, in the estimated AM-PF configuration, mone-

tary policy primarily anchors inflation, while fiscal policy governs debt stabilisation. As a result, the fiscal shock produces sustained changes in the primary balance and accounts for a large share of long-run debt dynamics, as confirmed by the historical decomposition.

Figure 11 shows the responses to a contractionary interest rate shock. Output and consumption decline, with stronger effects on borrowers due to their higher sensitivity to financing conditions. Real debt increases temporarily as higher interest rates raise debt servicing costs, but the effect is less persistent than under fiscal disturbances. Inflation declines rapidly following the monetary tightening, consistent with an active monetary policy stance. Money growth adjusts endogenously, reflecting the model's money demand structure. Overall, monetary shocks affect debt primarily through interest rate and inflation channels, rather than through direct changes in the fiscal position.

Figure 12 reports the responses to a positive shock to the central bank's inflation target. This disturbance raises inflation and lowers the real interest rate in the short run, stimulating output and borrowers' consumption. Real debt decreases due to the temporary inflationary environment. Importantly, the inflation-target shock operates within the estimated AM–PF regime and does not represent a structural regime switch. Its effects are smaller relative to those of fiscal disturbances. Whereas fiscal shocks alter the primary balance directly and generate long-lasting changes in debt, inflation-target shocks influence debt indirectly via the price level and real interest rate.

Taken together, the impulse responses clarify the distinct roles of fiscal and monetary disturbances in the model. Fiscal shocks generate persistent debt dynamics and strong redistribution effects, while monetary and inflation-target shocks primarily operate through intertemporal substitution and price adjustments. These transmission patterns provide a structural interpretation of the historical decomposition results presented in section 4.2.

