

Rule-Based Fiscal Stabilisation with Consumption Taxes

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Abstract

I study how far a consumption tax rule can substitute for interest rate policy when nominal rates are constrained. In a two-agent New Keynesian economy, the tax shifts spending across dates but also introduces labor supply distortions and affects tax revenue. Equilibrium determinacy depends jointly on transfer distribution and feedback strength. Weaker feedback improves population welfare under markup and productivity risk, while demand risk yields the highest welfare at an intermediate feedback strength. Inflation responds non-monotonically to consumption tax feedback strength, which can restrain inflation while producing different allocations and welfare from monetary policy.

JEL Codes: E52, E62, E63, D31, C62.

Keywords: Consumption taxes; fiscal stabilisation; heterogeneous households; equilibrium determinacy.

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1 Introduction

A temporary consumption tax can reproduce the intertemporal transmission of an interest rate adjustment when nominal rates are constrained.¹ It also changes the labour supply wedge and tax revenue, making the supporting transfer system part of stabilisation design. I study this interaction in a two-agent New Keynesian economy where the consumption tax follows a Taylor-type rule and is the sole active stabilisation instrument. Each adjustment is announced one period ahead, and a debt-stabilising transfer rule absorbs the resulting revenue changes. I find that the rule can produce smaller peak absolute inflation responses than the conventional monetary policy rule in the calibrated economy, but its effect on labour supply creates an output–inflation trade-off. Changing who receives the resulting transfer adjustment can then alter whether the tax and transfer rules pin down a unique equilibrium. Quantitatively, the welfare ranking depends on the shock and feedback strength. Consumption tax feedback and the transfer rule must therefore be assessed together.

Existing work identifies two fiscal approaches for reproducing outcomes attainable under monetary policy when interest rates are constrained. Correia et al. (2013) coordinate consumption and labour income taxes, using the former to reproduce the intertemporal wedge and the latter to offset its effect on marginal cost. Wolf (2025) instead shows that time-varying uniform transfers can reproduce output and inflation paths implementable through interest rate policy. I study the interaction between these channels in a two-agent New Keynesian economy, where a consumption tax rule generates fiscal adjustments that must be distributed across households. In the log-linearised benchmark model, aggregate equivalence continues to hold when savers absorb the residual adjustment, but transfers received by hand-to-mouth households affect current demand. Along stable transitions, aggregate

¹Temporary VAT reductions were implemented in the United Kingdom in 2008–09 and Germany in 2020 (Crossley, Low, and Sleeman 2014; Bachmann et al. 2026). Japan has proposed reducing the consumption tax on qualifying food purchases from 8 to 1 per cent from April 2027 to March 2029 and pairing it with income-linked payments to low- and middle-income households. Implementing legislation remained pending in August 2026 (The Japan Times 2026; Prime Minister’s Office of Japan 2026).

equivalence therefore requires hand-to-mouth households to receive the same transfer path as under monetary policy.

Within the log-linearised economy, exact replication through tax policy requires coordinated movements in consumption and labour income taxes. I ask what a consumption tax can achieve when the nominal interest rate and other tax instruments are held fixed. The Taylor-type feedback rule takes the structure as given and uses temporary consumption tax adjustments to stabilise shocks around the inherited steady state. Announcing each adjustment one period ahead allows the government to influence current spending through the relative price of current and future consumption. With the labour income tax fixed, the consumption tax also generates a distortionary labour supply wedge. The resulting movement in firms' marginal cost thus creates a trade-off between inflation and output stabilisation.

The labour supply margin that prevents joint replication also weakens the effect of a consumption tax adjustment on the output gap relative to an interest rate adjustment of the same size. Exact inflation matching supplies an inverse transmission coefficient against which to evaluate feedback strength. Scaling both conventional coefficients by this factor approximates closer to inflation targeting under monetary policy, which gives the transmission-compensated consumption tax rule. Transfer distribution can also change equilibrium determinacy. When part of the transfer adjustment reaches hand-to-mouth households, it changes their disposable income and spending, feeding back into output, inflation and tax revenue. Reallocating the transfer adjustment changes this feedback even when household composition and the aggregate policy rules remain fixed. With inflation and output coefficients under monetary policy, equilibrium determinacy holds when the adjustment is assigned entirely to savers, equally per household, or entirely to hand-to-mouth households. Under transmission-compensated feedback, equilibrium determinacy continues to hold when the adjustment is assigned entirely to savers or equally per household, but fails when it is assigned entirely to hand-to-mouth households. I vary a common multiplier on the inflation and output coefficients, including responses weaker than the conventional coefficients. Across this family,

the effect of transfer distribution on equilibrium determinacy varies non-monotonically with feedback strength.

In the calibrated economy, coordinated consumption and labour income taxes continue to reproduce aggregate and household allocations when the realised hand-to-mouth transfer path is matched. With only the consumption tax active, I evaluate transfer shares of 0, λ , and 0.4. Both the rule with conventional coefficients and the transmission-compensated rule reduce peak absolute inflation relative to the conventional monetary rule under demand, markup and productivity shocks. Across the feedback family, however, peak inflation first rises and then falls under all three transfer distributions. Assigning more of the adjustment to hand-to-mouth households shifts this reversal towards stronger feedback, and intermediate responses can produce higher peak inflation than the monetary policy regime (MP) when their share reaches 40 per cent.

The welfare comparison depends on the source of the shock. Weaker feedback improves population welfare under markup and productivity risk throughout the range considered. Under demand risk, the highest welfare occurs at an intermediate feedback value that falls as more of the transfer adjustment reaches hand-to-mouth households and every evaluated admissible rule remains below MP. Transmission-compensated feedback gives the lowest peak inflation in the evaluated family, yet lowers population welfare relative to conventional feedback under all three recurrent shocks and transfer distributions.

In heterogeneous-household economies, Seidl and Seyrich (2023) combine consumption and labour income taxes with public debt to reproduce household-level allocations. Bilbiie, Monacelli, and Perotti (2024) study how stabilisation and redistribution interact and establish an equivalence between real interest rate movements and expected changes in redistributive transfers in a debt-free two-agent economy. Bartal and Becard (2024) compare temporary consumption tax cuts with uniform transfers under a common public debt path,

including an experiment that holds debt constant.² Rachel and Ravn (2026) show that monetary stabilisation and fiscal debt adjustment must be evaluated jointly when government debt affects private demand. Here I discuss the case where the nominal interest rate is fixed and fiscal adjustment is generated by an anticipated consumption tax feedback rule. Holding household composition, the tax feedback coefficients, and the aggregate debt-stabilising transfer rule fixed, changing the distribution of that adjustment can alter equilibrium determinacy.

Section 2 presents the model and policy regimes. Section 3 develops the replication benchmark, the one-tax output–inflation trade-off, and the interaction between tax feedback and transfer distribution. Section 4 introduces the asymmetric calibration and assesses equilibrium determinacy. Section 5 evaluates transmission and welfare under alternative rules and transfer distributions.

2 Model

The economy builds on the standard two-agent New Keynesian model with limited asset market participation (Galí, López-Salido, and Vallés 2004; Bilbiie 2008). Savers trade one-period nominal bonds and own firms, whereas hand-to-mouth households hold no assets and spend their current disposable income. Firms set prices subject to Calvo rigidity. The government purchases a fixed quantity of final goods, issues one-period nominal debt, levies taxes on consumption, labour income, and profits, and pays lump-sum transfers. I compare an interest rate rule with two fiscal regimes: one jointly adjusts consumption and labour income taxes, whereas the other leaves the labour income and profit tax rates fixed and uses only the consumption tax as a time-varying tax instrument. In both fiscal regimes, the consumption tax is announced one period in advance.

²Related work studies consumption tax feedback in a representative-agent model (Leitner 2020), equilibrium determinacy under balanced-budget consumption tax rules (Giannitsarou 2007; Nourry, Seegmuller, and Venditti 2013; McKnight 2017), and VAT transmission with household heterogeneity (Andreolli, Rickard, and Surico 2024; Bachmann et al. 2026).

2.1 Households

The economy contains a unit mass of households, indexed by $i \in [0, 1]$, with identical preferences but different access to asset markets. A fraction $1 - \lambda$ of households are savers, denoted by S , and the remaining fraction λ of households are hand-to-mouth, denoted by H . Both household types maximise

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t U(C_{i,t}, N_{i,t}) \quad (1)$$

Period utility is

$$U(C_{i,t}, N_{i,t}) = \frac{C_{i,t}^{1-\sigma}}{1-\sigma} - \nu \frac{N_{i,t}^{1+\varphi}}{1+\varphi} \quad (2)$$

Here $\beta \in (0, 1)$ is the discount factor; $\sigma > 0$ is the inverse intertemporal elasticity of substitution, with the usual logarithmic limit at $\sigma = 1$; $\varphi > 0$ is the inverse Frisch elasticity of labour supply; and $\nu > 0$ scales the disutility of labour. The budget constraint of a hand-to-mouth household is

$$(1 + \tau_{c,t})P_t C_{H,t} = (1 - \tau_{n,t})W_t N_{H,t} + T_{H,t} \quad (3)$$

where $\tau_{c,t}$ is the consumption tax, $\tau_{n,t}$ is the labour income tax, W_t is the nominal wage, P_t is the aggregate price index, and $T_{H,t}$ is the nominal lump-sum transfer received by a hand-to-mouth household. The budget constraint of a saver is

$$(1 + \tau_{c,t})P_t C_{S,t} + \frac{B_t}{R_t} + s_{S,t+1}P_t^e \leq B_{t-1} + (1 - \tau_{n,t})W_t N_{S,t} + s_{S,t}(P_t^e + (1 - \tau_{d,t})\Pi_t) + T_{S,t} \quad (4)$$

where B_t is the face value of one-period nominal bonds held by each saver and purchased for B_t/R_t , R_t is the gross nominal interest rate, $s_{S,t}$ denotes equity holdings, P_t^e is the ex-dividend equity price, $\tau_{d,t}$ is the profit tax, Π_t denotes aggregate nominal profits, and $T_{S,t}$ is the nominal lump-sum transfer received by a saver.

Optimal labour supply satisfies the same intratemporal condition for both household types:

$$\nu C_{i,t}^\sigma N_{i,t}^\varphi = \frac{1 - \tau_{n,t}}{1 + \tau_{c,t}} \frac{W_t}{P_t} \quad i \in \{H, S\} \quad (5)$$

For savers, the Euler equation for nominal bonds is

$$1 = R_t \mathbb{E}_t [M_{t,t+1}] = \beta R_t \mathbb{E}_t \left[\left(\frac{C_{S,t+1}}{C_{S,t}} \right)^{-\sigma} \frac{1 + \tau_{c,t}}{1 + \tau_{c,t+1}} \frac{1}{\pi_{t+1}} \right] \quad (6)$$

Here $\pi_{t+1} \equiv P_{t+1}/P_t$ is gross inflation in the pre-tax final-good price index P_t . The tax-inclusive price paid by households is $(1 + \tau_{c,t})P_t$. The associated nominal stochastic discount factor is

$$M_{t,t+k} \equiv \beta^k \left(\frac{C_{S,t+k}}{C_{S,t}} \right)^{-\sigma} \frac{1 + \tau_{c,t}}{1 + \tau_{c,t+k}} \frac{P_t}{P_{t+k}} \quad k \geq 0 \quad (7)$$

It follows that the equity price satisfies

$$P_t^e = \mathbb{E}_t [M_{t,t+1} (P_{t+1}^e + (1 - \tau_{d,t+1}) \Pi_{t+1})] \quad (8)$$

2.2 Production

A competitive final good producer aggregates a continuum of intermediate varieties with the CES technology

$$Y_t = \left(\int_0^1 Y_t(j)^{\frac{\epsilon-1}{\epsilon}} dj \right)^{\frac{\epsilon}{\epsilon-1}}$$

The associated price index is

$$P_t = \left(\int_0^1 P_t(j)^{1-\epsilon} dj \right)^{\frac{1}{1-\epsilon}}$$

where $\epsilon > 1$ is the elasticity of substitution across varieties. Each intermediate good firm j produces according to

$$Y_t(j) = A_t N_t(j) \quad (9)$$

where A_t denotes aggregate productivity. Nominal operating profits before tax are

$$\Pi_t(j) = P_t(j)Y_t(j) - W_tN_t(j) \quad \Pi_t = \int_0^1 \Pi_t(j) dj$$

Demand for variety j is given by

$$Y_t(j) = \left(\frac{P_t(j)}{P_t} \right)^{-\epsilon} Y_t$$

Nominal marginal cost is common across firms and equals

$$MC_t = \frac{W_t}{A_t}$$

Let $mc_t \equiv MC_t/P_t$ denote real marginal cost. Following Calvo (1983), in each period a fraction $1 - \theta_p$ of firms can reset their price. A firm that reoptimises in period t chooses $\bar{P}_t$ to maximise the expected discounted stream of profits:

$$\max_{\bar{P}_t} \mathbb{E}_t \sum_{k=0}^{\infty} \theta_p^k M_{t,t+k} [\bar{P}_t Y_{t+k|t}(j) - W_{t+k} N_{t+k|t}(j)]$$

subject to

$$Y_{t+k|t}(j) = \left(\frac{\bar{P}_t}{P_{t+k}} \right)^{-\epsilon} Y_{t+k} \quad Y_{t+k|t}(j) = A_{t+k} N_{t+k|t}(j)$$

The profit tax is fixed in every maintained policy regime. Profits after tax are therefore a constant multiple of operating profits, so the tax does not affect the optimal reset price and is omitted from the firm objective. Let $p_t^* \equiv \bar{P}_t/P_t$ denote the relative reset price and let Δ_t denote price dispersion. The Calvo pricing structure implies

$$1 = \theta_p \pi_t^{\epsilon-1} + (1 - \theta_p)(p_t^*)^{1-\epsilon}$$

$$\Delta_t = \theta_p \pi_t^{\epsilon} \Delta_{t-1} + (1 - \theta_p)(p_t^*)^{-\epsilon}$$

Exact aggregation gives $N_t = Y_t \Delta_t / A_t$. Here and below, hats on positive variables denote log deviations from steady state. Around the zero-inflation steady state, $\bar{\Delta} = 1$, and price dispersion has no first-order deviation. Aggregate production satisfies $\hat{y}_t = \hat{A}_t + \hat{n}_t$ to first order. The condition for the optimal reset price then yields the standard New Keynesian Phillips curve:

$$\hat{\pi}_t = \beta \mathbb{E}_t \hat{\pi}_{t+1} + \psi_{mc} \widehat{mc}_t \quad \psi_{mc} \equiv \frac{(1 - \theta_p)(1 - \beta \theta_p)}{\theta_p} \quad (10)$$

In the symmetric benchmark of Section 3, a fixed sales subsidy removes the steady-state markup and is offset each period by a lump-sum levy on firms that is independent of their price and output choices. The two terms cancel in the consolidated government budget and aggregate profit accounting and leave the log-linear Phillips curve unchanged.

2.3 Government and policy regimes

The government issues one-period nominal debt, pays transfers, collects taxes on consumption, labour income, and profits, and purchases a fixed quantity G of final goods. Its nominal budget constraint is

$$T_t + P_t G + B_{g,t-1} = T R_t + \frac{B_{g,t}}{R_t} \quad (11)$$

where $B_{g,t}$ is the face value of one-period nominal government debt. Aggregate transfers T_t are defined by

$$T_t = (1 - \lambda) T_{S,t} + \lambda T_{H,t} \quad (12)$$

Real aggregate and household transfers are expressed as deviations from their steady-state levels, scaled by steady-state output:

$$\tilde{T}_t \equiv \frac{T_t/P_t - \bar{T}^r}{\bar{Y}} \quad \tilde{T}_{i,t} \equiv \frac{T_{i,t}/P_t - \bar{T}_i^r}{\bar{Y}} \quad i \in \{S, H\} \quad \bar{T}_i^r \equiv \frac{\bar{T}_i}{\bar{P}} \quad \bar{T}^r \equiv \frac{\bar{T}}{\bar{P}}$$

Let $\omega_T \in [0, 1]$ govern how the aggregate transfer deviation is distributed across household types:

$$\lambda \tilde{T}_{H,t} = \omega_T \tilde{T}_t \quad (1 - \lambda) \tilde{T}_{S,t} = (1 - \omega_T) \tilde{T}_t \quad (13)$$

The cases $\omega_T = 0$, $\omega_T = \lambda$, and $\omega_T = 1$ assign the entire adjustment to savers, distribute it equally per household, and assign it entirely to hand-to-mouth households, respectively.

Aggregate consumption is

$$C_t \equiv (1 - \lambda)C_{S,t} + \lambda C_{H,t}$$

Total nominal tax revenue is

$$TR_t = \tau_{c,t}P_tC_t + \tau_{n,t}W_tN_t + \tau_{d,t}\Pi_t \quad (14)$$

Government purchases are constant across policy regimes, and their steady-state level is determined separately in the analytical and quantitative economies so that the resource constraint and government budget both hold. The maintained debt-stabilising transfer rule adjusts real aggregate transfers to the real value of inherited nominal debt:

$$\frac{T_t}{P_t} - \bar{T}^r = -\gamma_g \left(\frac{B_{g,t-1}}{P_{t-1}} - \bar{b}^r \right) \quad \bar{b}^r \equiv \frac{\bar{B}_g}{\bar{P}} \quad \gamma_g > 0 \quad (15)$$

The rule responds to the real debt inherited from the preceding period. Unless an experiment explicitly replaces this rule, the same debt-stabilising transfer rule is imposed under the monetary policy and unconventional fiscal policy regimes. This debt-responsive adjustment is passive in the sense of Leeper (1991). The coefficient γ_g is chosen so that debt dynamics are stable and satisfy the government transversality condition.

The policy comparison has three regimes. Under monetary policy (**MP**), the nominal interest rate follows a Taylor rule and all tax rates are fixed. In the coordinated unconventional fiscal policy regime used for the equivalence benchmark (**UFPE**), the consumption and

labour income tax rates adjust jointly. Under limited unconventional fiscal policy (**LUFP**), the nominal rate is fixed and the consumption tax is the only time-varying tax instrument.

2.3.1 Monetary policy regime

Under the monetary policy regime, tax rates remain fixed at $(\bar{\tau}_c, \bar{\tau}_n, \bar{\tau}_d)$, and the central bank follows the Taylor rule

$$R_t = \bar{R} \left(\frac{\pi_t}{\bar{\pi}} \right)^{\theta_\pi} \left(\frac{Y_t}{\bar{Y}} \right)^{\theta_Y} \exp(\mu_t) \quad (16)$$

Here $\bar{R}$, $\bar{\pi}$, and $\bar{Y}$ denote the steady-state gross nominal interest rate, gross inflation, and output. Both the analytical and quantitative systems use a zero-inflation steady state, so $\bar{\pi} = 1$. The coefficients θ_π and θ_Y measure the responsiveness of the rule to inflation and output, and μ_t is a monetary policy shock following

$$\mu_{t+1} = \rho_\mu \mu_t + \epsilon_{t+1} \quad (17)$$

where ρ_μ is the persistence parameter and ϵ_{t+1} is the innovation. The expected gross real return under MP is

$$R_{r,t}^M \equiv R_t \mathbb{E}_t \left(\frac{1}{\pi_{t+1}} \right) \quad (18)$$

2.3.2 Unconventional fiscal policy regimes

Under either fiscal regime, the nominal interest rate remains at $R_t = \bar{R}$. Holding the nominal rate fixed, an increase in $(1 + \tau_{c,t}) / (1 + \tau_{c,t+1})$ raises the effective return to postponing consumption and therefore affects the same intertemporal substitution margin as the nominal interest rate under MP.

The consumption tax applied at t is predetermined by the announcement made at $t - 1$. After observing current inflation, output, and the current policy shock, the government uses the following rule to announce $\tau_{c,t+1}$:

$$\frac{1 + \tau_{c,t}}{1 + \tau_{c,t+1}} = \left(\frac{\pi_t}{\bar{\pi}}\right)^{\gamma_\pi^j} \left(\frac{Y_t}{\bar{Y}}\right)^{\gamma_Y^j} \exp(\zeta_t^j) \quad j \in \{U, L\} \quad (19)$$

where U denotes UFPE, L denotes LUFP, and γ_π^j and γ_Y^j are the regime-specific feedback coefficients. The policy shock follows

$$\zeta_{t+1}^j = \rho_\zeta \zeta_t^j + \epsilon_{t+1}^{\zeta,j} \quad (20)$$

where ρ_ζ is the persistence parameter and $\epsilon_{t+1}^{\zeta,j}$ is the innovation. The effective real return relevant for savers is

$$R_{r,t}^F = \bar{R} \mathbb{E}_t \left[\frac{1}{\pi_{t+1}} \frac{1 + \tau_{c,t}}{1 + \tau_{c,t+1}} \right] \quad (21)$$

The consumption tax also enters the household labour supply wedge in (5). UFPE offsets this intratemporal effect by jointly adjusting the labour income tax to keep the wedge constant (Correia et al. 2013), whereas LUFP leaves it active. The corresponding UFPE restriction is

$$\frac{1 - \tau_{n,t}}{1 + \tau_{c,t}} = \frac{1 - \bar{\tau}_n}{1 + \bar{\tau}_c} \quad \tau_{d,t} = \bar{\tau}_d \quad (22)$$

Thus, a higher consumption tax rate is paired with a lower labour income tax rate. Under LUFP, by contrast, the consumption tax is the only time-varying tax rate:

$$\tau_{n,t} = \bar{\tau}_n \quad \tau_{d,t} = \bar{\tau}_d \quad (23)$$

Holding the profit tax rate fixed keeps the comparison focused on whether the labour income tax accompanies the consumption tax rule.

2.4 Market clearing

Goods market clearing implies

$$Y_t = (1 - \lambda)C_{S,t} + \lambda C_{H,t} + G \quad (24)$$

Labour market clearing implies

$$N_t = (1 - \lambda)N_{S,t} + \lambda N_{H,t} \quad (25)$$

Only savers hold assets. Since all savers are identical, their equity holdings satisfy

$$s_{S,t+1} = s_{S,t} = s = \frac{1}{1 - \lambda} \quad (26)$$

In the baseline economy, aggregate profits are

$$\Pi_t = P_t Y_t - W_t N_t \quad (27)$$

Bond market clearing implies

$$B_{g,t} = (1 - \lambda)B_t \quad (28)$$

2.5 Equilibrium

Given inherited real public debt $B_{g,-1}/P_{-1}$, inherited price dispersion Δ_{-1} , private asset holdings, the initially announced consumption tax $\tau_{c,0}$, fixed real government purchases G , and the exogenous processes, an equilibrium is a sequence

$$\left\{ \begin{array}{l} C_{H,t}, C_{S,t}, N_{H,t}, N_{S,t}, Y_t, P_t, W_t, \Pi_t, \\ P_t^e, s_{S,t}, B_t, B_{g,t}, T_{S,t}, T_{H,t}, T_t, TR_t, R_t, \\ p_t^*, \Delta_t, \tau_{c,t}, \tau_{n,t}, \tau_{d,t} \end{array} \right\}_{t \geq 0}$$

such that, for all $t \geq 0$,

1. hand-to-mouth households solve their static problem and satisfy (3) and (5);
2. saver households solve their intertemporal problem and satisfy (4), (5), (6), (8), and the associated transversality conditions;
3. final good producers and intermediate good firms solve their optimisation problems, and pricing satisfies the Calvo price index and price dispersion conditions stated above;
4. the government budget constraint (11), the tax revenue identity (14), the aggregate transfer identity (12), the distribution in (13), and either the debt-stabilising transfer rule (15) or the alternative condition for budget adjustment specified by the experiment hold;
5. the goods, labour, bond, and equity market clearing conditions hold;
6. policy satisfies the MP, UFPE, or LUFPE regime defined above.

3 Consumption Tax Targeting: Equivalence, Trade-offs, and Determinacy

This section develops the analytical results in two nested systems. In the three-equation allocation block, the transfer adjustment is assigned entirely to savers. Coordinated movements in consumption and labour income taxes then reproduce the output and inflation paths under monetary policy, whereas holding the labour income tax fixed creates an output–inflation trade-off. The four-equation system adds the fiscal state implied by the government budget and debt-stabilising transfer rule. When part of the transfer adjustment reaches hand-to-mouth households, transfers move current demand directly, while current tax revenue changes public debt and hence the aggregate transfer adjustment in the following period.

Equilibrium determinacy therefore depends jointly on tax feedback and the distribution of the transfer adjustment.