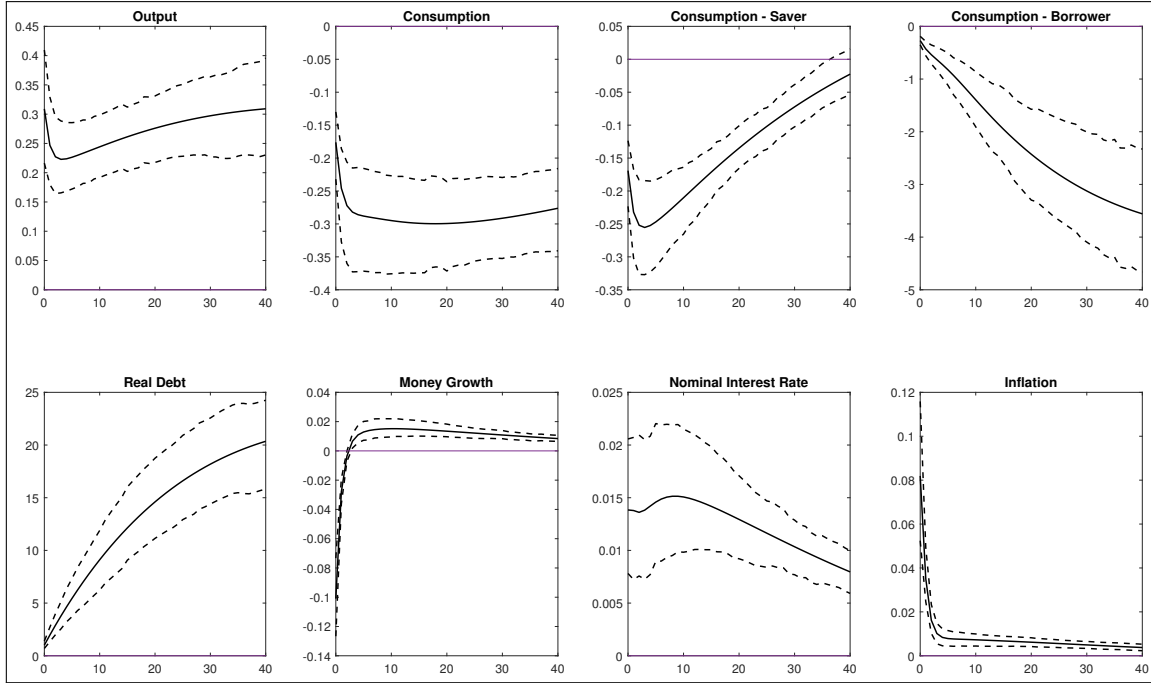


Figure 10: Impulse responses to fiscal shock in the model with money

E Robustness Checks

E.1 Automatic Stabilizers in the Fiscal Rule

In the baseline specification, fiscal policy is characterized by a debt-feedback rule in which lump-sum taxes respond to lagged public debt. While this formulation captures systematic debt stabilisation, it abstracts from the cyclical behavior of tax revenues associated with automatic stabilizers.

To address this concern, we re-estimate the model using an augmented fiscal rule in which taxes respond not only to lagged debt but also to output dynamics:

$$t_t = \gamma b_{t-1} + \gamma_y \widehat{\Delta GDP}_t, \quad (\text{E.1})$$

where the second term captures the cyclical component of tax revenues. This spec-

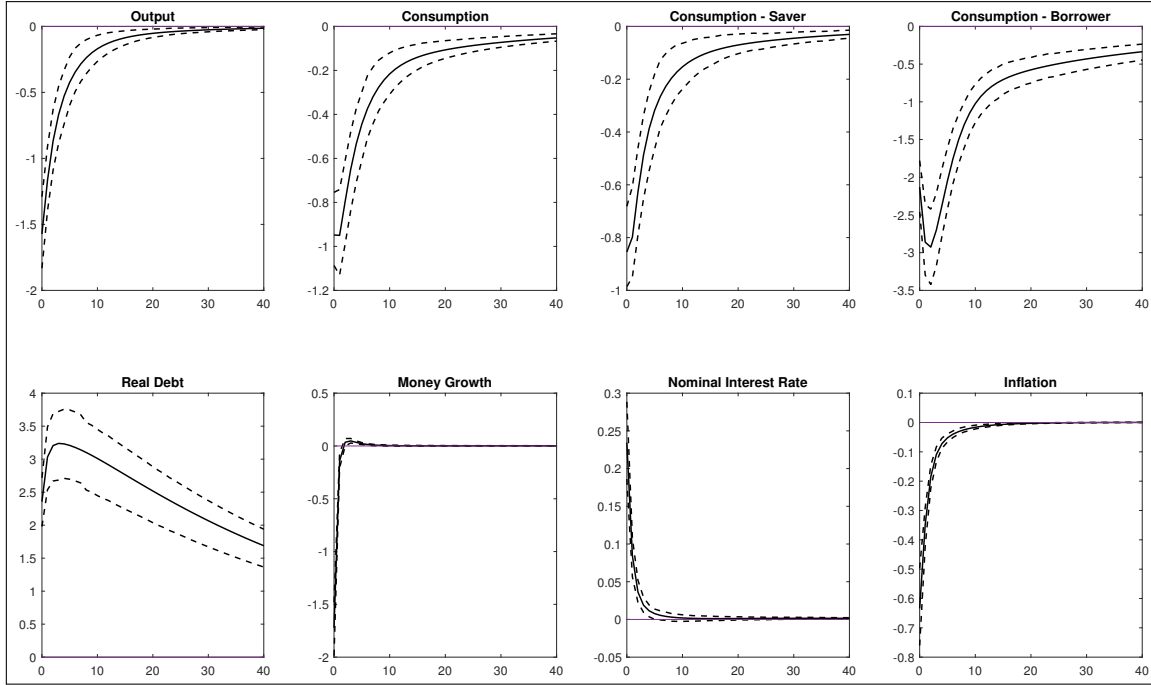


Figure 11: Impulse responses to interest rate shock in the model with money

ification captures the automatic stabilizer mechanism emphasized by Angeletos et al. (2024) by allowing tax revenues to decline (increase) during adverse (favorable) business cycle conditions, and increasing the potential role of non-fiscal shocks in explaining debt fluctuations.