3.1 Common analytical normalisation

To derive the policy mappings in closed form, I use a symmetric analytical benchmark in which savers and hand-to-mouth households have identical steady-state consumption and hours. Normalise $\bar{A} = \bar{P} = \bar{Y} = \bar{N}_S = \bar{N}_H = 1$, define $s_C \equiv \bar{C}_i/\bar{Y}$, and set $\bar{\pi} = 1$ and $\bar{R} = \beta^{-1}$. Thus $\bar{C}_S = \bar{C}_H = s_C$. I remove the steady-state markup distortion using the fixed sales subsidy described in Section 2, which satisfies $1 + \varsigma = \epsilon/(\epsilon - 1)$ (Bilbiie 2008; Cantore and Freund 2021). The benchmark uses the tax rates reported in Table 1 and sets

$$\bar{B}_g = \bar{T}_S = \bar{T}_H = 0 \tag{29}$$

The household budget and resource constraint imply³

$$s_C = \frac{1 - \bar{\tau}_n}{1 + \bar{\tau}_c} \quad \frac{\bar{G}}{\bar{Y}} = 1 - s_C \quad \nu = s_C^{1-\sigma}$$

Revenue from consumption and labour income taxes finances positive government purchases while the sales subsidy and firm levy offset one another and therefore have no net fiscal cost. With the steady-state markup removed, distributable profits are zero, so the profit tax raises no steady-state revenue, although it affects the first-order response of revenue to profit fluctuations. The calibrated asymmetric economy restores unequal household allocations and saver asset income.

³Appendix S1 verifies the steady-state level equations.

3.2 Aggregate equivalence and the one-tax trade-off

The three-equation system isolates the allocation effects of the tax wedges before introducing feedback through the government budget. The entire transfer adjustment is assigned to savers, so hand-to-mouth consumption contains no transfer term. Saver transfers do not enter the Euler equation directly, and therefore output, inflation, and the tax wedges can be solved, conditional on the government budget and transversality condition, without tracking public debt or saver transfers. These fiscal quantities are determined subsequently. Superscripts M and F denote the monetary and unconventional fiscal policy regimes. In either unconventional fiscal policy regime, $(\gamma_\pi^F, \gamma_Y^F, \zeta_t^F)$ takes the corresponding UFPE or LUFP values.

Combining the hand-to-mouth budget constraint, labour supply, and market clearing yields saver consumption as a function of aggregate output and productivity:

$$\hat{c}_{S,t}^j = \Lambda \hat{y}_t^j + \Xi \hat{A}_t^j \quad j \in \{M, F\} \quad (30)$$

Household heterogeneity determines the coefficients Λ and Ξ :

$$\begin{aligned} \eta &\equiv \frac{1 - \sigma}{\sigma + \varphi} \\ \Lambda &\equiv \frac{(1 - \lambda + \lambda\eta\varphi)/s_C - \lambda(1 + \eta)\varphi}{1 - \lambda} \\ \Xi &\equiv \frac{\lambda}{1 - \lambda}(1 + \eta)\varphi \end{aligned} \quad (31)$$

The coefficient Λ measures how saver consumption changes with aggregate output and therefore enters the intertemporal transmission coefficient derived below. The coefficient Ξ measures the response of saver consumption to productivity at a given output level.⁴

⁴Appendix S1 derives both coefficients and reports their limiting cases.

In the analytical system, the relevant tax variables are log deviations of the gross consumption tax wedge and the net labour income tax wedge

$$\hat{\tau}_{c,t} \equiv \log\left(\frac{1 + \tau_{c,t}}{1 + \bar{\tau}_c}\right) \quad \hat{\tau}_{n,t} \equiv \log\left(\frac{1 - \tau_{n,t}}{1 - \bar{\tau}_n}\right)$$

The consumption tax applied at t was announced at $t - 1$ and is therefore predetermined. Output and inflation are forward-looking variables. Using (30), the log-linear equilibrium under either unconventional fiscal policy regime is given by

$$\hat{y}_t^F = \mathbb{E}_t \hat{y}_{t+1}^F - \frac{1}{\sigma\Lambda} [\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} - \mathbb{E}_t \hat{\pi}_{t+1}^F] + \frac{\Xi}{\Lambda} (\mathbb{E}_t \hat{A}_{t+1}^F - \hat{A}_t^F) \quad (32)$$

$$\hat{\pi}_t^F = \beta \mathbb{E}_t \hat{\pi}_{t+1}^F + \psi_{mc} \chi \hat{y}_t^F + \psi_{mc} z \hat{A}_t^F + \psi_{mc} \hat{\tau}_{c,t} - \psi_{mc} \hat{\tau}_{n,t} \quad (33)$$

$$\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} = \gamma_\pi^F \hat{\pi}_t^F + \gamma_Y^F \hat{y}_t^F + \zeta_t^F \quad (34)$$

Under monetary policy, the corresponding system is

$$\hat{y}_t^M = \mathbb{E}_t \hat{y}_{t+1}^M - \frac{1}{\sigma\Lambda} [\hat{R}_t^M - \mathbb{E}_t \hat{\pi}_{t+1}^M] + \frac{\Xi}{\Lambda} (\mathbb{E}_t \hat{A}_{t+1}^M - \hat{A}_t^M) \quad (35)$$

$$\hat{\pi}_t^M = \beta \mathbb{E}_t \hat{\pi}_{t+1}^M + \psi_{mc} \chi \hat{y}_t^M + \psi_{mc} z \hat{A}_t^M \quad (36)$$

$$\hat{R}_t^M = \theta_\pi \hat{\pi}_t^M + \theta_Y \hat{y}_t^M + \mu_t \quad (37)$$

Here $\chi \equiv \varphi + \frac{\sigma}{s_c}$ measures how strongly marginal cost responds to output, $z \equiv -(1 + \varphi)$ is the productivity loading, and ψ_{mc} maps movements in marginal cost into inflation under Calvo pricing.

Under UFPE, the labour income tax moves so that $\hat{\tau}_{n,t} = \hat{\tau}_{c,t}$, causing the two tax terms in the Phillips curve to cancel. Under LUFP, the labour income tax remains fixed, so the consumption tax continues to affect marginal cost. Household heterogeneity changes the strength of intertemporal transmission through Λ . At the reference calibration reported in Section 4, $\Lambda > 0$, so a higher effective real return lowers current demand and output, as in the standard case described by Bilbiie (2008).

3.2.1 Coordinated two-tax benchmark

Proposition 1 gives sufficient conditions under which coordinated consumption and labour income taxes reproduce the monetary policy paths of output and inflation.

Proposition 1 (Aggregate equivalence with saver-only transfers). *Suppose MP and UFPE start from the same steady state and face the same non-policy shocks. Assume $\Lambda \neq 0$. Suppose the transfer adjustment is assigned entirely to savers and the UFPE fiscal implementation satisfies the government budget and the government transversality condition. Suppose the reduced MP system for output and inflation is locally determinate. Take the inherited consumption tax as given. If the UFPE instruments satisfy*

$$\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} = \theta_\pi \hat{\pi}_t^F + \theta_Y \hat{y}_t^F + \zeta_t^U \quad \zeta_t^U = \mu_t \quad \hat{\tau}_{n,t} = \hat{\tau}_{c,t} \quad (38)$$

then UFPE reproduces the MP paths of output and inflation.

Proof. Substituting each regime's policy rule into its IS equation and imposing $\hat{\tau}_{n,t} = \hat{\tau}_{c,t}$ and $\zeta_t^U = \mu_t$ makes the UFPE IS equation and Phillips curve algebraically identical to their MP counterparts. The reduced MP and UFPE systems therefore have the same set of bounded solutions for $(\hat{y}_t, \hat{\pi}_t)$. Since the reduced MP system is locally determinate, this set contains a single path, which UFPE reproduces. $\square$

The inflation path matched in Proposition 1 is measured in the pre-tax final-good price. Inflation in the tax-inclusive price paid by households also reflects changes in the consumption tax and need not coincide across regimes. The tax instruments enter the reduced allocation only through the intertemporal change in the consumption tax and the difference between the consumption and labour income tax wedges. Once output and inflation under monetary policy have returned to steady state, the coordinated tax wedges may stop changing at a common non-zero deviation. The reduced allocation then returns to steady state, but tax

revenue, saver transfers and public debt may settle at different long-run positions. Exact output and inflation equivalence is consequently conditional on a feasible fiscal implementation and does not pin down the long-run tax, transfer, or debt positions.

3.2.2 The one-tax trade-off

The coordinated benchmark identifies the labour income tax adjustment required for output and inflation equivalence. LUFP removes that adjustment and leaves the consumption tax as the only time-varying stabilisation instrument:

$$\frac{1 + \tau_{c,t}}{1 + \tau_{c,t+1}} = \left(\frac{\pi_t}{\bar{\pi}}\right)^{\gamma_\pi^L} \left(\frac{Y_t}{\bar{Y}}\right)^{\gamma_Y^L} \exp(\zeta_t^L) \quad (39)$$

The nominal interest rate, labour income tax and profit tax remain at $(\bar{R}, \bar{\tau}_n, \bar{\tau}_d)$. This restriction creates a one-instrument problem: the consumption tax cannot generally reproduce both the output and inflation paths under monetary policy.

Proposition 2 (Output–inflation trade-off with one tax). *Consider the saver-only three-equation system. Suppose MP and LUFP start from the same steady state and face the same productivity path. Assume that $0 < \theta_p < 1$ and $\Lambda \neq 0$. If LUFP reproduces both the MP output and inflation paths, then $\hat{\tau}_{c,t} = 0$ and $\hat{R}_t^M = 0$ for every t . An MP allocation with a non-zero interest rate path therefore cannot have both its output and inflation paths reproduced with the consumption tax alone.*

Proof. If output, inflation, and productivity are identical across regimes, subtracting the MP Phillips curve from the LUFP Phillips curve leaves $\psi_{mc}\hat{\tau}_{c,t} = 0$. Since $\psi_{mc} > 0$, $\hat{\tau}_{c,t} = 0$. The change in the consumption tax wedge is then also zero. Subtracting the two IS equations leaves $\hat{R}_t^M = 0$. Hence simultaneous replication is possible only for an MP path with no interest rate movement. $\square$

The consumption tax changes what labour income can buy. With the labour income tax fixed, a consumption tax cut increases the purchasing power of a given wage. Holding

consumption and hours fixed in (5), the same allocation therefore requires a lower producer real wage and, at unchanged productivity, lower real marginal cost. Consumption, hours and wages adjust jointly in equilibrium, while this direct tax effect changes the output level consistent with a given inflation path. The analysis next asks how output must adjust to reproduce inflation under monetary policy.

3.2.3 Inflation targeting with one tax

To compare consumption tax transmission with interest rate transmission, I write the LUFP system in terms of the output gap. Output under flexible prices is

$$\hat{y}_t^{F,\text{flex}} = -\chi^{-1}\hat{\tau}_{c,t} - \chi^{-1}z\hat{A}_t \quad (40)$$

Define the output gap by

$$\hat{y}_t^{F,\text{gap}} \equiv \hat{y}_t^F - \hat{y}_t^{F,\text{flex}}$$

Because the consumption tax rule responds to output rather than the output gap, combining the rule with the saver Euler equation and Phillips curve gives

$$\hat{y}_t^{F,\text{gap}} = \mathbb{E}_t \hat{y}_{t+1}^{F,\text{gap}} - \frac{1}{\sigma\Lambda} [\Omega_\tau (\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1}) - \mathbb{E}_t \hat{\pi}_{t+1}^F - r_t^*] \quad (41)$$

$$\hat{\pi}_t^F = \beta \mathbb{E}_t \hat{\pi}_{t+1}^F + \kappa \hat{y}_t^{F,\text{gap}} \quad (42)$$

$$(1 + \gamma_Y^L \chi^{-1}) \hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} = \gamma_\pi^L \hat{\pi}_t^F + \gamma_Y^L \hat{y}_t^{F,\text{gap}} - \gamma_Y^L \chi^{-1} z \hat{A}_t^F + \zeta_t^L \quad (43)$$

where

$$\Omega_\tau \equiv \frac{\chi - \sigma\Lambda}{\chi} \quad \kappa \equiv \psi_{mc}\chi \quad r_t^* \equiv \sigma (\Xi - \Lambda z \chi^{-1}) (\mathbb{E}_t \hat{A}_{t+1} - \hat{A}_t) \quad (44)$$

Here r_t^* is the natural real rate associated with expected productivity growth in the allocation under flexible prices. The coefficient Ω_τ measures how a change in the consumption tax wedge moves the output gap relative to an interest rate movement of the same size. A higher current tax relative to the announced future tax induces savers to postpone consumption.

The resulting decline in output and labour income also reduces spending by hand-to-mouth households, amplifying the aggregate contraction initiated by savers' response to the intertemporal tax wedge. What makes consumption tax transmission relatively weaker is that the tax also lowers output under flexible prices, offsetting part of its effect on the output gap. Holding the remaining parameters at their reference values, a larger hand-to-mouth population share lowers Λ and raises Ω_τ . The reference calibration implies $0 < \Omega_\tau < 1$.

Under the conventional coefficients $(\gamma_\pi^L, \gamma_Y^L) = (1.5, 0.125)$, the simple rule in (39) yields a determinate equilibrium in the saver-only allocation block. The inherited consumption tax is predetermined, while output and inflation are forward-looking, so local determinacy requires exactly two unstable roots, no root on the unit circle, and the Blanchard–Kahn rank condition. All three conditions hold at the reference calibration and at every sampled point with $\Lambda > 0$.⁵

Exact targeting and the output trade-off. Within the saver-only allocation block, hold the productivity path fixed across regimes, assume $\Lambda \neq 0$ and $\Omega_\tau \neq 0$, and impose $\hat{\pi}_t^F = \hat{\pi}_t^M$. The two Phillips curves then imply

$$\hat{y}_t^M = \hat{y}_t^F + \frac{1}{\chi} \hat{\tau}_{c,t} \quad (45)$$

Exact inflation matching therefore requires output to differ whenever $\hat{\tau}_{c,t} \neq 0$. Using this relation in the two IS equations gives

$$\hat{R}_t^M = \Omega_\tau (\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1}) \quad (46)$$

⁵Appendix Figure S1 reports the sampled determinacy map. Appendix S1 also compares alternative tax timing assumptions.

Substituting the monetary policy rule and using (45) yields the consumption tax rule that exactly reproduces the monetary policy inflation path:

$$\left(\Omega_\tau - \frac{\theta_Y}{\chi}\right) \hat{\tau}_{c,t} - \Omega_\tau \mathbb{E}_t \hat{\tau}_{c,t+1} = \theta_\pi \hat{\pi}_t^F + \theta_Y \hat{y}_t^F + \mu_t \quad (47)$$

If the monetary policy rule responds only to inflation, $\theta_Y = 0$, differences in output across regimes no longer affect the policy response. The exact condition then reduces to $\Omega_\tau(\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1}) = \theta_\pi \hat{\pi}_t^F + \mu_t$. Scaling both the inflation coefficient and the policy innovation by Ω_τ^{-1} therefore allows a simple inflation-only consumption tax rule to reproduce the monetary policy inflation path.

Given a monetary policy target path, the inherited consumption tax and a feasible saver-only implementation select a unique LUPP allocation transition through equations (45) and (47). Exact inflation matching does not, however, anchor the long-run consumption tax level. Because the tax applied at $t+1$ is announced at t , the expectation in (46) equals the announced tax. For a counterfactual monetary policy path under which the MP allocation returns to steady state and the interest rate response is summable, iterating (46) gives

$$\hat{\tau}_{c,\infty} = \hat{\tau}_{c,0} - \Omega_\tau^{-1} \sum_{t=0}^{\infty} \hat{R}_t^M$$

Unless the cumulative interest rate response along the counterfactual monetary policy path exactly offsets the inherited tax, the consumption tax therefore remains at a non-zero deviation. Because the labour income tax is fixed, this persistent consumption tax continues to affect marginal cost. Once productivity has returned to steady state, equation (40) gives $\hat{y}_\infty^{F,\text{flex}} = -\hat{\tau}_{c,\infty}/\chi$. Zero inflation in (42) requires the output gap to close, so actual output must settle at this tax-adjusted flexible-price level rather than return to its original steady state:

$$\hat{y}_\infty^F = \hat{y}_\infty^{F,\text{flex}} = -\frac{\hat{\tau}_{c,\infty}}{\chi}$$

A positive terminal tax therefore leaves output below its original steady state, while a negative terminal tax leaves it above. A temporary monetary policy shock can consequently leave permanent tax and output deviations. Exact inflation matching therefore identifies the tax changes needed to reproduce monetary policy inflation and the output deviations that accompany them.

Output matching as an alternative objective. Any tax plan that matches the monetary policy output path must satisfy

$$\hat{R}_t^M = (\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1}) - \psi_{mc} \sum_{j=1}^{\infty} \beta^{j-1} \mathbb{E}_t \hat{\tau}_{c,t+j} \quad (48)$$

The discounted sum reflects the effect of expected future tax levels on marginal cost and inflation. Matching output requires tax announcements to account for the resulting inflation difference from the counterfactual monetary policy path. The fixed inflation and output feedback rule used here does not impose these output-matching conditions.⁶ These exact constructions identify what one tax can target in the saver-only allocation block. With transfers to hand-to-mouth households, the spending response also depends on the fiscal adjustment generated by the tax rule.

3.3 Transfer distribution and fiscal feedback

3.3.1 Transfer condition for aggregate equivalence

Allowing transfers to reach hand-to-mouth households introduces two questions. First, what condition on the transfers they receive preserves aggregate equivalence under coordinated taxes? Second, when the consumption tax is the sole stabilisation instrument, how does the distribution of the transfer adjustment affect equilibrium determinacy?

⁶Appendix S6 derives the complete construction.

Using (13), the household first-order conditions and market clearing conditions imply⁷

$$\begin{aligned}\hat{c}_{S,t} &= \Lambda \hat{y}_t + \Xi \hat{A}_t - \frac{\lambda}{1-\lambda} \frac{\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \tilde{T}_{H,t} \\ &= \Lambda \hat{y}_t + \Xi \hat{A}_t - \frac{\omega_T}{1-\lambda} \frac{\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \tilde{T}_t\end{aligned}\tag{49}$$

Under the symmetric analytical normalisation, a transfer to hand-to-mouth households re-allocates both consumption and hours across households. Holding output, productivity, and the tax wedges fixed, hand-to-mouth households consume more and work less, while savers consume less and work more. In the saver labour supply condition, the higher hours and lower consumption have equal and opposite effects on the real wage. Transfers therefore enter aggregate demand directly but affect the Phillips curve only indirectly through equilibrium output. Combining (49) with the saver Euler equation gives the transfer-augmented aggregate demand equation

$$\begin{aligned}\hat{y}_t &= \mathbb{E}_t \hat{y}_{t+1} - \frac{1}{\sigma \Lambda} [\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} - \mathbb{E}_t \hat{\pi}_{t+1}] + \frac{\Xi}{\Lambda} (\mathbb{E}_t \hat{A}_{t+1} - \hat{A}_t) \\ &\quad + \frac{1}{\Lambda} \frac{\lambda}{1-\lambda} \frac{\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} (\tilde{T}_{H,t} - \mathbb{E}_t \tilde{T}_{H,t+1})\end{aligned}\tag{50}$$

Since hand-to-mouth households consume their current transfer, aggregate demand depends on the transfer received today relative to its expected value in the following period. The Phillips curve and consumption tax rule are

$$\hat{\pi}_t = \beta \mathbb{E}_t \hat{\pi}_{t+1} + \psi_{mc} \chi \hat{y}_t + \psi_{mc} z \hat{A}_t + \psi_{mc} \hat{\tau}_{c,t} - \psi_{mc} \hat{\tau}_{n,t}\tag{51}$$

$$\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} = \gamma_\pi^F \hat{\pi}_t + \gamma_Y^F \hat{y}_t + \zeta_t^F\tag{52}$$

Conditional on the coordinated tax wedge restrictions in Proposition 1, aggregate equivalence requires the difference between hand-to-mouth transfers under UFPE and MP to have no expected change. Proposition 3 formalises this additional condition.

⁷Appendix S2 derives both expressions.

Proposition 3 (Transfer condition for aggregate equivalence). *Consider the reduced transfer-augmented system with $0 < \lambda < 1$, $\varphi > 0$, and $\Lambda \neq 0$. Suppose the assumptions and coordinated tax wedge restrictions of Proposition 1 hold, except that the transfer adjustment may reach hand-to-mouth households according to (13). Take the inherited fiscal states as given. Then UFPE reproduces the MP paths of output and inflation if and only if*

$$\tilde{T}_{H,t}^F - \tilde{T}_{H,t}^M = \mathbb{E}_t \left(\tilde{T}_{H,t+1}^F - \tilde{T}_{H,t+1}^M \right) \quad \forall t \quad (53)$$

Proof. After imposing (38), subtracting the MP equations from the UFPE equations leaves the expected change in the hand-to-mouth transfer gap as the only forcing term in aggregate demand. The direct transfer terms in marginal cost cancel under the maintained analytical normalisation. Equation (53) is therefore necessary for zero output and inflation gaps. When it holds, the reduced MP and UFPE systems have the same set of bounded output and inflation solutions. Local determinacy of the reduced MP system makes that path unique, establishing sufficiency.⁸ $\square$

The restriction concerns the expected change in the hand-to-mouth transfer gap rather than aggregate transfers or public debt. It makes the cross-regime gap a martingale, so equal transfer levels do not follow from (53) alone. Along transitions in which the gap converges to zero in conditional mean, forward iteration implies that hand-to-mouth households receive the same transfer path under the two regimes. Household consumption and labour also coincide, while saver transfers, public debt and saver asset positions may differ. Those fiscal quantities are governed by the government budget, the debt-stabilising transfer rule, and the government transversality condition rather than by aggregate equivalence itself. Bilbiie, Monacelli, and Perotti (2024) establish how redistributive transfers can reproduce the demand effects of real interest rate movements. Seidl and Seyrich (2023) construct coordinated tax and debt policies that reproduce household allocations. In the present two-agent model,

⁸Appendix S2 reports the full difference system and limiting cases.

Proposition 3 isolates the additional transfer restriction once coordinated taxes have matched the monetary policy wedges. Matching those wedges aligns price incentives, but the associated fiscal adjustment can change the disposable income of households that cannot smooth consumption through asset holdings. The supporting transfer rule is therefore part of the replication policy: its distribution determines how the financing of tax adjustments enters household spending. If we impose identical public debt path across different regimes, the consumption tax rule can still support different household allocations because tax feedback and the distribution of residual transfers change household cash flows. ⁹

3.3.2 Fiscal feedback and equilibrium determinacy

Under LUFP, the current public debt position becomes inherited debt in the following period and therefore determines the next aggregate transfer adjustment. Let $\tilde{b}_t \equiv (B_{g,t}/P_t)/\bar{Y}$ denote real public debt, normalised by steady-state output. Define the real tax revenue deviation by

$$\widetilde{TR}_t \equiv \frac{TR_t/P_t - \overline{TR}^r}{\bar{Y}} \quad \overline{TR}^r \equiv \frac{\overline{TR}}{\bar{P}}$$

The first-order government budget and debt-stabilising transfer rule are

$$\tilde{T}_t + \tilde{b}_{t-1} = \widetilde{TR}_t + \beta \tilde{b}_t \tag{54}$$

$$\tilde{T}_t = -\gamma_g \tilde{b}_{t-1} \tag{55}$$

Define $\rho_T \equiv (1 - \gamma_g)/\beta$. Eliminating public debt with the transfer rule at dates t and $t + 1$ gives

$$\mathbb{E}_t \tilde{T}_{t+1} = \rho_T \tilde{T}_t + \frac{\gamma_g}{\beta} \widetilde{TR}_t$$

⁹Appendix S2 also reports the exercise under which debt-paths are fixed across regimes

Higher tax revenue reduces current debt issuance and, through the transfer rule, raises the transfer deviation in the following period. At fixed productivity and with the labour income and profit tax rates held constant, real tax revenue satisfies

$$\widetilde{TR}_t = r_y \hat{y}_t + r_\tau \hat{\tau}_{c,t} \quad (56)$$

With both coefficients positive, higher output and a higher consumption tax wedge both raise real tax revenue. The two coefficients incorporate movements in the consumption, labour income, and profit tax bases¹⁰. Substituting the revenue mapping gives

$$\mathbb{E}_t \tilde{T}_{t+1} = \rho_T \tilde{T}_t + \frac{\gamma_g}{\beta} (r_y \hat{y}_t + r_\tau \hat{\tau}_{c,t}) \quad (57)$$

Equations (50), (51), (52), and (57) form the four-equation LUFPP system. The transfer rule makes the current transfer adjustment a one-to-one representation of inherited public debt, $\tilde{b}_{t-1} = -\tilde{T}_t/\gamma_g$. The inherited consumption tax and current transfer adjustment are therefore predetermined, while output and inflation are forward-looking. When savers receive the entire transfer adjustment, the allocation equations do not depend on the transfer state. At the calibration, the additional fiscal root is stable, so the full system has the same equilibrium determinacy properties as the three-equation allocation block. Assigning a positive share of the transfer adjustment to hand-to-mouth households makes transfers affect current demand, which changes tax revenue and subsequent transfers. Equilibrium determinacy must then be assessed jointly for the allocation and fiscal equations.

3.3.3 Taylor-type feedback and determinacy maps

Exact inflation matching provides a reference for tax feedback strength. When $\theta_Y = 0$ and savers receive the entire transfer adjustment, the matching condition scales the inflation

¹⁰Here $r_y \equiv \bar{\tau}_c + \bar{\tau}_n(\chi + 1) - \bar{\tau}_d\chi$ and $r_\tau \equiv (1 + \bar{\tau}_c)s_C + \bar{\tau}_n - \bar{\tau}_d = 1 - \bar{\tau}_d$. Appendix S2 derives the full revenue mapping, including productivity and labour income tax movements, and states the parameter restrictions under which both loadings are positive.

response and the policy innovation by Ω_τ^{-1} . I use this relation to examine how feedback strength affects consumption tax stabilisation. Scaling the conventional inflation and output coefficients by a common factor preserves their relative weights:

$$\gamma_\pi^L = a_\tau \theta_\pi \quad \gamma_Y^L = a_\tau \theta_Y \quad a_\tau^{\text{comp}} \equiv \Omega_{\tau, \text{ref}}^{-1} \quad (58)$$

Baseline feedback sets $a_\tau = 1$, so the consumption tax rule retains the conventional Taylor rule coefficients $(1.5, 0.125)$. Transmission-compensated feedback sets $a_\tau = a_\tau^{\text{comp}} = 2.720$, giving $(\gamma_\pi^L, \gamma_Y^L) = (4.080, 0.340)$. The common multiplier changes overall feedback strength while leaving the relative inflation and output weights unaffected. These two values provide reference cases for evaluating weaker and stronger tax responses. For positive multipliers, output feedback anchors the long-run tax level in the saver-only analytical block. Once the policy shock has dissipated and inflation is zero, the policy rule requires output to return to steady state, and the Phillips curve then requires the consumption tax deviation to return to zero.

Figure 1 shows that, moving from baseline to transmission-compensated feedback reduces the largest transfer share that can be assigned to hand-to-mouth households while preserving equilibrium determinacy. The baseline rule satisfies the complete determinacy conditions when the adjustment is assigned entirely to savers, distributed equally across households, or assigned entirely to hand-to-mouth households. Under transmission-compensated feedback, the first two distributions continue to satisfy these conditions, whereas the last produces four unstable roots. The determinacy boundary occurs at $\omega_T = 0.586$, above equal distribution, $\omega_T = \lambda = 0.121$, and below complete assignment to hand-to-mouth households, $\omega_T = 1$.

The interaction is not monotone. For some intermediate shares of the transfer adjustment, increasing a_τ first moves the system out of and then back into the determinate region.

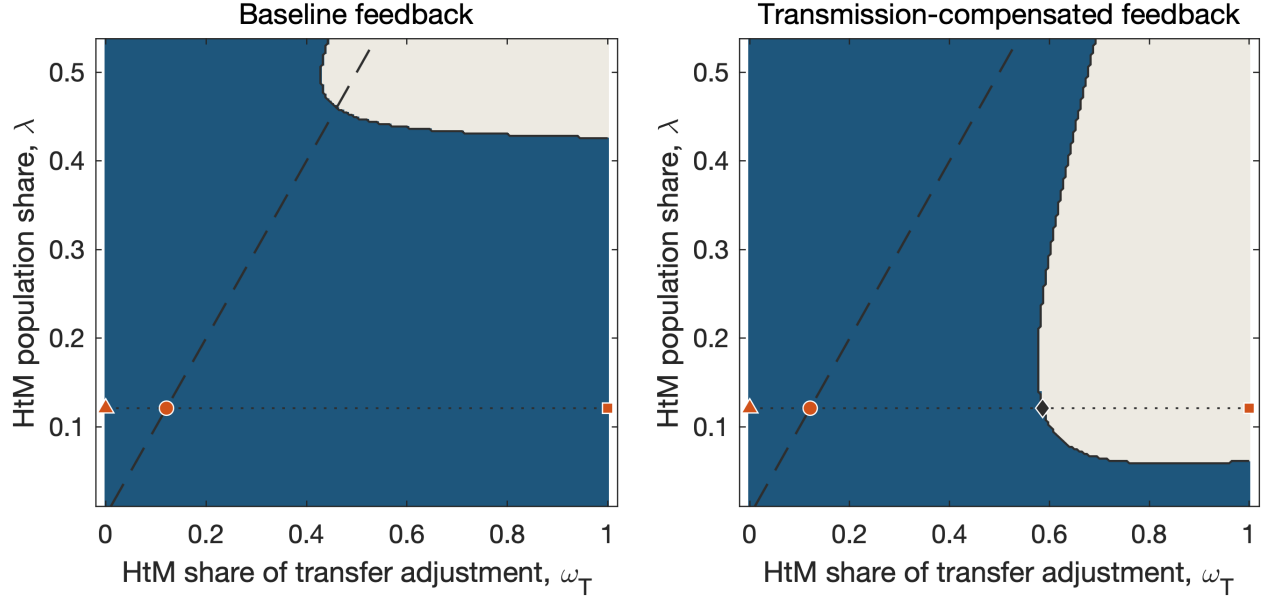


Figure 1: Transfer distribution and equilibrium determinacy under baseline and transmission-compensated feedback.

Notes: Blue regions indicate a locally determinate equilibrium. Light regions fail the determinacy conditions. Each panel holds one coefficient pair fixed while varying the hand-to-mouth population share and the share of the transfer adjustment assigned to hand-to-mouth households over the region with $\Lambda > 0$, holding $\theta_p = 0.67$, $\gamma_g = 0.1$, and the passive transfer rule fixed. The left panel uses baseline feedback $(\gamma_\pi^L, \gamma_Y^L) = (1.5, 0.125)$. The right panel uses the transmission-compensated pair $(4.080, 0.340)$. The dashed line denotes equal per-household distribution, $\omega_T = \lambda$, and the dotted line marks $\lambda = 0.121$. At that population share, the triangle, circle, and square denote complete assignment to savers, equal per-household distribution, and complete assignment to hand-to-mouth households. The diamond marks the determinacy boundary under the transmission-compensated rule.

Figure 2 isolates this interaction by holding the hand-to-mouth population share, price stickiness, the transfer response to debt γ_g , and the passive transfer rule fixed while varying a_τ and the share of the transfer adjustment assigned to hand-to-mouth households.

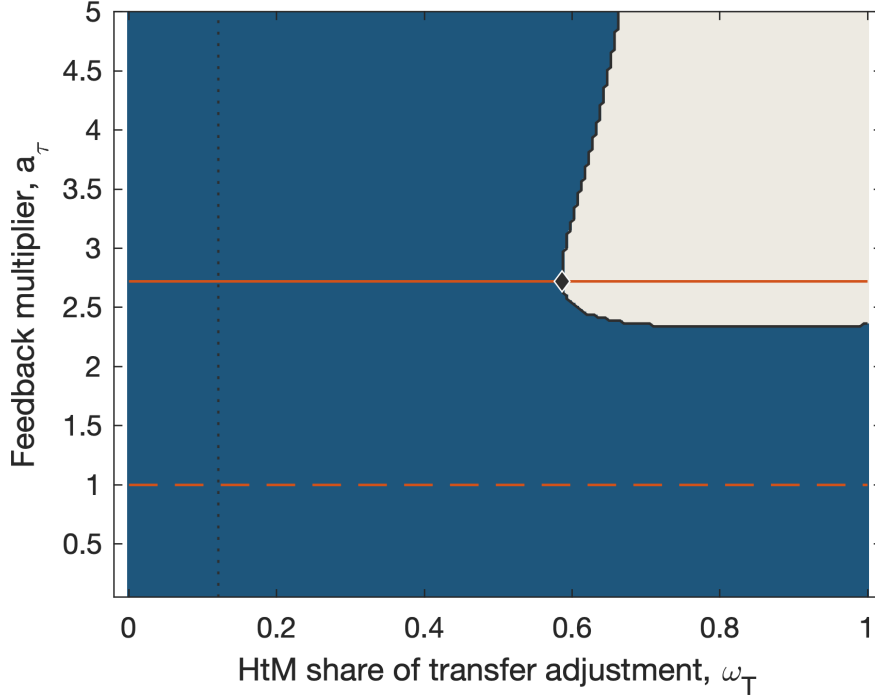


Figure 2: Feedback strength, transfer distribution, and equilibrium determinacy.

Notes: The hand-to-mouth population share is fixed at $\lambda = 0.121$, with benchmark price stickiness, fiscal backing, and the passive transfer rule. Blue regions satisfy the complete local determinacy conditions, while light regions fail at least one. The multiplier a_τ scales both baseline feedback coefficients. The dashed horizontal line marks baseline feedback, $a_\tau = 1$, while the solid horizontal line marks transmission compensation, $a_\tau = \Omega_{\tau, \text{ref}}^{-1} = 2.720$. The dotted vertical line is equal per-household distribution. The diamond marks the determinacy boundary under transmission-compensated feedback at $(\omega_T, a_\tau) = (0.586, 2.720)$.

To assess the robustness of this boundary, I vary the profit tax rate, price stickiness, and fiscal backing. Moving the profit tax rate from zero to its calibrated value has virtually no effect on the location of the boundary. Price stickiness affects equilibrium determinacy through the Phillips curve response to the consumption tax wedge. The transfer response to debt matters through the persistence of the transfer state and the response of future transfers to current revenue. These margins can shift, split, or eliminate the region that fails the determinacy conditions.¹¹

¹¹See Appendix Figure S2.

The results here complement Rachel and Ravn (2026), who show that monetary stabilisation and fiscal debt adjustment must be evaluated jointly when government debt affects private demand. Here household composition and fiscal backing are held fixed, and the additional margin is the distribution of the transfer adjustment. Assigning a larger share to hand-to-mouth households strengthens the feedback from the fiscal state to current demand, but its effect on whether equilibrium determinacy holds varies non-monotonically with feedback strength.

4 Calibration

The calibration restores household differences in income and asset ownership and tests whether the analytical determinacy result survives in the quantitative economy. Table 1 reports the quarterly calibration. The discount factor implies an annual real interest rate of approximately four per cent, while the Calvo parameter implies an average price duration of three quarters. The Taylor rule uses $(\theta_\pi, \theta_Y) = (1.5, 0.125)$, and baseline LUF_P sets $(\gamma_\pi^L, \gamma_Y^L)$ to the same values. Transmission-compensated LUF_P instead retains the factor derived in the analytical benchmark, giving $(\gamma_\pi^L, \gamma_Y^L) = (4.080, 0.340)$. All shocks have persistence $\rho = 0.5$, and the passive transfer rule sets $\gamma_g = 0.1$.

Parameter	Interpretation	Value
β	Discount factor	0.99
σ	Coefficient of relative risk aversion	2
λ	Hand-to-mouth population share	0.121
φ	Inverse Frisch elasticity	1
ϵ	Elasticity of substitution across varieties	6
θ_p	Calvo price stickiness	0.67
θ_π	Taylor rule response to inflation	1.5
θ_Y	Taylor rule response to output	0.125
ρ	Shock persistence	0.5
γ_g	Transfer response to debt	0.1
$\bar{\tau}_c$	Consumption tax rate	1.91%
$\bar{\tau}_n$	Labour income tax rate	19.64%
$\bar{\tau}_d$	Profit tax rate	21.54%
$\bar{B}_g/(\bar{P}\bar{Y})$	One-period face debt relative to quarterly output	1.712

Table 1: Baseline calibration.

Notes: Tax rates are reported as percentages rounded to two decimal places, while all calculations use the underlying unrounded estimates. The labour disutility scale ν is chosen to normalise aggregate hours to one-third.

Following Leeper, Traum, and Walker (2017), I construct effective consumption and labour income tax rates from US national accounts data. The tax rates and the underlying market-value debt ratio are unweighted means of 269 quarterly ratios over 1959Q1–2026Q1.¹² The profit tax rate is a direct federal proxy, measured as corporate income tax receipts divided by corporate profits from current production, although it remains an imperfect counterpart to the tax on model profits. The debt measure is the Dallas Fed market value of privately held gross federal debt, converted into one-period face debt relative to quarterly model output. Following the rule-of-thumb interpretation of Campbell and Mankiw (1989), I set the hand-to-mouth population share to $\lambda = 0.121$, the Kaplan, Violante, and Weidner (2014) estimate for poor hand-to-mouth households. This is the closer of their two empirical

¹²The consumption tax numerator is federal excise taxes plus customs duties, and its base is personal consumption expenditure net of those levies and state and local sales taxes. The labour income tax rate allocates personal current taxes between labour and capital income and adds contributions for government social insurance. All calculations use the underlying unrounded estimates reported in the replication package. Model output follows Leeper, Traum, and Walker (2017) and comprises personal consumption expenditure, gross private domestic investment, and federal government consumption expenditures and gross investment. The annual market-value debt ratio is converted into the one-period face debt coefficient reported in Table 1 by multiplying by four and dividing by $\beta = 0.99$.

categories because the model’s hand-to-mouth households neither hold financial assets nor own firms.

The asymmetric steady state sets transfers to zero and assigns firm ownership and government bonds to savers. I normalise aggregate output to one and aggregate hours to one-third, while fixed real government purchases are determined by the resource constraint and government budget.¹³ Savers consume more and work less because profits after tax and bond income accrue only to them. Unequal consumption and labour shares make the distribution of the transfer adjustment relevant for both aggregate demand and marginal cost. Positive steady-state public debt also introduces the revaluation of inherited nominal liabilities into fiscal dynamics.

Under baseline feedback, all three reference transfer distributions satisfy the complete determinacy conditions. Under transmission-compensated feedback, the equilibrium is determinate when the transfer adjustment is assigned entirely to savers or distributed equally per household, but not when the entire adjustment is assigned to hand-to-mouth households. At $\lambda = 0.121$, the calibrated frontier is approximately $\omega_T = 0.471$, compared with 0.586 in the analytical benchmark, and changes only modestly over the admissible profit tax grid.¹⁴ Household asymmetry therefore shifts the boundary without changing whether equilibrium determinacy holds for any of the three reference transfer distributions. This calibrated result provides the benchmark for the quantitative exercises that follow.

5 Quantitative Analysis

The calibrated economy shows how far consumption tax policy can reproduce monetary policy allocations once households differ in income and asset ownership. Coordinated taxes establish the allocation benchmark. A common innovation to the policy rule then illustrates transmission under consumption tax feedback. The demand, markup and productivity shock

¹³Appendix S2 reports the full steady-state system. Appendix Table S1 reports the resulting household allocations.

¹⁴See Appendix Figure S3.

comparisons examine how feedback strength and transfer distribution affect stabilisation and welfare. The monetary benchmark uses the conventional interest rate rule throughout.

5.1 Allocation equivalence and fiscal implementation

In the calibrated asymmetric economy, coordinated taxes deliver aggregate equivalence with unequal household allocations, saver asset income, and positive public debt. MP and UFPE receive the same policy rule innovation and use the same debt-stabilising rule for aggregate transfers. MP distributes the transfer adjustment equally per household while UFPE coordinates the consumption and labour income tax wedges, matches the transfer received by hand-to-mouth households under MP, and assigns the residual to savers.

Figure 3 shows that UFPE reproduces output, inflation, and both households' consumption and hours to numerical precision. On impact, output falls by 0.410 per cent and inflation by 0.484 percentage points in both regimes. Hand-to-mouth consumption falls roughly twice as much as saver consumption, while saver and hand-to-mouth hours move in opposite directions. Aggregate equivalence therefore holds in the calibrated economy with limited asset market participation and a marginal cost channel created by unequal steady-state allocations.

However, aggregate equivalence does not pin down the paths or long-run levels of taxes, transfers and public debt. Tax revenue, aggregate transfers, and real public debt differ across regimes.¹⁵ After the private allocation has returned to steady state, the coordinated tax wedges, tax revenue, aggregate and saver transfers, and public debt can remain at non-zero deviations. Savers absorb the residual through their transfers and asset positions without changing consumption or labour. The government budget and debt-stabilising transfer rule ensure solvency but do not select the original fiscal steady state. Returning taxes, transfers, and public debt to specified long-run targets therefore requires an additional fiscal anchor.

¹⁵See Appendix Figure S6.

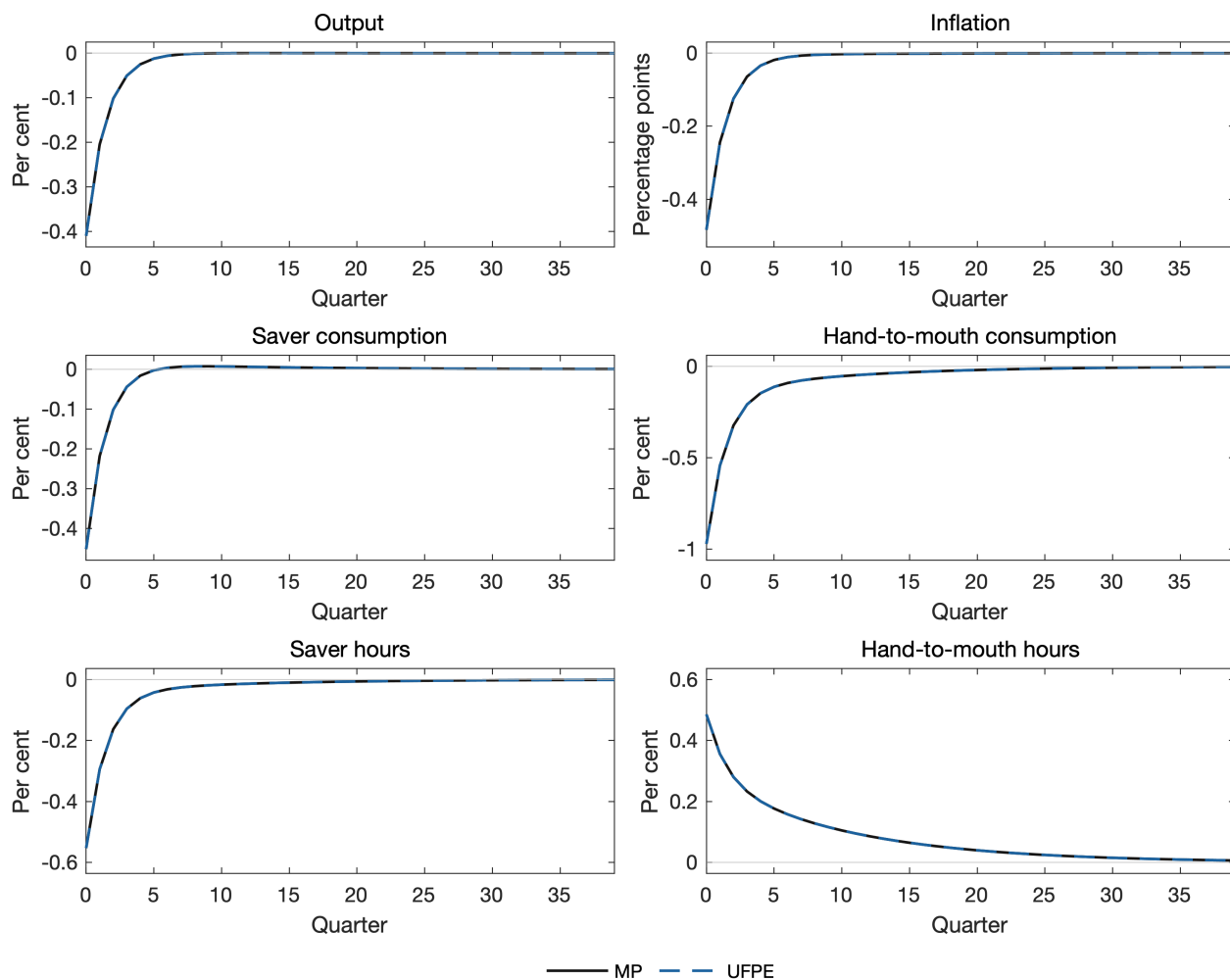


Figure 3: Coordinated taxes reproduce the MP allocation in the calibrated economy.

Notes: Responses are to the same unexpected one-percentage-point policy rule innovation in both regimes. In both regimes, aggregate transfers follow the same debt-stabilising rule. MP distributes the adjustment equally per household. UFPE matches the transfer received by hand-to-mouth households under MP, with the residual going to savers. Output, consumption, and hours are per cent deviations; inflation is in quarterly percentage points. The displayed horizon is 40 quarters.

5.2 Transmission under the consumption tax rule

A common policy innovation reveals how consumption tax feedback transmits differently from monetary policy. I compare MP, baseline LUF_P and transmission-compensated LUF_P under the same contractionary innovation, holding the transfer distribution and debt-stabilising transfer rule fixed across regimes. The innovation contributes one percentage point directly to each intertemporal policy wedge. Output and inflation feed back into the rules, so the realised wedges differ.

Figure 4 shows that, under equal per-household transfers, baseline LUF_P produces a smaller initial output contraction than MP but slightly more deflation. The consumption tax applied on impact is inherited, so the rule initially works through a tax cut announced for the following quarter. The prospect of lower consumption taxes encourages savers to postpone purchases. Once implemented, the cut eases marginal cost, allowing output to recover above steady state while inflation remains negative. The tax cut also reduces revenue, leading to debt accumulation and subsequent transfer cuts. The spending response to the announcement therefore precedes the fiscal adjustment that follows its implementation.

Falling output and inflation activate a systematic policy response that partly offsets the contractionary innovation. Transmission-compensated feedback strengthens this response, leaving a smaller realised wedge on impact and producing the smallest initial output contraction and least deflation. It also reduces peak debt accumulation and the largest subsequent transfer cuts relative to baseline LUF_P.

Figure 5 shows that, on impact, compensated feedback moderates the consumption falls for both household types, the decline in saver hours and the increase in hand-to-mouth hours relative to baseline LUF_P. Hand-to-mouth hours rise again during the subsequent adjustment, as tax relief fades and transfer cuts weigh on current income.¹⁶

¹⁶Appendix S4 reports the responses under alternative transfer distributions.

Propagation after an innovation to the policy rule: Adjustment distributed equally per household, $\omega_T = \lambda = 0.121$

Same direct one-percentage-point innovation in every regime

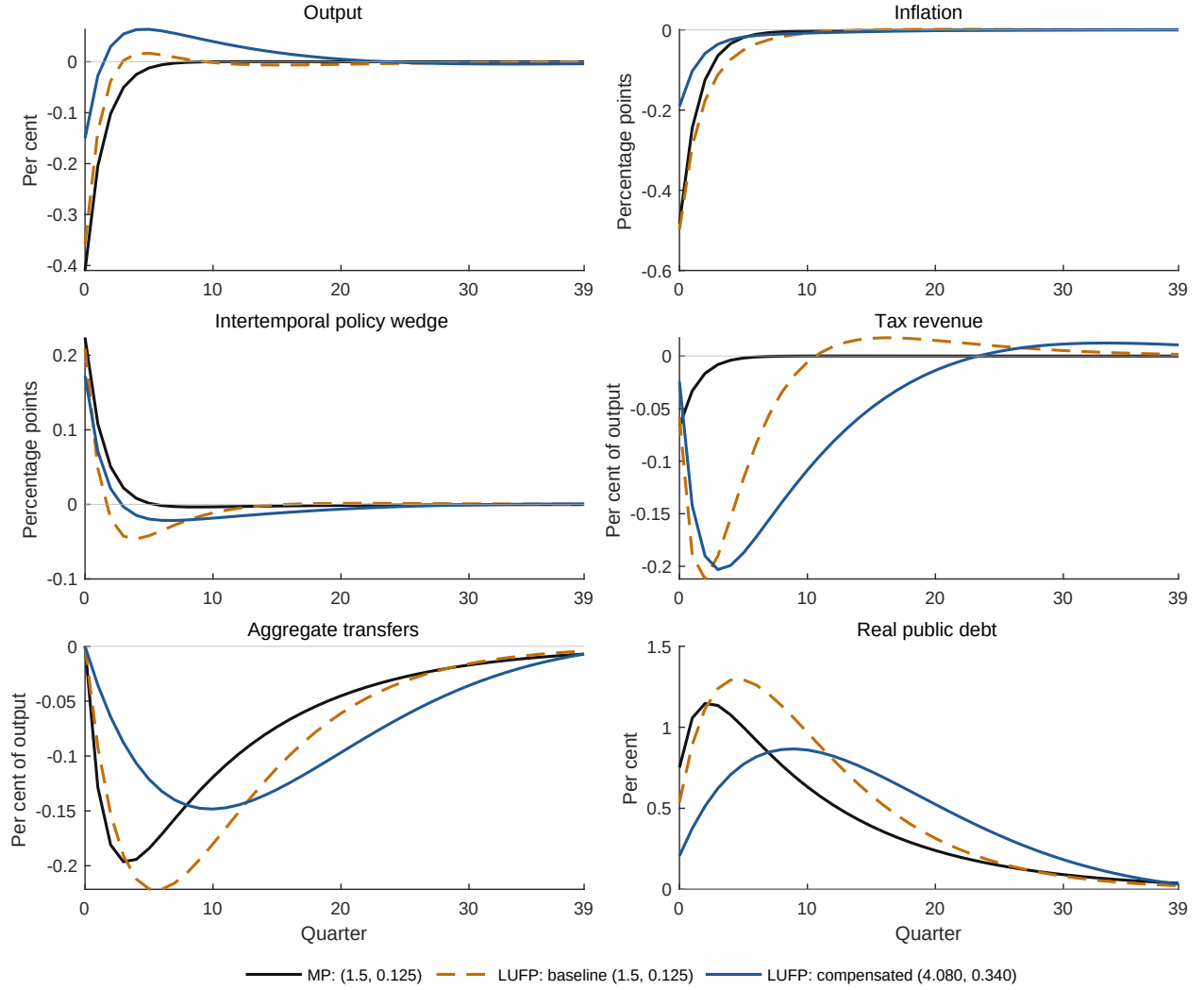


Figure 4: Propagation after a common innovation to the policy rule.