The estimation results under this alternative specification confirm the robustness of our main findings. In particular, the estimated monetary-fiscal configuration remains in the Active Monetary-Passive Fiscal (AM-PF) region and the posterior distributions of the structural parameters and shocks' standard deviations and persistence are only marginally different from the baseline. The historical decomposition of public debt is displayed in Figure 13. The relative contributions of fiscal shocks, monetary shocks, and the inflation-target shock remain broadly similar to those in the baseline specification. Therefore, its qualitative interpretation is unchanged. The central bank inflation-target shock continues to account for a substantial share of debt

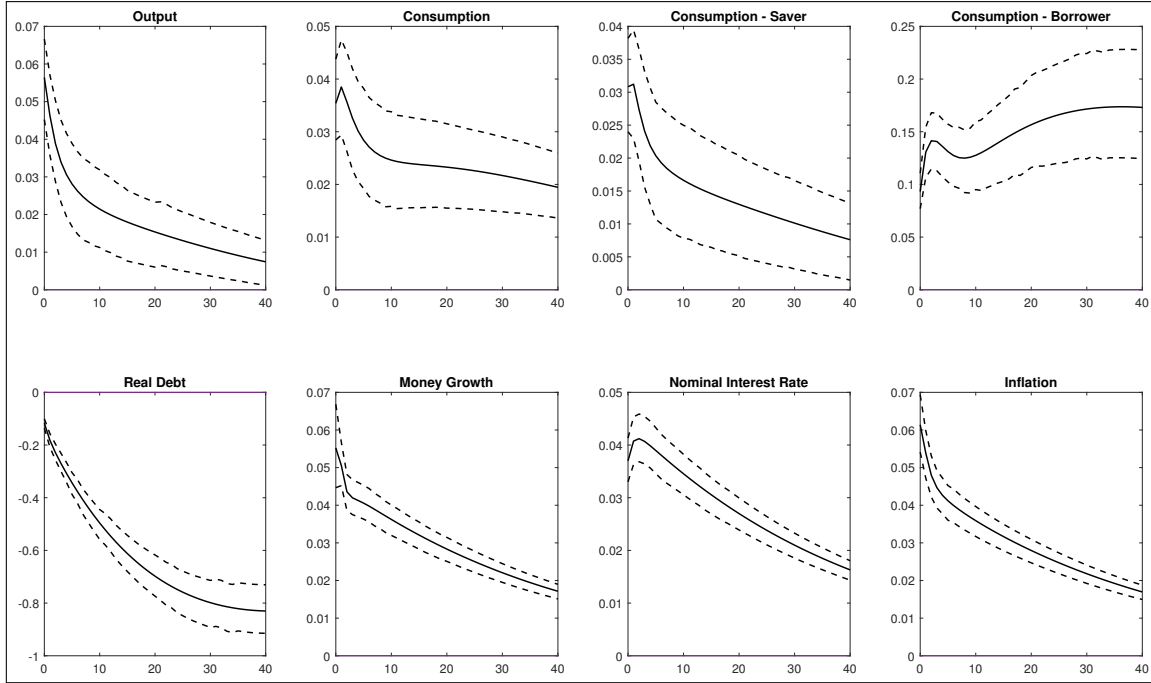


Figure 12: Impulse responses to central bank inflation target shock in the model with money

dynamics, and fiscal shocks remain quantitatively important. Although allowing for automatic stabilizers modestly increases the contribution of non-fiscal shocks to debt fluctuations, the qualitative patterns of the historical decomposition are unchanged.

These results indicate that our conclusions do not hinge on the absence of cyclical tax responses. The central mechanism emphasized in the paper, namely the interaction between fiscal and monetary policy, remains both qualitatively and quantitatively robust to the inclusion of automatic stabilizers in the fiscal rule.

E.2 Passive Monetary - Active Fiscal Regime

To assess whether our baseline results are driven by the calibration and prior distribution on policy parameters, we re-estimate the model under priors that concentrate mass in the region associated with a PM–AF regime.