Notes: In all three regimes, aggregate transfers follow the same debt-stabilising rule and the transfer adjustment is distributed equally per household. The innovation contributes one percentage point directly to the policy wedge in every regime. Baseline LUF uses (1.5, 0.125), and transmission-compensated LUF uses (4.080, 0.340). The realised intertemporal wedge remains endogenous. Under MP, the wedge is the nominal rate deviation, whereas under LUF, it is the current applied gross consumption tax wedge minus the wedge announced for the following period. Real variables are per cent deviations, inflation and policy wedges are in quarterly percentage points, and fiscal flows are expressed as percentages of steady-state output. The displayed horizon is 40 quarters.

Propagation after an innovation to the policy rule: Adjustment distributed equally per household, $\omega_T = \lambda = 0.121$

Same direct one-percentage-point innovation in every regime

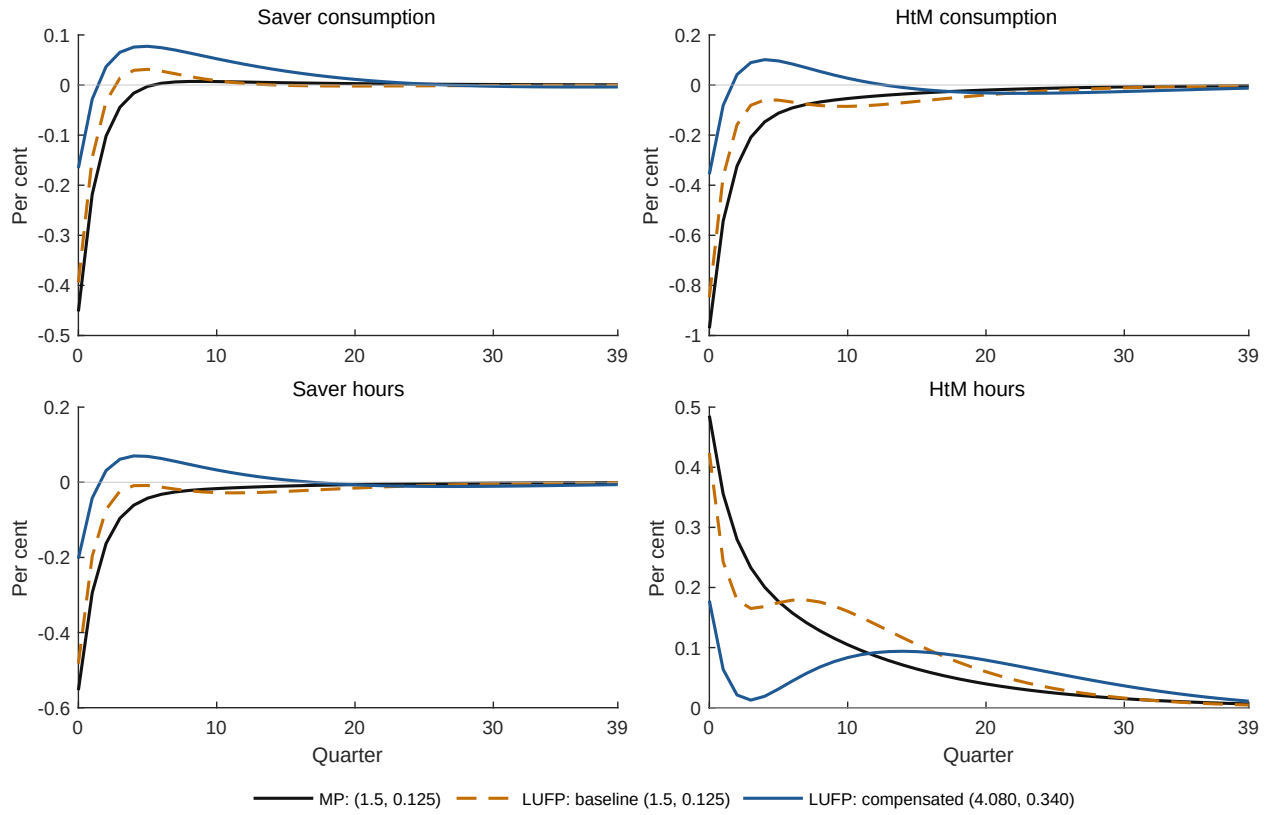


Figure 5: Household responses after the common innovation to the policy rule.

Notes: The policy rules, direct innovation, transfer distribution, and debt-stabilising transfer rule are as in Figure 4. Consumption and hours are per cent deviations. The displayed horizon is 40 quarters.

Over the complete transition, compensated feedback yields higher lifetime utility for both household types under all three transfer distributions.¹⁷

These gains concern the propagation of an innovation to the policy rule. Under demand, markup and productivity shocks, feedback instead determines the systematic tax response to the underlying disturbance. The following subsection examines how that response interacts with transfer distribution to shape stabilisation and welfare.

5.3 Feedback strength, stabilisation, and welfare

Demand, markup and productivity shocks change how the spending and labour supply effects of consumption tax policy combine with the subsequent fiscal adjustment. I compare MP and consumption tax feedback under each shock, holding the transfer distribution and debt-stabilising transfer rule fixed across regimes. Each shock follows an AR(1) process with persistence 0.5 and is evaluated separately, with the other shock variances set to zero. For welfare, I compute expected lifetime utility from the common deterministic steady state, allowing new innovations to the same shock at date 0 and in every later period. The markup shock shifts firms' desired gross markup, the productivity shock moves log productivity, and the demand shock d_t enters savers' Euler equation as an intertemporal demand wedge:

$$1 = R_t \exp(-d_t) \mathbb{E}_t[M_{t,t+1}] \quad (59)$$

A positive d_t lowers the effective return to postponing consumption and shifts savers' consumption towards the present. The welfare comparison under the demand shock is therefore conditional on this particular wedge specification.

Figure 6 show that under equal per-household transfer distribution, baseline LUFPP lowers peak absolute inflation relative to MP under all three shocks. Peak absolute output responses

¹⁷Welfare is evaluated along the exact nonlinear transitions. Appendix Table S3 reports the comparisons for transfer shares $\omega_T \in \{0, \lambda, 0.4\}$. Population gains relative to baseline LUFPP are 0.0043–0.0055 per cent of permanent consumption.

are approximately 46 per cent larger after the demand shock and 43 and 50 per cent smaller after the markup and productivity shocks, respectively.

Tax announcements shift spending across dates. Demand and markup shocks induce a consumption tax cut for the following quarter, encouraging savers to postpone purchases. A productivity improvement instead induces a tax increase and supports current spending. Once applied, the tax also changes the purchasing power of labour income. A tax cut lowers the producer real wage required to support a given consumption and hours allocation, reducing marginal cost; a tax increase has the opposite effect.

Figure 6 shows how this marginal-cost effect works differently across shocks. Following a markup shock, the tax cut offsets part of the cost pressure and cushions the initial output contraction. Following a demand shock, the same cost relief can reinforce the later expansion, allowing lower inflation alongside a larger output response. After a productivity improvement, the tax increase counters deflation but restrains the expansion. The labour-supply channel also underlies the finding of Barta and Becard (2024) that consumption tax cuts generate more output with less inflationary pressure than budget-equivalent transfers.

The transfer rule determines how the fiscal adjustment reaches household income. Figure 7 holds transmission-compensated feedback fixed and varies transfer distribution. When savers absorb the entire transfer adjustment, hand-to-mouth households respond through the purchasing power of wages. Higher purchasing power raises their consumption and reduces hours because the income effect dominates. Transfers reaching these households add a direct change in disposable income that they cannot smooth through borrowing or saving.

Once implemented, consumption tax cuts support the purchasing power of labour income, but the subsequent fiscal adjustment can withdraw that support through transfers. At $\omega_T = 0.4$, following demand and markup shocks, later transfer cuts outweigh the benefit of consumption taxes remaining below steady state. Hand-to-mouth households then consume less and work more. Early tax relief can therefore be followed by lower consumption and greater labour effort as the fiscal adjustment unfolds. Following productivity improvements,

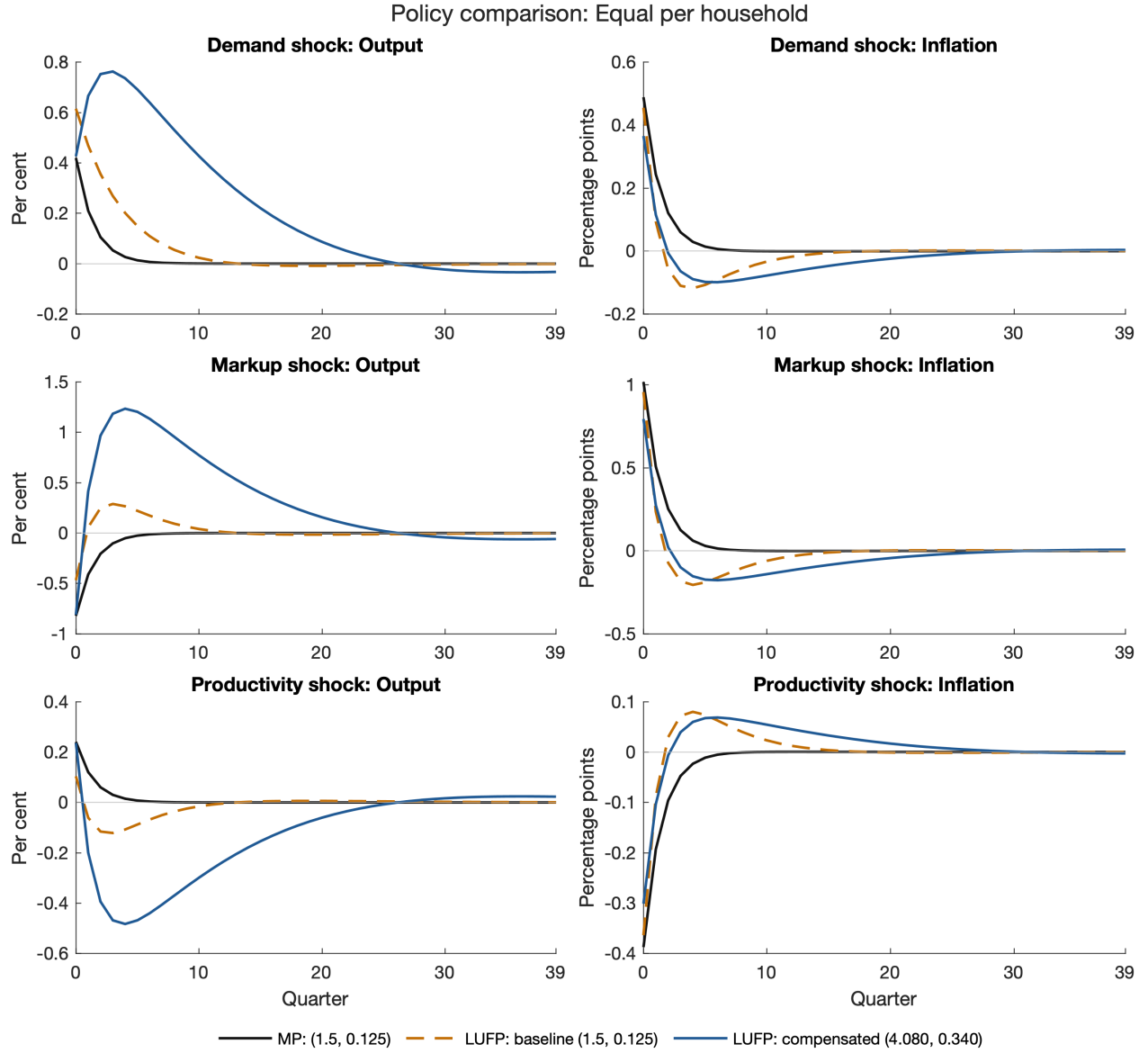


Figure 6: Aggregate responses under equal per-household transfer distribution.

Notes: Rows report demand, markup, and productivity shocks; columns report output and inflation. MP and both LUFP rules use equal per-household transfer distribution and the same debt-stabilising transfer rule. Baseline LUFP uses $(\gamma_{\pi}^L, \gamma_Y^L) = (1.5, 0.125)$, while transmission-compensated LUFP uses $(4.080, 0.340)$. Each shock has persistence 0.5. Each row reports the response to a positive one-standard-deviation innovation of 0.01 to the corresponding shock, with the other shocks held at zero. Output is a per cent deviation and inflation is in quarterly percentage points. The displayed horizon is 40 quarters.

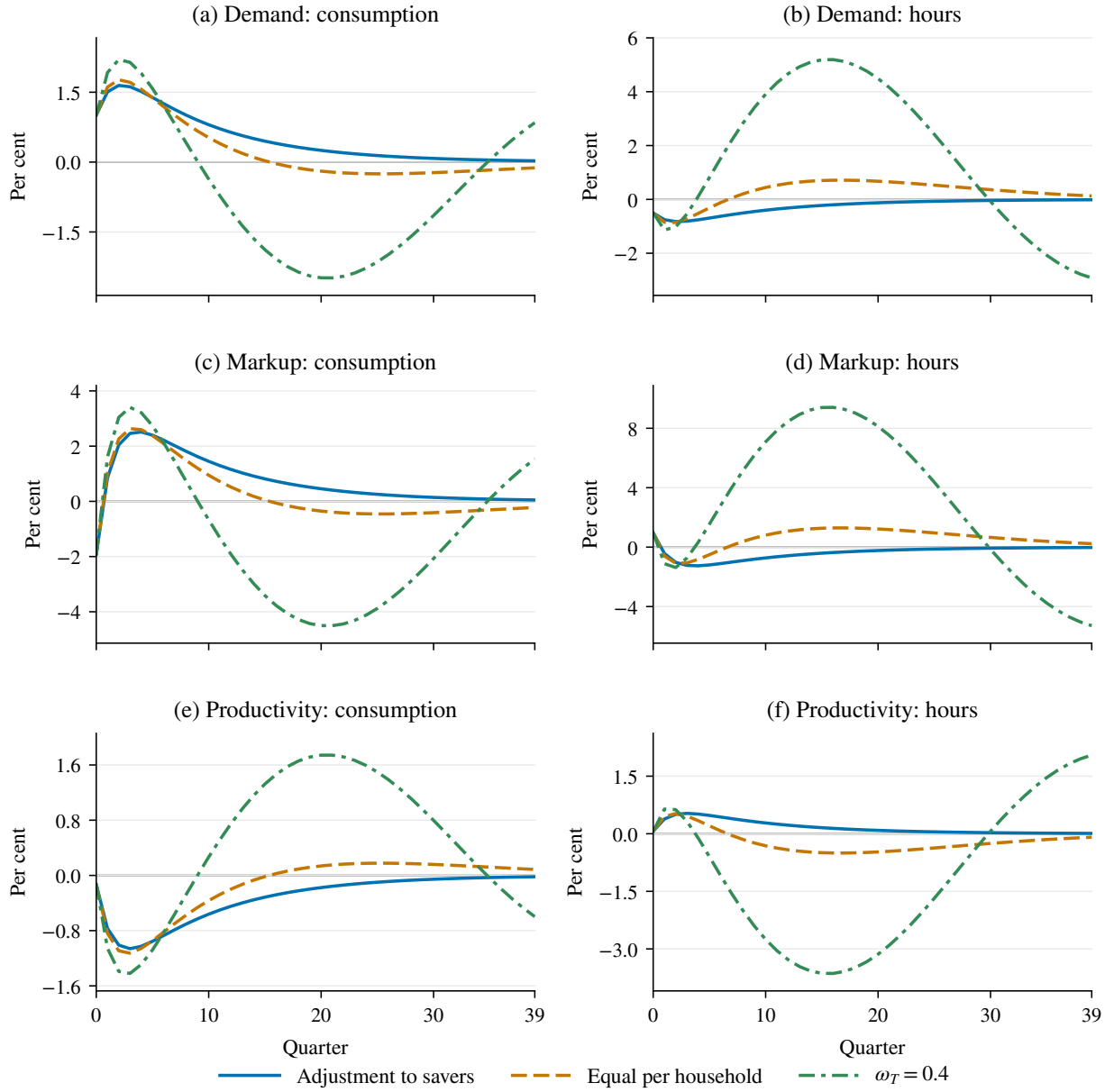


Figure 7: Hand-to-mouth adjustment across transfer distributions.

Notes: Rows report demand, markup, and productivity shocks; columns report hand-to-mouth consumption and hours. All paths use transmission-compensated LUPF, with $(\gamma_\pi^L, \gamma_Y^L) = (4.080, 0.340)$, and the same debt-stabilising transfer rule. The share of the aggregate transfer adjustment assigned to hand-to-mouth households is $\omega_T = 0$, $\lambda = 0.121$, or 0.4 . Shock processes and innovations are as in Figure 6. Responses are per cent deviations over 40 quarters.

the opposite adjustment occurs: later transfer increases support consumption and reduce hours despite higher consumption taxes.

Under compensated feedback, greater transfer exposure accompanies larger later output expansions after demand and markup shocks and a deeper output reversal after productivity shocks. Higher aggregate output can therefore coexist with lower hand-to-mouth consumption and more work. These changes in spending and hours feed back into output, tax revenue and subsequent fiscal adjustment.

Figure 8 varies the feedback multiplier over $0 < a_\tau \leq a_\tau^{\text{comp}}$ within each transfer distribution, keeping the relative inflation and output weights and the debt-stabilising transfer rule fixed.¹⁸

Peak inflation first rises and then falls with feedback. Under demand shocks at $\omega_T = 0.4$, increasing a_τ from 1 to about 2 lowers current output and marginal cost but raises inflation because anticipated later cost pressure dominates. Greater hand-to-mouth exposure strengthens the interaction between fiscal adjustment, spending and hours, shifting the inflation reversal towards stronger feedback. Transmission-compensated feedback gives the lowest peak inflation in the family, but larger and later peak output responses than baseline LUFP at the same transfer share.

Welfare weighs the consumption benefits of the policy against its labour costs over the full adjustment. For policy rule r and shock j , population welfare is

$$W_j^r(\bar{s}) = \mathbb{E}_{-1} \sum_{t=0}^{\infty} \beta^t \left[(1 - \lambda) U(C_{S,t}^{r,j}, N_{S,t}^{r,j}) + \lambda U(C_{H,t}^{r,j}, N_{H,t}^{r,j}) \right] \quad (60)$$

where U is period utility, comprising consumption utility and labour disutility. Both policies begin from the same inherited steady state $\bar{s}$, before the first innovation, and expectations include new innovations in subsequent periods.

¹⁸All tested positive values yield a determinate equilibrium and convergent responses. At zero feedback, the tax rule leaves a unit root and fails the determinacy conditions. I therefore exclude zero feedback from the conditional welfare comparison. Appendix S5 gives the numerical grid and diagnostics.

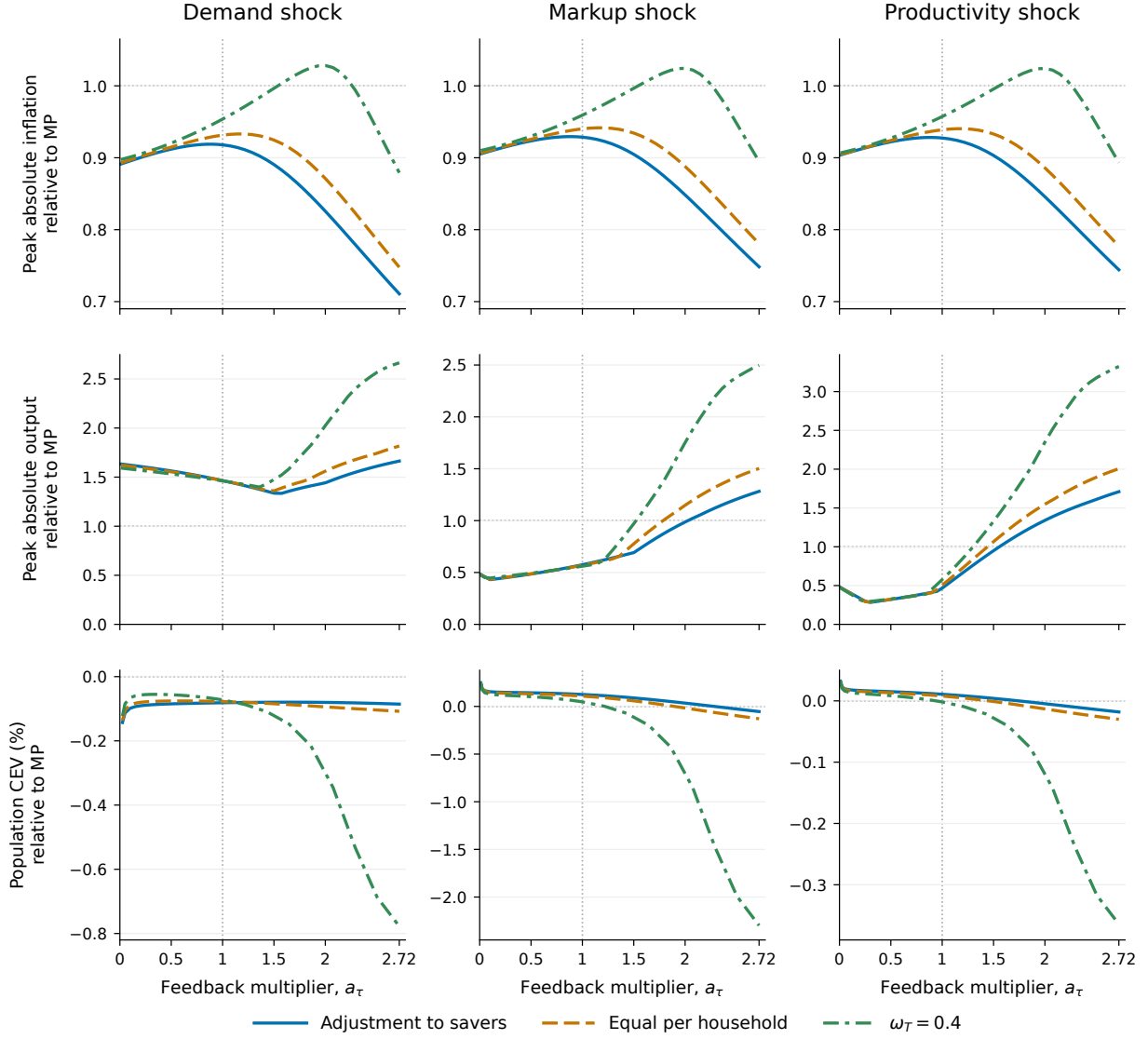


Figure 8: Feedback strength, stabilisation, and welfare under recurrent shocks.

Notes: Rows report peak absolute inflation, peak absolute output and population CEVs relative to MP under the same transfer distribution and debt-stabilising transfer rule. Lines connect computed values of a_τ . Horizontal dotted lines mark MP; vertical dotted lines mark baseline feedback, $a_\tau = 1$. The rightmost value is a_τ^{comp} . Demand welfare at $a_\tau = 0.01$ is omitted because the local approximation fails the bounded positivity check.

I evaluate this criterion using a local second-order approximation and express differences as consumption-equivalent variations (CEVs). The population CEV is the common permanent percentage change in both household types' consumption under MP, holding their hours paths fixed, that equates population welfare with LUPP. Positive values favour LUPP under the same transfer distribution and debt-stabilising transfer rule.

Weaker feedback raises population welfare under markup and productivity risk throughout the evaluated range. Under equal transfers, reducing feedback from $a_\tau = 1$ to 0.01 produces a larger consumption-utility benefit relative to MP that more than offsets the additional labour-disutility cost. Demand risk yields a different balance: welfare is highest at an intermediate feedback strength that depends on transfer distribution, yet even there the consumption loss exceeds the benefit from lower labour disutility. Every admissible demand comparison remains below MP. The labour-supply margin that prevents exact replication thus changes the consumption-work allocation in ways whose welfare consequences depend on the shock.

Population gains need not benefit both household types. At $\omega_T = 0.4$ and $a_\tau = 0.01$, the gains under markup and productivity risk coexist with saver losses. Table 2 reports the baseline and transmission-compensated rules.¹⁹ Compensated feedback lowers population welfare relative to baseline LUPP in all nine comparisons, with larger losses when hand-to-mouth households receive 40 per cent of the transfer adjustment. Its lower peak inflation accompanies a more costly consumption and hours adjustment across households and over time.

¹⁹Appendix Tables S4–S6 give their household and population welfare decompositions. Appendix S5 reports the diagnostic procedure and results for the flagged comparisons.

Shock	Transfer distribution	Baseline LUF _P relative to MP	Compensated LUF _P relative to MP	Compensated LUF _P relative to baseline LUF _P
Demand	Adjustment to savers ($\omega_T = 0$)	-0.081	-0.086	-0.004
	Equal per household ($\omega_T = \lambda$)	-0.078	-0.108	-0.030
	$\omega_T = 0.4$	-0.072	-0.778	-0.705
Markup	Adjustment to savers ($\omega_T = 0$)	+0.126	-0.054	-0.179
	Equal per household ($\omega_T = \lambda$)	+0.109	-0.130	-0.238
	$\omega_T = 0.4$	+0.048	-2.298 [†]	-2.349 [†]
Productivity	Adjustment to savers ($\omega_T = 0$)	+0.011	-0.018	-0.029
	Equal per household ($\omega_T = \lambda$)	+0.008	-0.030	-0.038
	$\omega_T = 0.4$	-0.002	-0.364	-0.363

Table 2: Conditional welfare under recurrent external shocks.

Notes: Entries are consumption-equivalent variations in per cent. Positive values favour the policy named first; negative values favour its benchmark. Welfare is conditional expected lifetime utility starting from the common deterministic steady state before the date-0 innovation. Each shock is evaluated separately with persistence 0.5 and innovation standard deviation 0.01, while the other shock variances are zero. Population CEVs apply one common consumption scaling to both benchmark household paths with weights $(1 - \lambda, \lambda)$. Each LUF_P–MP comparison holds the transfer distribution and debt-stabilising transfer rule fixed. The final column compares transmission-compensated directly with baseline LUF_P. [†] In these comparisons, some simulated paths of the local approximation imply nonpositive hand-to-mouth consumption.

6 Conclusion

Consumption tax feedback can stabilise inflation around the inherited steady state when the nominal interest rate and other tax rates are fixed. Tax announcements shift spending across dates, while the consumption tax also changes labour incentives and public revenue. When the resulting transfer adjustment reaches hand-to-mouth households, it changes their current income and spending, feeding back into output, inflation and tax revenue. Reallocating that adjustment can therefore alter equilibrium determinacy even when household composition and the aggregate policy rules remain fixed.

Coordinated taxes reproduce monetary policy allocations by offsetting the consumption tax’s effect on marginal cost and matching the hand-to-mouth transfer path along stable transitions. With the labour income tax fixed, the effect on marginal cost instead creates an output–inflation trade-off that depends on the shock. The cost relief from a consumption tax cut can cushion the contraction after a markup shock while reinforcing the later expansion after a demand shock. Effective inflation control can therefore accompany quite different output responses.

The subsequent fiscal adjustment also matters for welfare. Early tax relief can be followed by transfer cuts that leave hand-to-mouth households consuming less and working more. Welfare weighs these consumption and labour adjustments over the full transition. Under recurrent external shocks, transmission-compensated feedback delivers the smallest peak inflation in the evaluated family while lowering population welfare relative to the rule with conventional coefficients. Weaker feedback improves population welfare under markup and productivity risk throughout the range considered. Under demand risk, welfare is highest at an intermediate feedback strength that depends on transfer distribution, but all admissible comparisons remain below MP. Tighter inflation control therefore need not provide a better substitute for monetary policy once household consumption and labour costs are taken into account.

The model abstracts from capital and represents expenditure with a single flow consumption good. Capital would add an investment margin and a return condition. Distinguishing durable from non-durable spending could also alter tax transmission: Bachmann et al. (2026) find larger spending responses to temporary VAT cuts for more durable goods.

Future work could jointly choose interest rate and consumption tax responses when monetary policy remains partly available, and optimise tax feedback with its supporting transfer rule. Relaxing commitment to next-period tax announcements would clarify how credibility affects the intertemporal channel.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, I used ChatGPT and Codex (OpenAI) to assist with manuscript drafting and revision, literature checks, analytical checks, and the development and checking of numerical and plotting code. I directed the research, evaluated the economic arguments and interpretations, and reviewed and edited the resulting material. I take full responsibility for the content of this article.

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Supplementary Appendix S1. Three-equation representation

This appendix derives the three-equation representation used in Section 3. The analytical benchmark has zero steady-state debt and transfers, identical steady-state allocations across household types, positive fixed government purchases, and the offsetting sales subsidy and firm levy described below. The entire transfer adjustment is assigned to savers, who also hold public debt. Conditional on the inherited consumption tax, the allocation can therefore be solved before debt and saver transfers, which are subsequently recovered from the government budget and transversality condition.

Firm-side markup correction and common steady state

For the analytical benchmark, let $\mu_p \equiv \epsilon/(\epsilon - 1)$ denote the desired gross markup and write firm j 's distributable profit before the profit tax as

$$\Pi_t(j) = (1 + \varsigma)P_t(j)Y_t(j) - W_tN_t(j) - \mathcal{F}_t(j) \quad \int_0^1 \mathcal{F}_t(j) dj = \varsigma P_t Y_t$$

The lump-sum levy $\mathcal{F}_t(j)$ is independent of firm j 's own price and output choice. A resetting firm's first-order condition is therefore

$$\mathbb{E}_t \sum_{k=0}^{\infty} \theta_p^k M_{t,t+k} Y_{t+k|t}(j) [(1 + \varsigma)\bar{P}_t - \mu_p M C_{t+k}] = 0$$

Choosing

$$1 + \varsigma = \mu_p \quad \varsigma = \frac{1}{\epsilon - 1}$$

gives marginal-cost pricing in the zero-inflation steady state. Under linear production and the unit normalisation, $\bar{w} = \bar{m}\bar{c} = 1$. Because the subsidy and levy balance in every period, aggregate post-levy distributable profit remains

$$\Pi_t = P_t Y_t - W_t N_t \quad \bar{\Pi} = 0$$

The fixed markup terms cancel from the log-linear reset-price condition, leaving the standard New Keynesian Phillips curve used in the main text. The subsidy and levy also cancel state by state in the consolidated government budget. Normalise $\bar{A} = \bar{P} = \bar{Y} = \bar{N}_S = \bar{N}_H = 1$ and define the common private consumption share as $s_C \equiv \bar{C}_S/\bar{Y} = \bar{C}_H/\bar{Y}$. With zero steady transfers and profits, either household budget and the resource constraint give

$$(1 + \bar{\tau}_c)s_C = 1 - \bar{\tau}_n \quad \frac{\bar{G}}{\bar{Y}} = 1 - s_C$$

Hence

$$s_C = \frac{1 - \bar{\tau}_n}{1 + \bar{\tau}_c} \quad \bar{\tau}_c s_C + \bar{\tau}_n = 1 - s_C$$

so consumption and labour income taxes exactly finance fixed government purchases. The labour supply condition sets $\nu = s_C^{1-\sigma}$, and the bond Euler equation gives $\bar{R} = \beta^{-1}$. Evaluating at the calibration reported in Table 1 gives

$$s_C = 0.7886007 \quad \frac{\bar{G}}{\bar{Y}} = 0.2113993 \quad \nu = 1.2680689$$

Steady profits and the equity price are zero, so the equity equation is represented in level deviations:

$$\tilde{P}_t^e = \beta \mathbb{E}_t \left[\tilde{P}_{t+1}^e + (1 - \bar{\tau}_d) \tilde{\Pi}_{t+1} \right]$$

where tildes denote real level deviations normalised by steady-state output. Saver ownership equals the market-clearing share $1/(1 - \lambda)$.

Let $w_t \equiv W_t/P_t$ denote the real wage. The hand-to-mouth budget and labour supply conditions are

$$(1 + \tau_{c,t})C_{H,t} = (1 - \tau_{n,t})w_t N_{H,t}$$

$$w_t C_{H,t}^{-\sigma} = \frac{1 + \tau_{c,t}}{1 - \tau_{n,t}} \nu N_{H,t}^\varphi$$

Because ν is constant, it drops out of the log-linear equations. Log-linearising the two conditions gives

$$\hat{n}_{H,t} = -\eta \hat{\tau}_{c,t} + \eta \hat{\tau}_{n,t} + \eta \hat{w}_t \quad \eta \equiv \frac{1 - \sigma}{\sigma + \varphi}$$

The budget constraint then gives

$$\hat{c}_{H,t} = -(1 + \eta) \hat{\tau}_{c,t} + (1 + \eta) \hat{\tau}_{n,t} + (1 + \eta) \hat{w}_t$$

For savers, the labour supply condition is

$$\hat{w}_t = \varphi \hat{n}_{S,t} + \sigma \hat{c}_{S,t} + \hat{\tau}_{c,t} - \hat{\tau}_{n,t}$$

Substituting into the hand-to-mouth equations yields

$$\hat{n}_{H,t} = \eta \varphi \hat{n}_{S,t} + \eta \sigma \hat{c}_{S,t}$$

$$\hat{c}_{H,t} = (1 + \eta) \varphi \hat{n}_{S,t} + (1 + \eta) \sigma \hat{c}_{S,t}$$

Clearing in the goods and labour markets implies

$$\hat{y}_t = s_C [(1 - \lambda) \hat{c}_{S,t} + \lambda \hat{c}_{H,t}]$$

$$\hat{n}_t = (1 - \lambda) \hat{n}_{S,t} + \lambda \hat{n}_{H,t}$$

Using the second equation to eliminate $\hat{n}_{S,t}$ and substituting into the first yields

$$\hat{y}_t = s_C \frac{1 - \lambda}{(1 - \lambda) + \lambda\eta\varphi} \hat{c}_{S,t} + s_C \frac{\lambda(1 + \eta)\varphi}{(1 - \lambda) + \lambda\eta\varphi} \hat{n}_t$$

Since production satisfies $\hat{y}_t = \hat{A}_t + \hat{n}_t$, we obtain

$$\hat{c}_{S,t} = \Lambda \hat{y}_t + \Xi \hat{A}_t \tag{S1}$$

where

$$\begin{aligned} \Lambda &= \frac{(1 - \lambda + \lambda\eta\varphi)/s_C - \lambda(1 + \eta)\varphi}{1 - \lambda} \\ \Xi &= \frac{\lambda}{1 - \lambda} (1 + \eta)\varphi \end{aligned}$$

Substituting (S1) into the saver Euler equation gives the unconventional fiscal policy IS curve in (32). To derive the Phillips curve, write real marginal cost as

$$\widehat{mc}_t = \hat{w}_t - \hat{A}_t$$

Substituting the saver labour supply condition and (S1) gives

$$\widehat{mc}_t = \chi \hat{y}_t + z \hat{A}_t + \hat{\tau}_{c,t} - \hat{\tau}_{n,t} \tag{S2}$$

where

$$\chi = \varphi + \frac{\sigma}{s_C} \quad z = -(1 + \varphi)$$

Combining this marginal-cost mapping with Calvo price setting gives (33). Setting marginal cost to zero gives (40). The Euler equation, Phillips curve, and consumption tax rule then produce the output-gap system (41)–(43), with the transmission coefficient in (44). At the benchmark, $\Lambda = 1.1181120$, $\Xi = 0.0917710$, and $\Omega_\tau = 0.3676083$.

As λ approaches zero, Λ approaches $1/s_C$ and Ξ approaches zero, recovering the representative-household allocation block. The consumption tax transmission coefficient becomes $\Omega_\tau = s_C\varphi/(\sigma + s_C\varphi)$, which equals 0.2827944 at the benchmark. At

$$\lambda^* = \frac{\sigma + \varphi}{(1 + \varphi)(\sigma + s_C\varphi)}$$

$\Lambda = 0$, so the output-based IS representation is singular. On either side of this value, Λ changes sign.

Tax timing and determinacy with transfers to savers

For the determinacy calculation, set productivity and policy shocks to zero and define $x_t = [\hat{y}_t^{\text{gap}}, \hat{\pi}_t, \hat{\tau}_{c,t}]'$. Under the maintained timing, the tax applied at date t was announced at $t - 1$. The date- t rule announces $\hat{\tau}_{c,t+1}$, so $\mathbb{E}_t \hat{\tau}_{c,t+1} = \hat{\tau}_{c,t+1}$. Writing the announced tax as an expectation matches the saver Euler equation. The current tax is therefore one predetermined state, while output and inflation are forward-looking. Local determinacy requires two unstable generalised roots, no root on the unit circle, and the Blanchard–Kahn rank condition.

Figure S1 reports equilibrium determinacy for the LUFP rule with conventional Taylor rule coefficients and for the monetary policy benchmark. Both systems satisfy these conditions at every sampled point with $\Lambda > 0$, corresponding to $\lambda < \lambda^* = 0.5379042$. The benchmark is $(\theta_p, \lambda) = (0.67, 0.121)$. Across both panels, every sampled point satisfying the root-count and unit-root conditions also satisfies the Blanchard–Kahn rank condition. The remaining boundaries lie beyond $\Lambda = 0$, outside this region.

The state count depends on the announcement timing. If the current tax were freely chosen without a separate level rule, it would become a third forward-looking variable. The benchmark has only two unstable roots, and as a result a unique bounded path would not be selected. Preannouncement instead makes the current tax inherited without strengthening

feedback. The positive output coefficient anchors its level, whereas setting $\gamma_Y^L = 0$ produces the unit root discussed in Section 3.

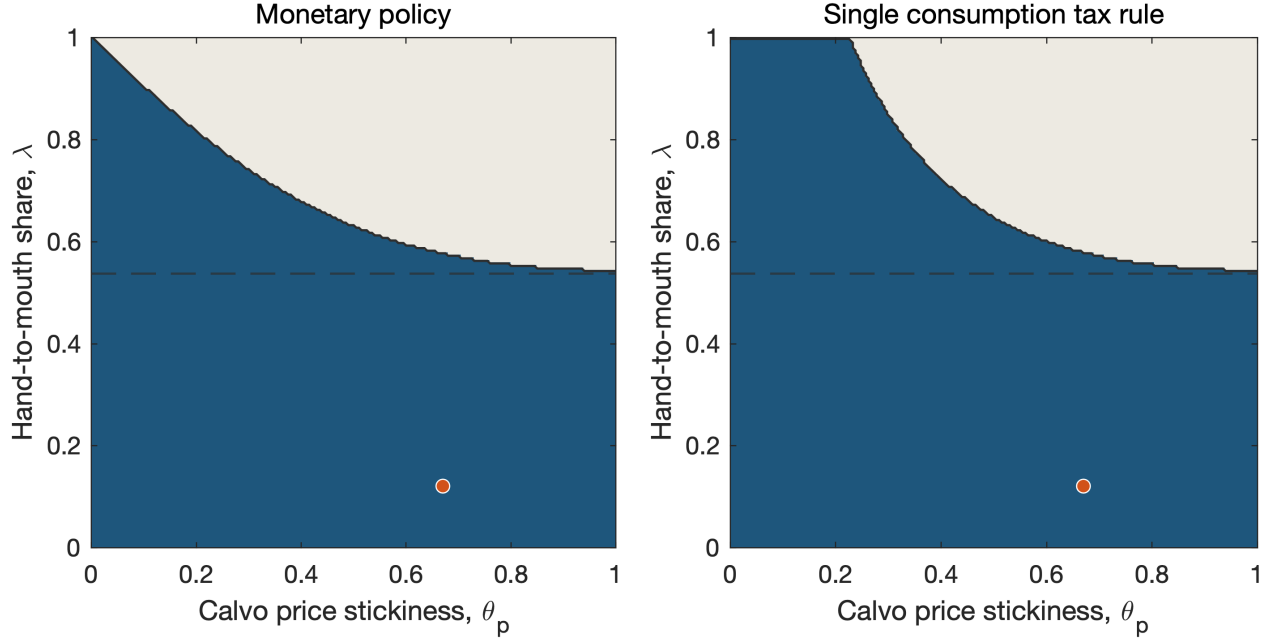


Figure S1: Equilibrium determinacy in the analytical allocation block with transfers to savers.

Notes: The horizontal axis is the Calvo price stickiness parameter θ_p , and the vertical axis is the hand-to-mouth share λ . Blue regions indicate a locally determinate equilibrium, while light regions fail the root-count or unit-root condition. The orange marker denotes $(\theta_p, \lambda) = (0.67, 0.121)$. The dashed line marks $\Lambda = 0$, which occurs at $\lambda = 0.5379$ under the benchmark calibration. Policy coefficients are $\theta_\pi = \gamma_\pi^L = 1.5$ and $\theta_Y = \gamma_Y^L = 0.125$. In the LUPF panel, the current tax is inherited and the next tax is announced.

Supplementary Appendix S2. Transfer distribution and fiscal dynamics

This appendix derives the transfer coefficient and fiscal state used in Section 3.3. Because $\tilde{T}_{H,t}$ is normalised by steady-state output while consumption is normalised by steady-state gross expenditure, the transfer entering the hand-to-mouth budget is $\tilde{T}_{H,t}/[(1 + \bar{\tau}_c)s_C]$. The household budget and common labour supply condition give

$$\hat{n}_{H,t} = \frac{(1 - \sigma)\varphi}{\sigma + \varphi}\hat{n}_{S,t} + \frac{(1 - \sigma)\sigma}{\sigma + \varphi}\hat{c}_{S,t} - \frac{\sigma}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C}\tilde{T}_{H,t} \quad (\text{S3})$$

$$\hat{c}_{H,t} = \frac{(1 + \varphi)\varphi}{\sigma + \varphi}\hat{n}_{S,t} + \frac{(1 + \varphi)\sigma}{\sigma + \varphi}\hat{c}_{S,t} + \frac{\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C}\tilde{T}_{H,t} \quad (\text{S4})$$

Labour market clearing and $\tilde{T}_{H,t} = (\omega_T/\lambda)\tilde{T}_t$ imply

$$\hat{n}_{S,t} = \frac{\hat{n}_t - \lambda \frac{(1 - \sigma)\sigma}{\sigma + \varphi}\hat{c}_{S,t} + \frac{\omega_T\sigma}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C}\tilde{T}_t}{1 - \lambda + \lambda \frac{(1 - \sigma)\varphi}{\sigma + \varphi}} \quad (\text{S5})$$

Clearing in the goods market is

$$\begin{aligned} \hat{y}_t = s_C \left[1 - \lambda + \lambda \frac{(1 + \varphi)\sigma}{\sigma + \varphi} \right] \hat{c}_{S,t} + s_C \lambda \frac{(1 + \varphi)\varphi}{\sigma + \varphi} \hat{n}_{S,t} \\ + \frac{\omega_T\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)}\tilde{T}_t \end{aligned} \quad (\text{S6})$$

Substituting $\hat{n}_t = \hat{y}_t - \hat{A}_t$ and (S5) into (S6), collecting terms, and simplifying gives

$$\begin{aligned} \hat{c}_{S,t} = \Lambda \hat{y}_t + \Xi \hat{A}_t - \frac{\lambda}{1 - \lambda} \frac{\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \tilde{T}_{H,t} \\ = \Lambda \hat{y}_t + \Xi \hat{A}_t - \frac{\omega_T}{1 - \lambda} \frac{\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \tilde{T}_t \end{aligned} \quad (\text{S7})$$

where, directly in the structural parameters,

$$\begin{aligned}\Lambda &= \frac{(1 - \lambda + \lambda\eta\varphi)/s_C - \lambda(1 + \eta)\varphi}{1 - \lambda} \\ \Xi &= \frac{\lambda}{1 - \lambda} \left(1 + \frac{1 - \sigma}{\sigma + \varphi} \right) \varphi\end{aligned}\tag{S8}$$

At fixed aggregate output and productivity, substituting (S7) into (S5) gives the following transfer contribution to saver hours:

$$\frac{\lambda}{1 - \lambda} \frac{\sigma}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \tilde{T}_{H,t}$$

The coefficient on $\tilde{T}_{H,t}$ in the saver real wage is therefore

$$\varphi \left[\frac{\lambda}{1 - \lambda} \frac{\sigma}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \right] - \sigma \left[\frac{\lambda}{1 - \lambda} \frac{\varphi}{(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \right] = 0$$

Real marginal cost has the same zero coefficient because aggregate labour is already fixed by production. This cancellation depends on common preferences and the symmetric zero-transfer analytical normalisation. In the quantitative linearisation, transfers enter marginal cost because household steady-state shares are unequal.

Tax revenue and the fiscal state equation

The fixed firm subsidy and its balancing levy cancel in the consolidated government budget, so tax revenue is

$$TR_t = \tau_{c,t}P_tC_t + \tau_{n,t}W_tN_t + \tau_{d,t}\Pi_t$$

The real wage bill and post-levy distributable profits satisfy

$$\begin{aligned}\frac{d(W_tN_t/P_t)}{\bar{Y}} &= (\chi + 1)\hat{y}_t - (1 + \varphi)\hat{A}_t + \hat{\tau}_{c,t} - \hat{\tau}_{n,t} \\ \frac{d(\Pi_t/P_t)}{\bar{Y}} &= -\chi\hat{y}_t + (1 + \varphi)\hat{A}_t - \hat{\tau}_{c,t} + \hat{\tau}_{n,t}\end{aligned}$$

Combining the consumption tax, labour income tax, and profit tax bases gives

$$\begin{aligned}
\widetilde{TR}_t &= r_y \hat{y}_t + r_\tau \hat{\tau}_{c,t} + r_A \hat{A}_t + r_n \hat{\tau}_{n,t} \\
r_y &\equiv \bar{\tau}_c + \bar{\tau}_n(\chi + 1) - \bar{\tau}_d \chi \\
r_\tau &\equiv (1 + \bar{\tau}_c)s_C + \bar{\tau}_n - \bar{\tau}_d = 1 - \bar{\tau}_d \\
r_A &\equiv (\bar{\tau}_d - \bar{\tau}_n)(1 + \varphi) \\
r_n &\equiv \bar{\tau}_d - 1
\end{aligned}$$

The equality $r_\tau = 1 - \bar{\tau}_d$ uses the symmetric steady-state household budget. Under LUFP, the labour income tax is fixed. The determinacy calculation also suppresses productivity shocks, leaving $\widetilde{TR}_t = r_y \hat{y}_t + r_\tau \hat{\tau}_{c,t}$. Both coefficients are positive whenever

$$\bar{\tau}_d < \min \left\{ 1, \frac{\bar{\tau}_c + \bar{\tau}_n(\chi + 1)}{\chi} \right\}$$

Using $\tilde{T}_t = -\gamma_g \tilde{b}_{t-1}$ and $\mathbb{E}_t \tilde{T}_{t+1} = -\gamma_g \tilde{b}_t$ in (54) gives the fiscal state in (57). Before setting $\hat{A}_t = 0$, it is

$$\mathbb{E}_t \tilde{T}_{t+1} = \frac{1 - \gamma_g}{\beta} \tilde{T}_t + \frac{\gamma_g}{\beta} \left(r_y \hat{y}_t + r_\tau \hat{\tau}_{c,t} + r_A \hat{A}_t \right)$$

Cross-regime transfer restriction

Let

$$\Delta \hat{y}_t \equiv \hat{y}_t^F - \hat{y}_t^M \quad \Delta \hat{\pi}_t \equiv \hat{\pi}_t^F - \hat{\pi}_t^M \quad \Delta \tilde{T}_{H,t} \equiv \tilde{T}_{H,t}^F - \tilde{T}_{H,t}^M$$

Impose the tax wedge conditions in (38) and common productivity. Subtracting the MP equations from the UFPE equations gives

$$\begin{aligned}\Delta\hat{y}_t &= \mathbb{E}_t\Delta\hat{y}_{t+1} + \frac{1}{\sigma\Lambda}\mathbb{E}_t\Delta\hat{\pi}_{t+1} \\ &\quad - \frac{1}{\sigma\Lambda}(\theta_\pi\Delta\hat{\pi}_t + \theta_Y\Delta\hat{y}_t) \\ &\quad + \frac{1}{\Lambda}\frac{\lambda}{1-\lambda}\frac{\varphi}{(\sigma+\varphi)(1+\bar{\tau}_c)s_C}\left(\Delta\tilde{T}_{H,t} - \mathbb{E}_t\Delta\tilde{T}_{H,t+1}\right)\end{aligned}\tag{S9}$$

$$\Delta\hat{\pi}_t = \beta\mathbb{E}_t\Delta\hat{\pi}_{t+1} + \psi_{mc}\chi\Delta\hat{y}_t\tag{S10}$$

For $0 < \lambda < 1$, $\varphi > 0$, and $\Lambda \neq 0$, zero output and inflation gaps require

$$\Delta\tilde{T}_{H,t} = \mathbb{E}_t\Delta\tilde{T}_{H,t+1}$$

Conversely, this restriction removes the only forcing term from (S9)–(S10). The output and inflation gaps then satisfy the homogeneous version of the MP allocation block. Because the zero-gap path is a bounded solution and local determinacy admits a unique bounded path, $\Delta\hat{y}_t = \Delta\hat{\pi}_t = 0$ for every t . If the transfer gap converges to zero in conditional mean, forward iteration further implies $\Delta\tilde{T}_{H,t} = 0$ for every t .