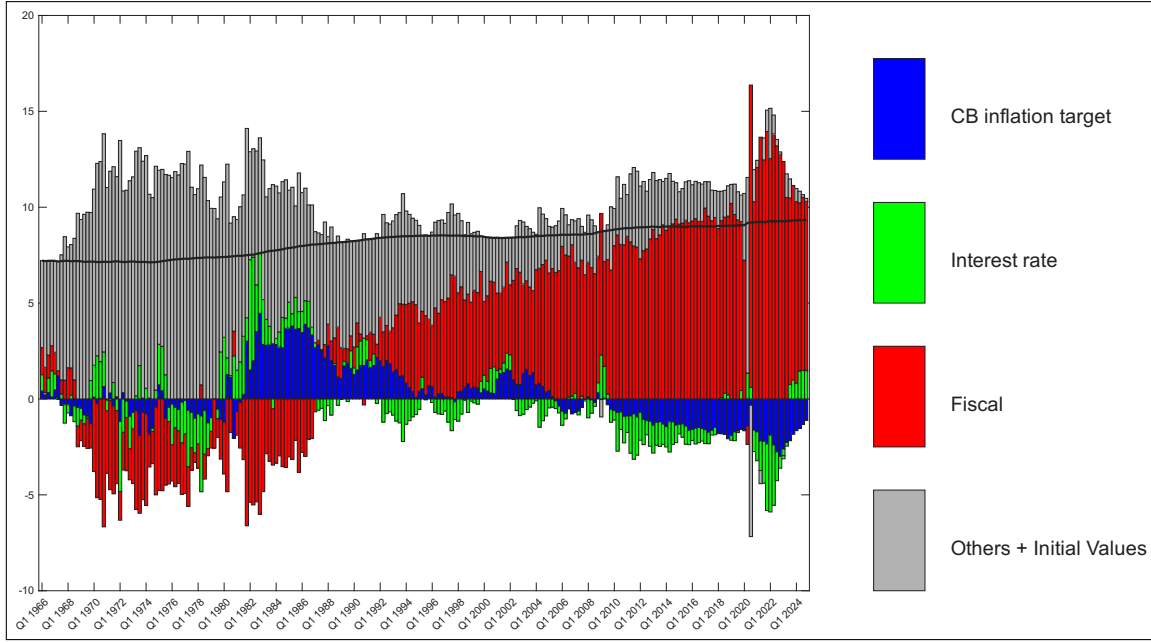


Figure 13: Historical decomposition of net real public debt issuance (log) under the fiscal rule with automatic stabilizers

Specifically, we modify the prior on the inflation coefficient in the Taylor rule by centering it at zero, thereby placing most prior mass in the region where the monetary authority reacts weakly to inflation. At the same time, we set the fiscal feedback parameter on public debt to a near-zero value (0.001), effectively removing systematic fiscal stabilisation of debt. This prior configuration concentrates probability mass in the region of the parameter space typically associated with fiscal dominance.

It is important to emphasize that, following the identification logic in ?, monetary–fiscal regimes correspond to distinct regions of the policy-parameter space rather than to different model structures. Accordingly, our exercise does not alter the model’s equations, but instead shifts prior mass toward the PM–AF region and lets the data determine the posterior allocation of probability across regimes.

Despite these PM–AF–oriented priors, the posterior distribution shifts back toward the AM–PF region as the posterior mean of the Taylor-rule coefficient moves

above unity ($r_\pi = 1.06$).

Model comparison based on marginal data densities strongly favors the baseline specification. The log marginal data density under the baseline AM–PF priors equals 5330.68, whereas under the PM–AF–oriented priors it falls to 5113.23. This implies a log Bayes factor of 217.45 in favor of the baseline specification, corresponding to overwhelming evidence against the PM–AF configuration in our sample.

These results indicate that the data do not support a fiscally dominant regime in the period under study. Instead, even when prior mass is concentrated in the PM–AF region, the posterior distribution reallocates probability toward a determinate AM–PF configuration, consistent with the regime characterization emphasized by Leeper and Leith (2016).