The relevant cases follow directly:

- Assigning the entire transfer adjustment to savers sets $\tilde{T}_{H,t}^F = \tilde{T}_{H,t}^M = 0$, so the restriction holds regardless of aggregate transfers, saver transfers, or public debt.
- Equal transfers per household set $\tilde{T}_{H,t} = \tilde{T}_t$. The restriction then applies to the expected change in the aggregate transfer gap.
- Assigning the entire transfer adjustment to hand-to-mouth households sets $\tilde{T}_{H,t} = \tilde{T}_t/\lambda$, magnifying a given aggregate transfer gap at the household level.

- Different aggregate transfer paths and distributions preserve equivalence whenever $\omega_T^F \tilde{T}_t^F = \omega_T^M \tilde{T}_t^M$, because they deliver the same payment to hand-to-mouth households.
- As λ tends to zero under equal per-household transfers, the transfer coefficient tends to zero and the qualification disappears.

For the determinacy calculation, set productivity deviations to zero, $\hat{A}_t = 0$, and hold the labour income tax rate fixed. Define

$$x_t = \begin{bmatrix} \hat{y}_t & \hat{\pi}_t & \hat{\tau}_{c,t} & \tilde{T}_t \end{bmatrix}'$$

Within the matrices below, γ_π and γ_Y denote the LUF coefficients γ_π^L and γ_Y^L . Equations (50)–(57) imply

$$\mathbb{A}x_t = \mathbb{B}\mathbb{E}_t x_{t+1}$$

The transfer state equation adds the fourth row to the three-equation allocation block, giving

$$\mathbb{A} = \begin{bmatrix} 1 & 0 & \frac{1}{\sigma\Lambda} & -\frac{\omega_T\varphi}{(1-\lambda)\Lambda(\sigma+\varphi)(1+\bar{\tau}_c)s_C} \\ -\kappa & 1 & -\psi_{mc} & 0 \\ -\gamma_Y & -\gamma_\pi & 1 & 0 \\ \frac{\gamma_g}{\beta}r_y & 0 & \frac{\gamma_g}{\beta}r_\tau & \frac{1-\gamma_g}{\beta} \end{bmatrix} \quad (\text{S11})$$

The matrix on expected variables is

$$\mathbb{B} = \begin{bmatrix} 1 & \frac{1}{\sigma\Lambda} & \frac{1}{\sigma\Lambda} & -\frac{\omega_T\varphi}{(1-\lambda)\Lambda(\sigma+\varphi)(1+\bar{\tau}_c)s_C} \\ 0 & \beta & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

To isolate how transfer distribution enters the characteristic determinant, let $C(q)$ denote the upper-left 3×3 block of $\mathbb{A} - q\mathbb{B}$, let $e_1 = (1, 0, 0)'$, and define

$$h_0 \equiv \frac{\varphi}{(1 - \lambda)\Lambda(\sigma + \varphi)(1 + \bar{\tau}_c)s_C} \quad v' \equiv \frac{\gamma_g}{\beta} \begin{bmatrix} r_y & 0 & r_\tau \end{bmatrix} \quad \rho_T \equiv \frac{1 - \gamma_g}{\beta}$$

Then

$$\mathbb{A} - q\mathbb{B} = \begin{bmatrix} C(q) & \omega_T h_0(q - 1)e_1 \\ v' & \rho_T - q \end{bmatrix}$$

and the characteristic determinant satisfies

$$p(q; \omega_T) \equiv \det(\mathbb{A} - q\mathbb{B}) = \det C(q)(\rho_T - q) - \omega_T h_0(q - 1)v' \text{adj}(C(q))e_1$$

Here, adj denotes the classical adjugate. Transfer distribution therefore enters the characteristic determinant linearly through ω_T . At $\omega_T = 0$, the determinant factorises into the three-equation allocation determinant and the fiscal root, while the coupling term vanishes at $q = 1$. The roots themselves need not vary monotonically with ω_T , and so linear entry of the transfer share does not imply a monotone determinacy boundary.

The generalised eigenvalues of $(\mathbb{A}, \mathbb{B})$ give the four-equation root count. The tax wedge and transfer are predetermined, while output and inflation are forward-looking. Local determinacy requires exactly two unstable roots, no root on the unit circle, and the Blanchard–Kahn rank condition. The rank condition holds at every sampled point satisfying the root-count and unit-root conditions in the transfer-distribution maps, so the blue regions satisfy all three determinacy conditions. At $\omega_T = 0$, the matrices are block triangular and their roots equal the three-equation allocation roots together with $\rho_T \equiv (1 - \gamma_g)/\beta$. Stability of the additional fiscal root therefore requires

$$|\rho_T| < 1 \quad \Longleftrightarrow \quad 1 - \beta < \gamma_g < 1 + \beta$$

The lower bound rules out a transfer response too weak to prevent debt accumulation, while the upper bound rules out explosive alternating adjustment. At the reference calibration, $\rho_T = 0.9091$. The benchmark results under baseline and transmission-compensated feedback are reported in Figure 1.

Figure S2 shows how equilibrium determinacy changes with price stickiness and fiscal backing under the transmission-compensated rule. At $\omega_T = 1$, the system has four unstable roots for $\theta_p \lesssim 0.750$ over the reported range. At the reference value $\theta_p = 0.67$, the system also has four unstable roots for γ_g between approximately 0.042 and 0.158.

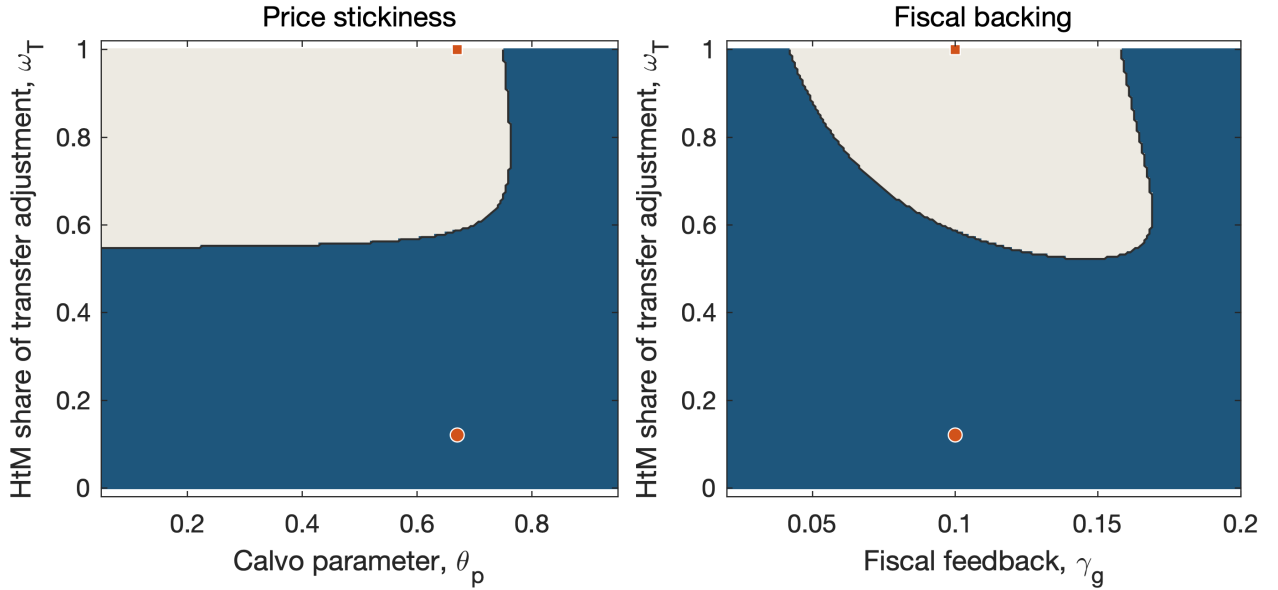


Figure S2: Sensitivity of equilibrium determinacy to transfer distribution, price stickiness, and fiscal backing.

Notes: Both panels fix $\lambda = 0.121$, use the transmission-compensated pair $(\gamma_\pi^L, \gamma_Y^L) = (4.080, 0.340)$, and use the debt-stabilising transfer rule. The left panel varies price stickiness and the share of the transfer adjustment assigned to hand-to-mouth households at $\gamma_g = 0.1$, while the right panel varies fiscal backing and the same transfer share at $\theta_p = 0.67$. Blue regions indicate a locally determinate equilibrium, while light regions fail the root-count or unit-root condition. Circles mark equal per-household distribution and squares mark $\omega_T = 1$ at the analytical reference values.

Asymmetric quantitative steady state and linearisation

The calibrated quantitative economy imposes zero steady transfers, positive public debt, saver ownership of firms and government bonds, and the empirical tax rates in Table 1. In the zero-inflation steady state, linear production and monopolistic competition imply

$$\frac{\bar{w}\bar{N}}{\bar{Y}} = \frac{\epsilon - 1}{\epsilon} \quad \frac{\bar{\Pi}}{\bar{P}\bar{Y}} = \frac{1}{\epsilon} \quad (\text{S12})$$

Here $\bar{w} = \bar{W}/\bar{P}$. Normalising $\bar{Y} = 1$ and $\bar{N} = 1/3$ implies $\bar{A} = 3$.

The fixed level of government purchases is

$$\frac{G}{\bar{Y}} = \frac{\bar{\tau}_c + \bar{\tau}_n \frac{\epsilon-1}{\epsilon} + \bar{\tau}_d \frac{1}{\epsilon} - (1-\beta) \frac{\bar{b}^r}{\bar{Y}}}{1 + \bar{\tau}_c} \quad (\text{S13})$$

It satisfies the steady-state government budget and resource constraint.

With $\bar{b}^r = (1-\lambda)\bar{b}_S^r$, where $\bar{b}_S^r = \bar{B}_S/\bar{P}$, and $(1-\lambda)\bar{s}_S = 1$, the household budgets are

$$(1 + \bar{\tau}_c)\bar{C}_H = (1 - \bar{\tau}_n)\bar{w}\bar{N}_H \quad (\text{S14})$$

$$(1 + \bar{\tau}_c)\bar{C}_S = (1 - \bar{\tau}_n)\bar{w}\bar{N}_S + \frac{(1 - \bar{\tau}_d)\bar{\Pi}/\bar{P} + (1 - \beta)\bar{b}^r}{1 - \lambda} \quad (\text{S15})$$

These equations are solved jointly with the common labour supply condition, production, aggregation, and $\bar{N} = 1/3$. They generate the allocation in Table S1.

Variable	Saver	Hand-to-mouth
Consumption relative to aggregate output	0.8095	0.7502
Hours	0.3268	0.3805

Table S1: Calibrated asymmetric household steady state.

Notes: Steady-state transfers are zero. Aggregate output is normalised to one and aggregate hours to one-third. Aggregate consumption and government purchases are 0.8023 and 0.1977 of output, respectively.

The calibrated linearisation uses steady-state consumption and labour shares rather than population shares. With government purchases fixed, the static household block is

$$\hat{y}_t = (1 - \lambda) \frac{\bar{C}_S}{\bar{Y}} \hat{c}_{S,t} + \lambda \frac{\bar{C}_H}{\bar{Y}} \hat{c}_{H,t} \quad (\text{S16})$$

$$\hat{y}_t = (1 - \lambda) \frac{\bar{N}_S}{\bar{N}} \hat{n}_{S,t} + \lambda \frac{\bar{N}_H}{\bar{N}} \hat{n}_{H,t} \quad (\text{S17})$$

$$\varphi \hat{n}_{S,t} + \sigma \hat{c}_{S,t} = \varphi \hat{n}_{H,t} + \sigma \hat{c}_{H,t}$$

$$\hat{\tau}_{c,t} + \hat{c}_{H,t} - \hat{w}_t - \hat{n}_{H,t} = \frac{\omega_T}{\lambda(1 + \bar{\tau}_c)(\bar{C}_H/\bar{Y})} \tilde{T}_t$$

$$\hat{w}_t = \varphi \hat{n}_{S,t} + \sigma \hat{c}_{S,t} + \hat{\tau}_{c,t} \quad (\text{S18})$$

These five equations determine the four household deviations and the wage conditional on output, the consumption tax wedge, and transfers.

At the benchmark, solving the static block gives

$$\hat{c}_{S,t} = 1.1030 \hat{y}_t + \begin{cases} 0, & \omega_T = 0 \\ -0.0578 \tilde{T}_t, & \omega_T = \lambda \\ -0.4777 \tilde{T}_t, & \omega_T = 1 \end{cases} \quad (\text{S19})$$

At fixed productivity, production gives $\hat{n}_t = \hat{y}_t$, and

$$\widehat{mc}_t = \hat{w}_t \quad (\text{S20})$$

Consequently,

$$\widehat{mc}_t = 3.5562 \hat{y}_t + \hat{\tau}_{c,t} + \begin{cases} 0, & \omega_T = 0 \\ 0.0255 \tilde{T}_t, & \omega_T = \lambda \\ 0.2110 \tilde{T}_t, & \omega_T = 1 \end{cases} \quad (\text{S21})$$

The distribution of the transfer adjustment therefore enters marginal cost in the calibrated linearisation even though the direct transfer term cancels under the symmetric analytical normalisation.

The corresponding tax revenue deviation is

$$\begin{aligned}\widetilde{TR}_t &= (\bar{\tau}_c + \bar{\tau}_d)\hat{y}_t + (1 + \bar{\tau}_c)\frac{\bar{C}}{\bar{Y}}\hat{\tau}_{c,t} \\ &\quad + (\bar{\tau}_n - \bar{\tau}_d)\frac{\epsilon - 1}{\epsilon}(\hat{w}_t + \hat{n}_t)\end{aligned}\tag{S22}$$

With positive steady-state debt, the government budget and debt-stabilising transfer rule imply

$$\mathbb{E}_t\widetilde{T}_{t+1} = \frac{1 - \gamma_g}{\beta}\widetilde{T}_t + \frac{\gamma_g}{\beta}\widetilde{TR}_t + \frac{\gamma_g s_b}{\beta}\hat{\pi}_t - \gamma_g s_b \hat{R}_t\tag{S23}$$

The inflation term records erosion of inherited nominal debt, while the interest rate term records the proceeds from current issuance, where $s_b = \bar{B}_g/(\bar{P}\bar{Y})$. Both terms are absent from the zero-debt analytical system. The nominal rate is fixed under UFPE and LUFP, so $\hat{R}_t = 0$ in the four-equation LUFP system.

After the static household block is substituted, the saver Euler equation, Phillips curve, tax rule, and (S23) remain four dynamic equations in $(\hat{y}_t, \hat{\pi}_t, \hat{\tau}_{c,t}, \widetilde{T}_t)$. The current consumption tax wedge and current transfer are the policy and fiscal states, while output and inflation are the two forward-looking variables.

The profit tax sensitivity exercise uses the economically admissible domain $0 \leq \bar{\tau}_d < 1$, with a numerical grid ending at 0.99. At $\bar{\tau}_d = 1$, profits after tax are identically zero, so the firm's reset price is not pinned down. The algebraic rate required for exact household symmetry is 1.1027 and therefore lies outside the admissible domain.

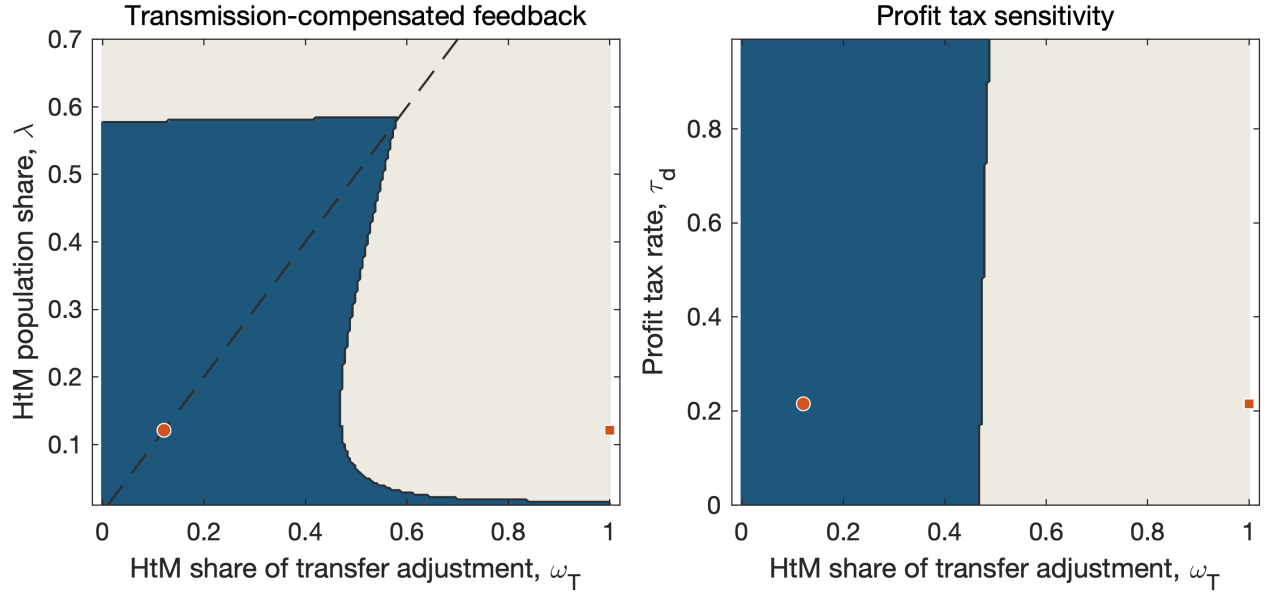


Figure S3: Equilibrium determinacy in the calibrated economy under transmission-compensated feedback.

Notes: Both panels use $(\gamma_\pi^L, \gamma_Y^L) = (4.080, 0.340)$. Blue regions indicate a locally determinate equilibrium, while light regions fail the root-count or unit-root condition. The left panel varies the hand-to-mouth population share and the share of the transfer adjustment assigned to those households. The dashed line denotes equal per-household distribution. The right panel fixes $\lambda = 0.121$ and varies the profit tax rate over $0 \leq \bar{\tau}_d \leq 0.99$. Circles mark equal per-household distribution, and squares mark the case in which the entire transfer adjustment is assigned to hand-to-mouth households.

Debt matching and household allocations

A common public debt path can support different household allocations under one-tax stabilisation. In the calibrated asymmetric economy, I impose the real debt path under MP and vary consumption tax feedback and the distribution of residual transfers. This exercise extends the comparison under a common debt path in Bartal and Becard (2024) by varying both margins.

Define real face-value debt as $b_t^r = B_{g,t}/P_t$, and let $j \in \{M, F\}$ index MP and LUFP. Dividing the nominal government budget by P_t and linearising around $\bar{R} = 1/\beta$ gives

$$\tilde{T}_t^j + s_b \hat{b}_{t-1}^{r,j} - s_b \hat{\pi}_t^j = \widetilde{TR}_t^j + \beta s_b \hat{b}_t^{r,j} - \beta s_b \hat{R}_t^j \quad s_b = \frac{\bar{B}_g}{\bar{P}\bar{Y}} = 1.7115457 \quad (\text{S24})$$

Here $\hat{b}_t^{r,j}$ is the log deviation of $b_t^{r,j}$, and fiscal flow deviations are divided by steady-state output. Inflation erodes the real value of inherited nominal debt, while the current nominal return determines the proceeds from new issuance.

The MP block combines (S24), the Taylor rule, and the debt-stabilising transfer rule with equal per-household transfers to generate $\{\hat{b}_t^{r,M}\}$. Under LUFP, $\hat{R}_t^F = 0$, and the debt-matched experiment imposes $\hat{b}_t^{r,F} = \hat{b}_t^{r,M}$. MP and each LUFP rule receive the same direct one-percentage-point innovation. LUFP is evaluated under baseline feedback, $(\gamma_\pi^L, \gamma_Y^L) = (1.5, 0.125)$, and transmission-compensated feedback, $(\gamma_\pi^L, \gamma_Y^L) = (4.080, 0.340)$. The realised intertemporal wedges remain endogenous under both rules. Aggregate transfers are therefore the residual

$$\tilde{T}_t^F = \widetilde{TR}_t^F - s_b \hat{b}_{t-1}^{r,M} + s_b \hat{\pi}_t^F + \beta s_b \hat{b}_t^{r,M} \quad (\text{S25})$$

With the labour income tax rate and profit tax rate fixed, LUFP tax revenue is

$$\begin{aligned} \widetilde{TR}_t^F &= (\bar{\tau}_c + \bar{\tau}_d) \hat{g}_t^F + (1 + \bar{\tau}_c) \frac{\bar{C}}{\bar{Y}} \hat{\tau}_{c,t}^F \\ &\quad + (\bar{\tau}_n - \bar{\tau}_d) \frac{\epsilon - 1}{\epsilon} (\hat{w}_t^F + \hat{n}_t^F) \end{aligned} \quad (\text{S26})$$

Equation (13) allocates the resulting transfer using $\omega_T = 0$, $\omega_T = \lambda$, or $\omega_T = 1$. The transfer is solved separately in each case because recipient choice changes the household allocation and the tax base.

The joint debt-matched system has four forward-looking variables. Under both feedback rules and all three transfer distributions, it has four unstable roots, contains no unit root, and satisfies the Blanchard–Kahn rank condition. This establishes conditional solvability with the imposed debt path. It is distinct from stand-alone LUF_P determinacy under the debt-stabilising transfer rule. All three systems with baseline feedback satisfy the local determinacy conditions under that rule. Under transmission-compensated feedback, the conditions hold when the transfer adjustment is assigned to savers or distributed equally per household, but fail when the entire adjustment is assigned to hand-to-mouth households.

When the residual is assigned to savers, imposing the MP debt path leaves the private allocation, tax revenue, and consumption tax path unchanged relative to the corresponding Section 5.2 exercise, in which debt evolves endogenously under the debt-stabilising transfer rule. The imposed debt path is instead accommodated by offsetting changes in saver transfers and bond holdings. Once part of the residual reaches hand-to-mouth households, it changes their current disposable income and therefore aggregate demand. The resulting movements in output, inflation, tax revenue, and future transfers feed back into saver decisions, so the private allocation as a whole no longer coincides with its counterpart under the debt-stabilising transfer rule.

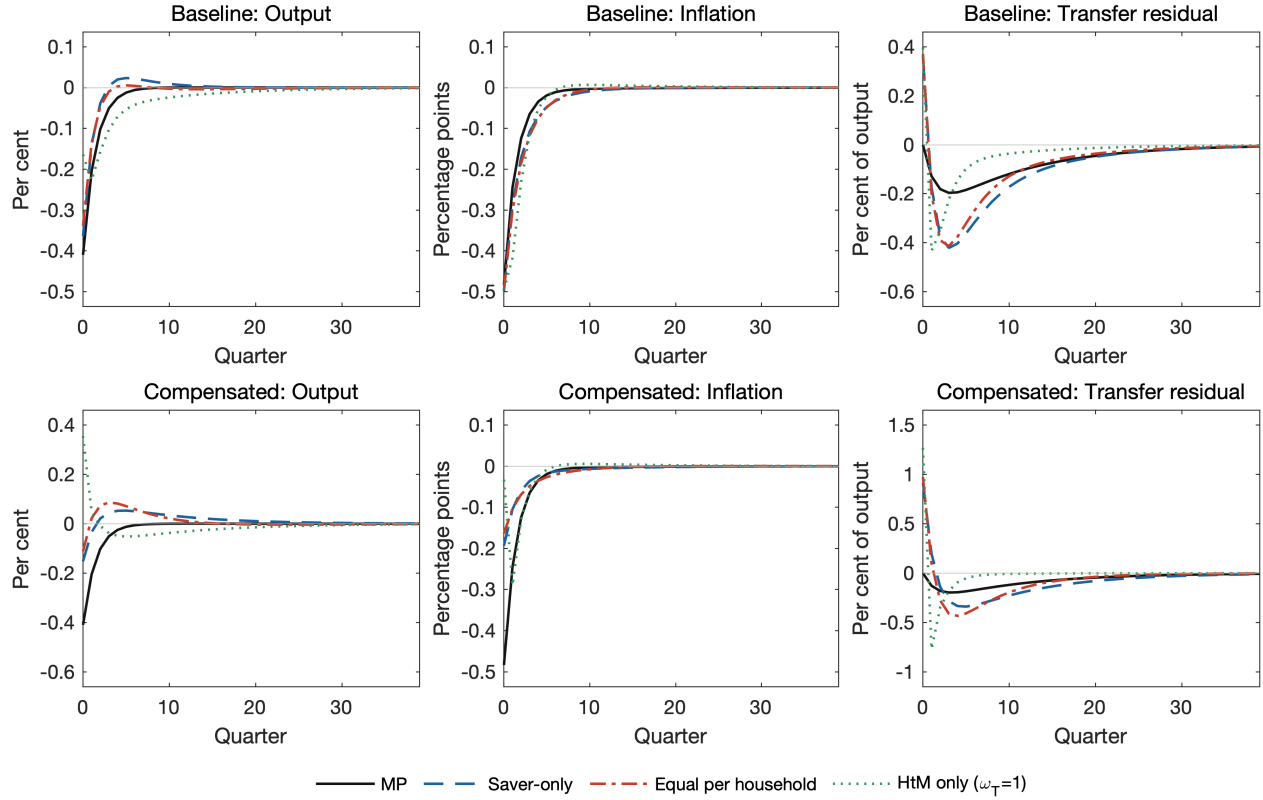


Figure S4: Aggregate responses under a common real public debt path.

Notes: The figure reports linearised responses after the common direct one-percentage-point innovation. Rows distinguish baseline and transmission-compensated LUFP. Every LUFP case follows the MP real public debt path, while its realised intertemporal wedge remains endogenous. MP uses equal per-household transfers under the debt-stabilising transfer rule. Output is a per cent deviation, inflation is in quarterly percentage points, and the aggregate transfer residual is a percentage of steady-state output. The displayed horizon is 40 quarters.

Household adjustment under a common public debt path

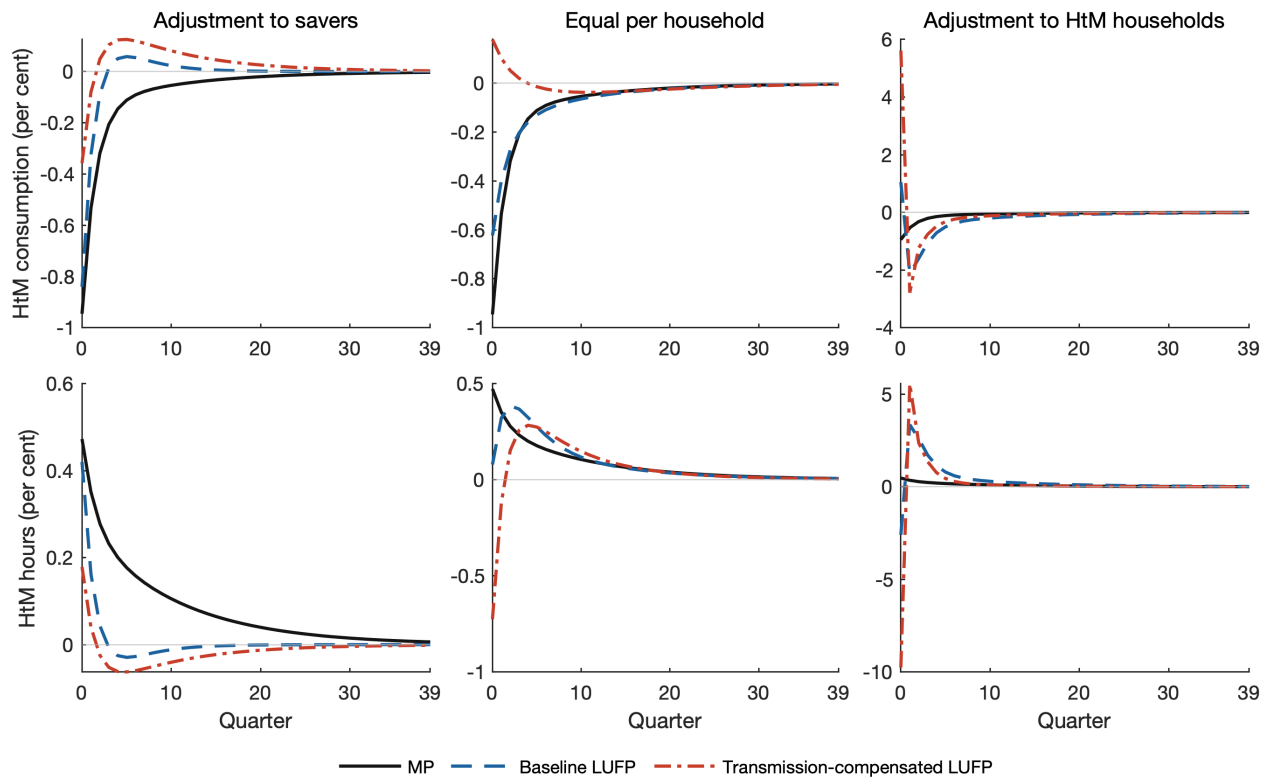


Figure S5: Feedback strength and transfer distribution under a common public debt path.

Notes: Nonlinear transitions after the common direct one-percentage-point innovation. Columns assign residual transfers to savers, equally per household, or entirely to hand-to-mouth households. Each compares MP, baseline LUFP and transmission-compensated LUFP. All LUFP cases follow the MP real public debt path, with endogenous intertemporal wedges. MP uses equal per-household transfers and the debt-stabilising transfer rule. Consumption and hours are per cent log deviations from steady state over 40 quarters. The case $\omega_T = 1$ is a polar diagnostic.

With the residual assigned to savers, transmission-compensated feedback reduces both the initial fall in hand-to-mouth consumption and the initial rise in their hours relative to baseline LUFP (Figure S5). With no direct transfer adjustment, this difference comes through the consumption tax and labour income. Under equal per-household transfers, stronger feedback changes their impact consumption from a decline of about 0.6 per cent to a small increase. Concentrating the entire residual on the small hand-to-mouth group magnifies the difference: stronger feedback nearly eliminates the inflation response, reverses the

sign of the impact output response and amplifies hand-to-mouth transfer and consumption movements under the common debt target.

<i>Panel A: Exact nonlinear impact responses</i>					
Transfer distribution	Feedback	$\hat{y}_0$	$\hat{\pi}_0$	$\tilde{T}_0$	$\hat{C}_{H,0}$
Adjustment to savers	Baseline	-0.359	-0.507	+0.341	-0.840
	Transmission-compensated	-0.151	-0.195	+0.911	-0.358
Equal per household	Baseline	-0.335	-0.503	+0.352	-0.623
	Transmission-compensated	-0.111	-0.164	+0.969	+0.179
Entire adjustment to HtM	Baseline	-0.165	-0.502	+0.379	+1.048
	Transmission-compensated	+0.370	-0.033	+1.270	+5.617

<i>Panel B: Exact transition CEV relative to MP (per cent)</i>				
Transfer distribution	Feedback	Saver	HtM	Population
Adjustment to savers	Baseline	-0.0042	+0.0478	+0.0025
	Transmission-compensated	-0.0034	+0.0756	+0.0068
Equal per household	Baseline	+0.0008	+0.0020	+0.0009
	Transmission-compensated	+0.0011	+0.0396	+0.0061
Entire adjustment to HtM	Baseline	+0.0143	-0.1277	-0.0041
	Transmission-compensated	+0.0003	+0.0106	+0.0016

Table S2: Exact nonlinear impacts and transition welfare under debt matching.

Notes: Panel A reports exact nonlinear impact responses. Output and hand-to-mouth consumption are per cent log deviations, inflation is in quarterly percentage points, and aggregate transfers are percentages of steady-state output. Panel B reports exact transition CEVs relative to MP. Positive values favour debt-matched LUF. Household entries are type-specific. Population entries apply one common consumption scaling to both household paths with weights $(1 - \lambda, \lambda)$, and so they are not weighted averages of household CEVs. MP uses equal per-household transfers under the debt-stabilising transfer rule and is the benchmark for every row. Every regime receives the same direct innovation. Each LUF case follows the MP real public debt path, while its realised intertemporal wedge remains endogenous. The comparisons are conditional on the specified feedback rule, debt path, and transfer distribution.

Under both feedback rules, hand-to-mouth welfare is highest when savers absorb the residual, although assigning it to hand-to-mouth households produces their largest impact consumption gain. The subsequent transfer reversal and hours response make this initial gain a poor guide to lifetime welfare. Feedback changes the size and timing of these cash flows. When hand-to-mouth households receive the entire residual, moving to transmission-compensated feedback reverses their welfare ranking and the population welfare ranking relative to MP.

Supplementary Appendix S3. Welfare measurement

The external-shock comparisons in Section 5.3 and the transition exercises in Section 5.2 and Appendix S2 use two welfare methods across three experiments. The comparisons after an innovation to the policy rule and under debt matching evaluate exact nonlinear utility along their realised transitions. The policy rule innovation uses the debt-stabilising transfer rule, while debt matching uses the budget adjustment that imposes the target debt path. Welfare under recurrent external shocks is evaluated from conditional expected utility using a local second-order solution of the nonlinear economy. Both calculations start from the nonlinear economy, including household utility, the government budget and Calvo price dispersion. The first-order impulse responses are descriptive and do not enter the welfare calculations.

Exact transition welfare

For any policy rule r , exact transition utility over horizon $H = 800$ is

$$V_i^r = \sum_{t=0}^{H-1} \beta^t u_i(C_{i,t}^r, N_{i,t}^r) + \frac{\beta^H}{1-\beta} u_i(\bar{C}_i, \bar{N}_i) \quad (\text{S27})$$

The household CEV permanently scales the complete benchmark consumption path, including its steady-state continuation, while holding benchmark hours fixed. The population CEV applies one common scaling to both benchmark consumption paths and weights utility by $(1-\lambda, \lambda)$. Extending the horizon to 1,200 quarters leaves all reported transition CEVs unchanged to numerical precision.

Section 5.2 applies (S27) after a common direct one-percentage-point innovation to the rule, with the debt-stabilising transfer rule maintained under every policy. Table S3 reports the complete household and population decomposition. Appendix S2 applies the same criterion to baseline and transmission-compensated debt-matched LUFP relative to MP. Every regime receives the same direct innovation. Each LUFP case follows the MP real public debt path, and transfers adjust residually to satisfy the government budget for each distribution.

Comparison	Transfer distribution	Saver			Hand-to-mouth			Population		
		Consumption	Labour	Total	Consumption	Labour	Total	Consumption	Labour	Total
Baseline relative to MP	Adjustment to savers	+0.004719	-0.004691	+0.000027	+0.010244	+0.005122	+0.015366	+0.005433	-0.003422	+0.002011
	Equal per household	+0.003097	-0.002192	+0.000905	+0.003585	-0.001821	+0.001764	+0.003160	-0.002144	+0.001016
	$\omega_T = 0.4$	-0.001395	-0.000077	-0.001472	+0.001553	+0.005735	+0.007288	-0.001014	+0.000675	-0.000339
Compensated relative to MP	Adjustment to savers	+0.013563	-0.012692	+0.000871	+0.028778	+0.014389	+0.043167	+0.015530	-0.009191	+0.006340
	Equal per household	+0.012818	-0.011663	+0.001155	+0.026137	+0.011898	+0.038035	+0.014541	-0.008617	+0.005924
	$\omega_T = 0.4$	+0.009583	-0.010756	-0.001173	+0.026837	+0.020718	+0.047556	+0.011815	-0.006686	+0.005129
Compensated relative to baseline	Adjustment to savers	+0.008845	-0.008001	+0.000844	+0.018530	+0.009265	+0.027795	+0.010097	-0.005768	+0.004329
	Equal per household	+0.009722	-0.009472	+0.000250	+0.022551	+0.013720	+0.036271	+0.011381	-0.006473	+0.004908
	$\omega_T = 0.4$	+0.010978	-0.010679	+0.000300	+0.025282	+0.014980	+0.040262	+0.012828	-0.007360	+0.005468

Table S3: Welfare decomposition after the common innovation to the policy rule.

Notes: Entries are CEVs in per cent. The three transfer distributions set $\omega_T = 0$, λ , and 0.4. Consumption and labour entries are exact additive accounting contributions for $\sigma = 2$. Every comparison holds the transfer distribution and debt-stabilising transfer rule fixed.

Conditional welfare under recurrent external shocks

Let d_t , m_t , and a_t denote the intertemporal demand wedge, the markup shock, and the log productivity shock. Each follows

$$x_t = 0.5x_{t-1} + \varepsilon_t^x \quad x \in \{d, m, a\} \quad \text{sd}(\varepsilon_t^x) = 0.01 \quad (\text{S28})$$

Here a new mean-zero innovation to the shock process under consideration is drawn at date 0 and in every subsequent period. Only that innovation process has positive variance in a given experiment. Productivity and the desired gross markup satisfy

$$A_t = \bar{A} \exp(a_t) \quad \mu_{p,t} = \frac{\epsilon}{\epsilon - 1} \exp\left(\frac{m_t}{\psi_{mc}}\right) \quad (\text{S29})$$

where $\mu_{p,t}$ enters the exact Calvo reset price condition. The intertemporal demand wedge enters only the saver Euler equation (59). For each shock $j \in \{d, m, a\}$, all inherited endogenous and shock states begin at their common deterministic steady state immediately before the date-0 innovation is drawn. For household type $i \in \{S, H\}$ and policy rule r , conditional welfare is

$$V_{i,j}^r(\bar{s}) = \mathbb{E}_{-1} \sum_{t=0}^{\infty} \beta^t u_i(C_{i,t}^{r,j}, N_{i,t}^{r,j}) \quad (\text{S30})$$

where conditioning fixes the common inherited state $s_{-1} = \bar{s}$, while the date-0 and future realisations of that shock remain random. Comparisons hold the transfer distribution and debt-stabilising transfer rule fixed across policies. The feedback-family comparisons use MP and baseline LUFP at $a_\tau = 1$ as explicit reference policies. The reference-rule tables compare baseline LUFP with MP, transmission-compensated LUFP with MP, and transmission-compensated LUFP with baseline LUFP.

For a target rule r relative to benchmark b , the type-specific consumption-equivalent variation $\xi_{i,j}^{r|b}$ solves

$$\mathbb{E}_{-1} \sum_{t=0}^{\infty} \beta^t u_i\left((1 + \xi_{i,j}^{r|b})C_{i,t}^{b,j}, N_{i,t}^{b,j}\right) = V_{i,j}^r(\bar{s}) \quad (\text{S31})$$

The population CEV uses lifetime utility weights $(1 - \lambda, \lambda)$ and one common consumption scaling for both benchmark household allocations. Tables report 100ξ , so a positive entry favours the rule named first and a negative entry favours its benchmark.

For $\sigma = 2$, the consumption and labour entries provide an exact additive accounting decomposition of the CEV. Writing $V_i^r = V_{i,C}^r + V_{i,N}^r$ and $\Delta V_{i,k} = V_{i,k}^r - V_{i,k}^b$ gives

$$\xi_i^{r|b} = -\frac{\Delta V_{i,C}}{V_i^r - V_{i,N}^b} - \frac{\Delta V_{i,N}}{V_i^r - V_{i,N}^b} \quad (\text{S32})$$

The two terms are contributions to one consumption equivalent, not separate policy counterfactuals. Tables [S4](#)–[S6](#) report the complete household and population decomposition.

Shock	Transfer distribution	Saver			Hand-to-mouth			Population		
		Consumption	Labour	Total	Consumption	Labour	Total	Consumption	Labour	Total
Demand	Adjustment to savers	-0.176	+0.171	-0.005	-0.395	-0.197	-0.592	-0.204	+0.123	-0.081
	Equal per household	-0.208	+0.128	-0.080	-0.221	+0.161	-0.060	-0.210	+0.133	-0.078
	$\omega_T = 0.4$	-0.281	+0.026	-0.255	+0.193	+0.983	+1.175	-0.221	+0.148	-0.072
Markup	Adjustment to savers	+0.184	-0.119	+0.065	+0.359	+0.179	+0.538	+0.206	-0.081	+0.126
	Equal per household	+0.212	-0.083	+0.130	+0.176	-0.209	-0.033	+0.208	-0.099	+0.109
	$\omega_T = 0.4$	+0.278	+0.018	+0.296	-0.307	-1.285	-1.592	+0.201	-0.154	+0.048
Productivity	Adjustment to savers	+0.027	-0.024	+0.002	+0.045	+0.022	+0.067	+0.029	-0.018	+0.011
	Equal per household	+0.031	-0.019	+0.012	+0.018	-0.035	-0.017	+0.029	-0.021	+0.008
	$\omega_T = 0.4$	+0.041	-0.005	+0.035	-0.054	-0.197	-0.251	+0.028	-0.030	-0.002

Table S4: Welfare decomposition: baseline LUFP relative to MP.

Notes: Entries are CEVs in per cent. The three transfer distributions set $\omega_T = 0$, λ , and 0.4. Consumption and labour entries are exact additive accounting contributions for $\sigma = 2$, not separate policy experiments.

Shock	Transfer distribution	Saver			Hand-to-mouth			Population		
		Consumption	Labour	Total	Consumption	Labour	Total	Consumption	Labour	Total
Demand	Adjustment to savers	-0.091	+0.053	-0.038	-0.269	-0.135	-0.404	-0.114	+0.029	-0.086
	Equal per household	-0.119	+0.033	-0.086	-0.207	-0.051	-0.258	-0.130	+0.022	-0.108
	$\omega_T = 0.4$	-0.406	-0.036	-0.442	-0.265	-2.716	-2.981	-0.387	-0.391	-0.778
Markup	Adjustment to savers	+0.049	-0.086	-0.037	-0.110	-0.055	-0.165	+0.029	-0.082	-0.054
	Equal per household	+0.032	-0.092	-0.060	-0.178	-0.414	-0.592	+0.005	-0.134	-0.130
	$\omega_T = 0.4$	-0.692	-0.138	-0.830	-1.089	-10.060	-11.149	-0.748	-1.550	-2.298
Productivity	Adjustment to savers	+0.006	-0.021	-0.015	-0.028	-0.014	-0.042	+0.002	-0.020	-0.018
	Equal per household	+0.003	-0.023	-0.019	-0.037	-0.066	-0.103	-0.002	-0.028	-0.030
	$\omega_T = 0.4$	-0.106	-0.033	-0.139	-0.189	-1.664	-1.853	-0.117	-0.247	-0.364

Table S5: Welfare decomposition: transmission-compensated LUF relative to MP.

Notes: Entries are CEVs in per cent. Definitions and transfer distributions are as in Table S4.

Shock	Transfer distribution	Saver			Hand-to-mouth			Population		
		Consumption	Labour	Total	Consumption	Labour	Total	Consumption	Labour	Total
Demand	Adjustment to savers	+0.085	-0.118	-0.033	+0.127	+0.063	+0.190	+0.090	-0.094	-0.004
	Equal per household	+0.090	-0.095	-0.005	+0.014	-0.212	-0.197	+0.080	-0.110	-0.030
	$\omega_T = 0.4$	-0.125	-0.062	-0.187	-0.445	-3.624	-4.070	-0.168	-0.537	-0.705
Markup	Adjustment to savers	-0.135	+0.033	-0.102	-0.466	-0.233	-0.698	-0.178	-0.002	-0.179
	Equal per household	-0.180	-0.010	-0.190	-0.354	-0.207	-0.561	-0.203	-0.035	-0.238
	$\omega_T = 0.4$	-0.967	-0.155	-1.122	-0.821	-9.005	-9.826	-0.946	-1.402	-2.349
Productivity	Adjustment to savers	-0.021	+0.004	-0.017	-0.073	-0.036	-0.109	-0.027	-0.001	-0.029
	Equal per household	-0.028	-0.003	-0.031	-0.055	-0.031	-0.086	-0.031	-0.007	-0.038
	$\omega_T = 0.4$	-0.147	-0.028	-0.175	-0.136	-1.473	-1.609	-0.145	-0.217	-0.363

Table S6: Welfare decomposition: transmission-compensated LUFP relative to baseline LUFP.

Notes: Entries are CEVs in per cent. Definitions and transfer distributions are as in Table S4.

Supplementary Appendix S4. A common innovation to the policy rule

Figure S6 reports the fiscal paths supporting the common allocation in Section 5.1. The remaining figures extend the policy-innovation comparison in Section 5.2 to alternative transfer distributions. Every reported case has a determinate equilibrium and a convergent transition.

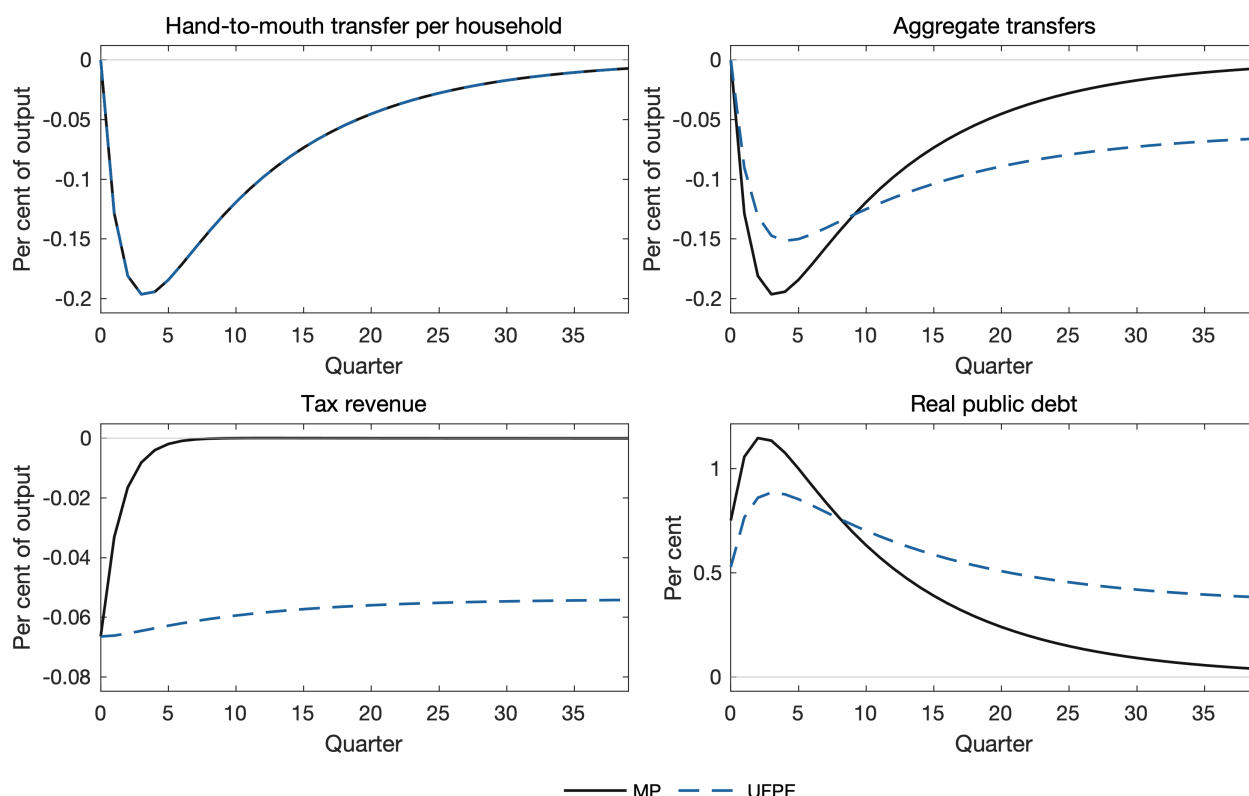


Figure S6: The common MP–UFPE allocation is supported by different fiscal paths.

Notes: The experiment and transfer arrangements are the same as in Figure 3. The transfer received per hand-to-mouth household is matched across regimes. Aggregate transfers, tax revenue, and real public debt are allowed to differ. Fiscal flows are reported as percentages of steady-state output, and real public debt as a per cent deviation. The displayed horizon is 40 quarters.

Tax feedback and household adjustment

Figures S8–S11 report responses for $\omega_T = 0$ and 0.4, using the policy rules, innovation and timing in Section 5.2. Figure S7 compares transfer distributions under transmission-compensated feedback. Under equal per-household transfers, the second peak in hand-to-mouth hours occurs later and the subsequent hours adjustment is more persistent under compensated than baseline feedback (Figure 5).

On impact, across the two additional transfer distributions, output falls most under MP and least under transmission-compensated LUPP, while inflation falls most under baseline LUPP and least under transmission-compensated LUPP. Changing ω_T instead affects how the subsequent fiscal adjustment is distributed and propagated. Aggregate transfers are unchanged on impact, so differences across transfer distributions initially reflect anticipated fiscal adjustment and its equilibrium effects. Under transmission-compensated feedback, once the debt-stabilising rule begins cutting transfers, moving from equal per-household distribution to $\omega_T = 0.4$ places more of those cuts on households that cannot smooth them, magnifying the later movements in their consumption and hours and generating a larger, more persistent public debt response. Assigning 40 per cent of the transfer adjustment to hand-to-mouth households slightly moderates the initial output contraction relative to equal per-household distribution but produces a slower and more uneven adjustment across household types (Figure S7). The responses converge to steady state, so the adjustment is persistent rather than permanent.

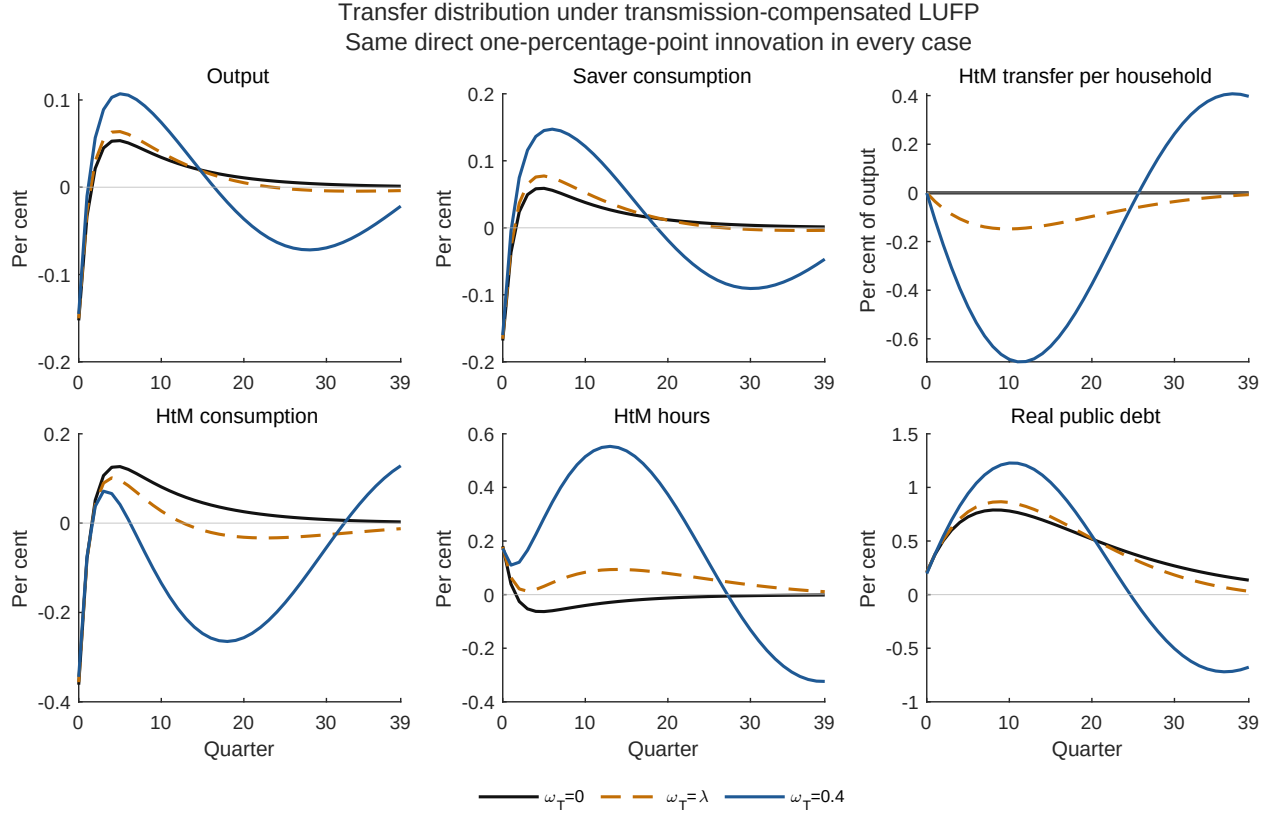


Figure S7: Transfer distribution and propagation under transmission-compensated LUFP.

Notes: The figure compares linearised responses to the same direct one-percentage-point innovation under transmission-compensated LUFP when the transfer adjustment is assigned entirely to savers ($\omega_T = 0$), distributed equally per household ($\omega_T = \lambda = 0.121$), or assigned to hand-to-mouth households with share $\omega_T = 0.4$. All cases use feedback coefficients (4.080, 0.340) and the same debt-stabilising transfer rule, but the realised intertemporal policy wedge remains endogenous. The hand-to-mouth transfer panel reports the transfer received per hand-to-mouth household, $\tilde{T}_{H,t} = (\omega_T/\lambda)\tilde{T}_t$, as a percentage of steady-state output. Output, consumption, hours, and real public debt are per cent deviations. The aggregate transfer deviation, and therefore each household transfer deviation, is zero on impact because the rule responds to inherited public debt. The displayed horizon is 40 quarters, while the underlying 1,200-quarter paths converge to steady state.

Appendix S3 gives the exact transition welfare criterion, decomposition and convergence checks. Relative to MP, both LUFP rules benefit both household types when $\omega_T = 0$ or transfers are distributed equally per household. At $\omega_T = 0.4$, savers lose while hand-to-mouth households gain (Table S3).

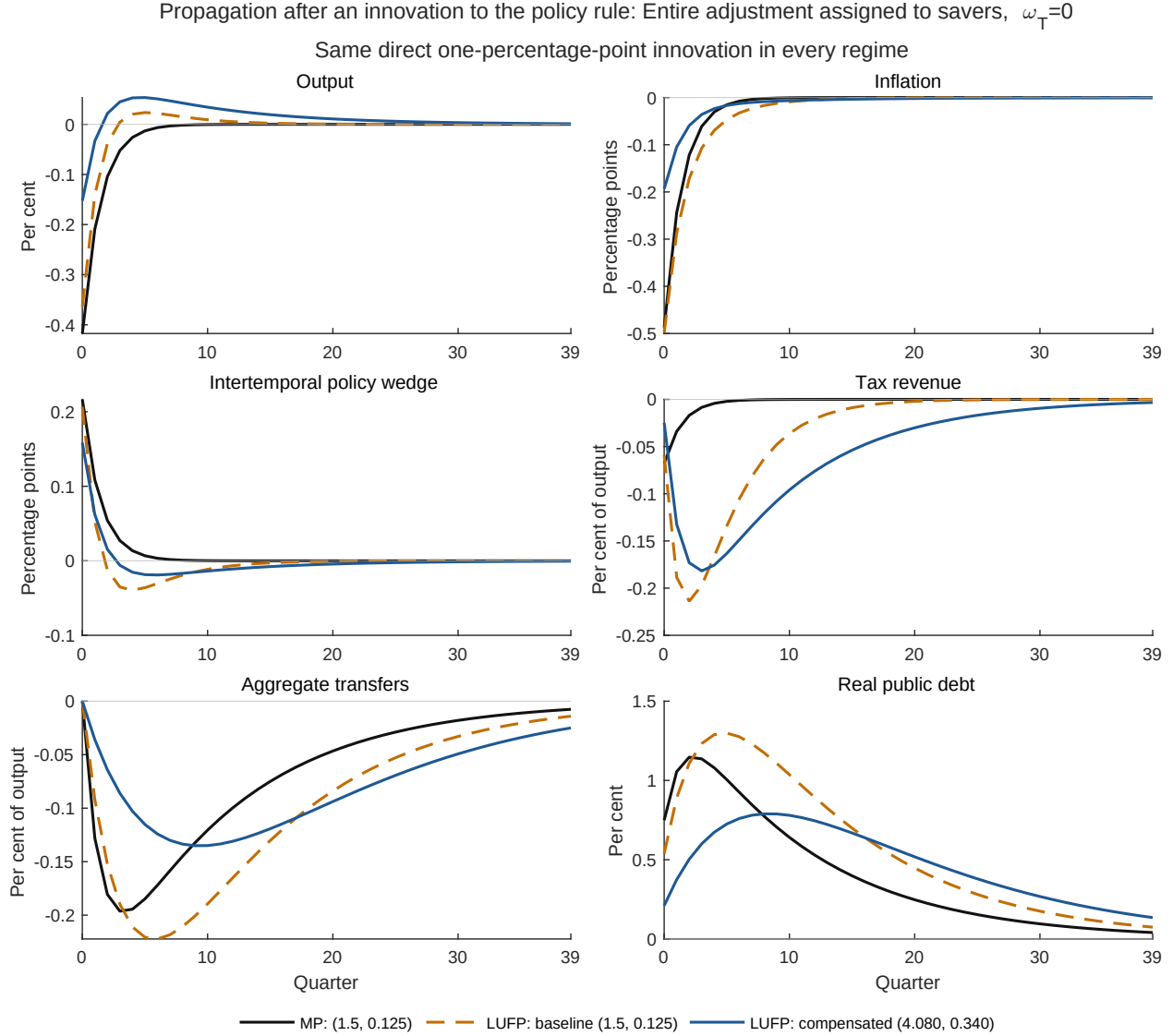


Figure S8: Aggregate propagation after an innovation to the policy rule when the transfer adjustment is assigned entirely to savers.

Notes: All regimes use $\omega_T = 0$ and the same debt-stabilising transfer rule. Units and the display horizon are as in Figure 4.

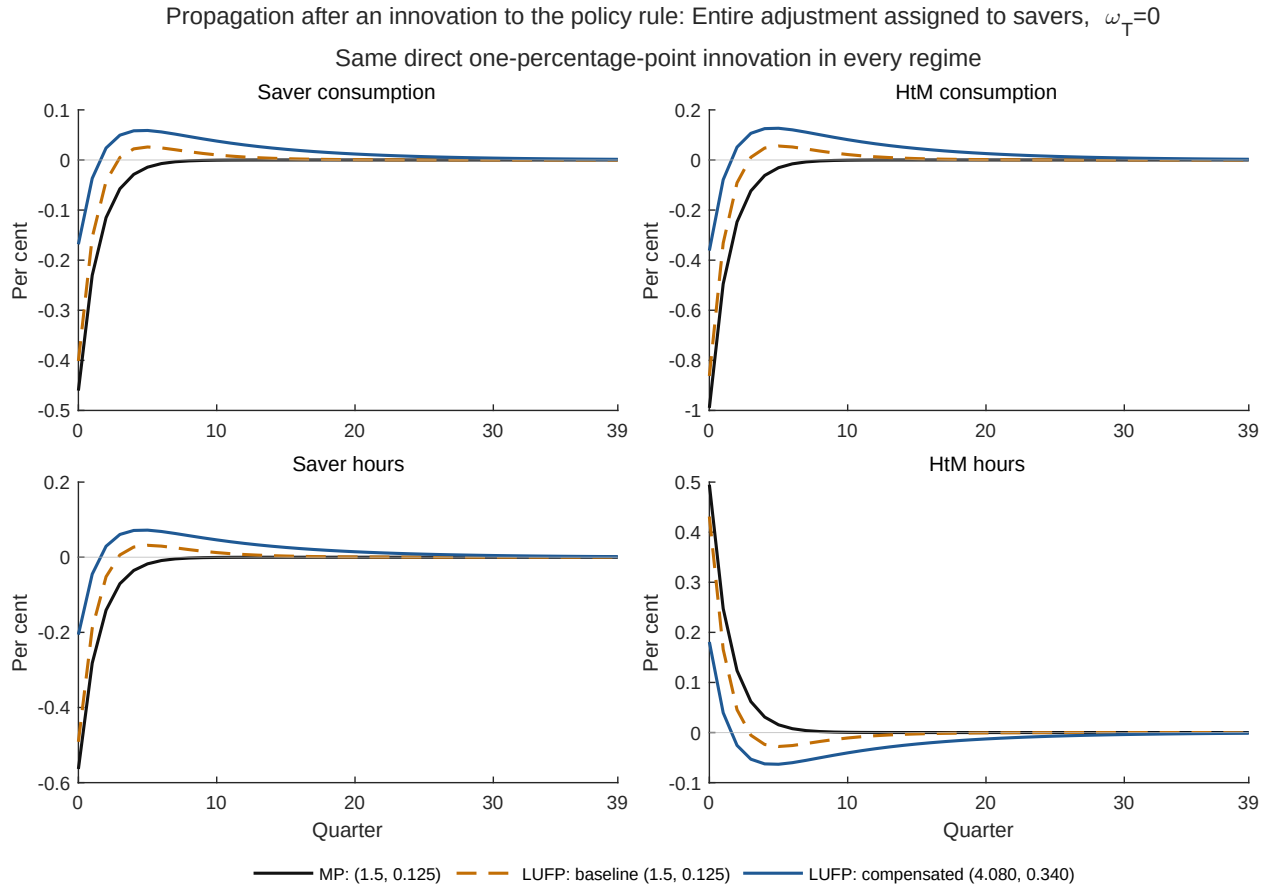


Figure S9: Household propagation after an innovation to the policy rule when the transfer adjustment is assigned entirely to savers.

Notes: Policies, the transfer distribution, and the debt-stabilising transfer rule are as in Figure S8. Consumption and hours are per cent deviations.

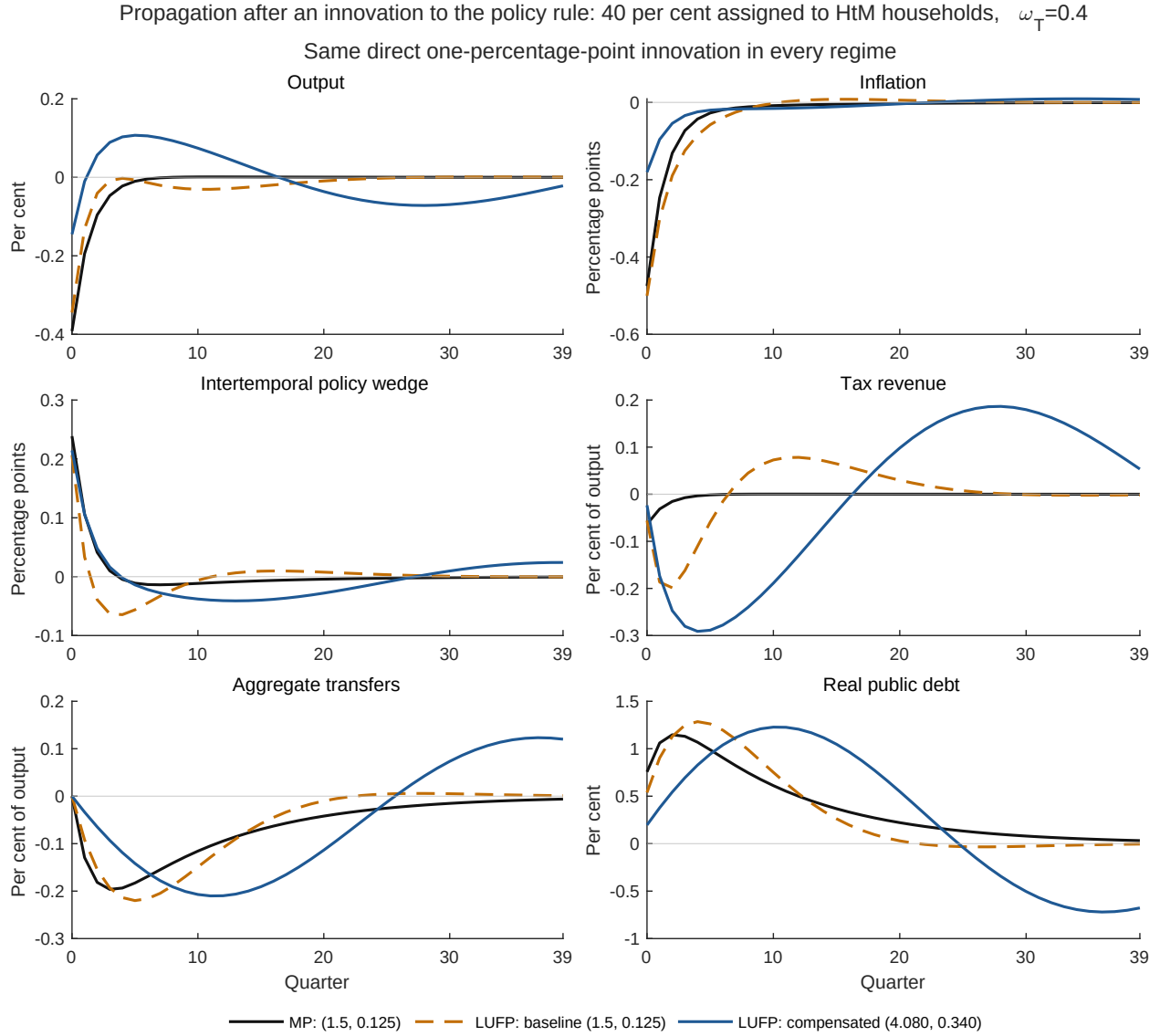


Figure S10: Aggregate propagation after an innovation to the policy rule when 40 per cent of the transfer adjustment is assigned to hand-to-mouth households.

Notes: All regimes direct $\omega_T = 0.4$ of the aggregate transfer adjustment to hand-to-mouth households and use the same debt-stabilising transfer rule. Units and the display horizon are as in Figure 4.

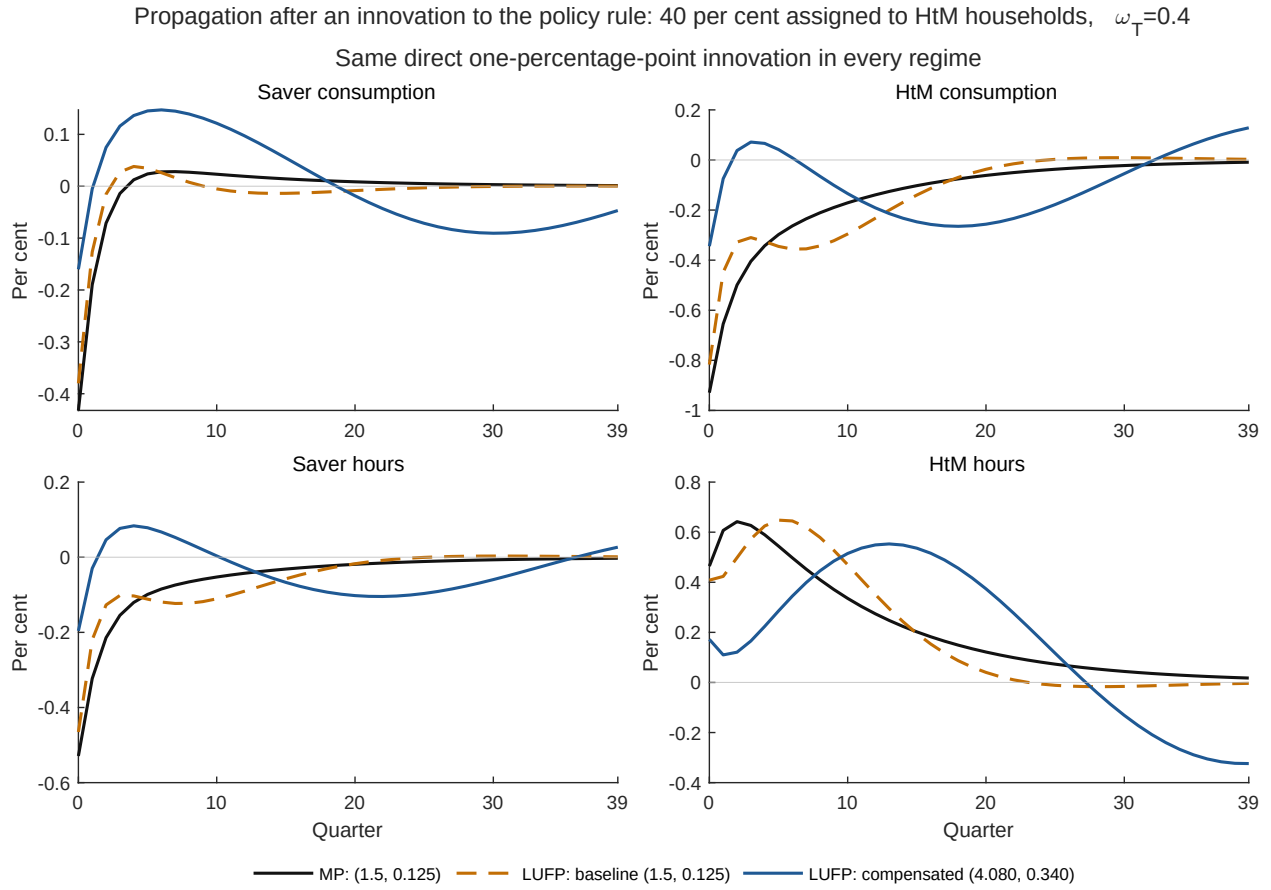


Figure S11: Household propagation after an innovation to the policy rule when 40 per cent of the transfer adjustment is assigned to hand-to-mouth households.

Notes: Policies, the transfer distribution, and the debt-stabilising transfer rule are as in Figure S10. Consumption and hours are per cent deviations.

Supplementary Appendix S5. Rule comparison under external shocks

Figures S12 and S13 extend the three-rule aggregate comparison in Section 5.3 to $\omega_T = 0$ and 0.4, holding the transfer distribution and debt-stabilising transfer rule fixed within each comparison. Figure S14 instead holds transmission-compensated LUFPP fixed and compares household paths across transfer distributions against the common equal per-household MP reference.

For the displayed impulse responses, each shock is a positive innovation of 0.01 to a separately evaluated AR(1) process with persistence 0.5, while the other shocks are held at zero and no innovation enters the policy rule. The feedback family contains 46 positive values of a_τ . These comprise 0.01, 0.025, the values from 0.05 to 0.95 in increments of 0.05, and 25 equally spaced values from 1 to $a_\tau^{\text{comp}} = 2.720286452579479$. Recurrent welfare is evaluated at all 21 values below one and every third point from one onwards, giving 30 welfare values per shock and transfer share. The common shock normalisation supports comparisons across rules within each shock.

All 138 combinations of positive feedback strength and transfer share satisfy the full local determinacy conditions. The 414 impulse-response comparisons pass the timing and equilibrium checks and converge within 1,200 quarters. The displayed paths cover quarters 0–39. At $a_\tau = 0$, all three transfer distributions leave one unit root and only one unstable root for two forward-looking variables. Zero feedback therefore fails the determinacy conditions maintained in this exercise and is excluded from the conditional welfare comparison.

Of the 270 second-order welfare cases, 267 pass the numerical checks. Under demand risk at $a_\tau = 0.01$, the local approximation violates positivity in the bounded recurrent-shock diagnostic for all three transfer distributions. Those welfare values are omitted, although their first-order equilibria are determinate. The remaining cases pass the bounded positivity, Bellman identity and welfare decomposition checks.

Expected lifetime utility is evaluated directly from the second-order approximation to the value function. A separate diagnostic simulates the associated decision rules using 256 Gaussian innovation sequences and their sign reversals, giving 512 paths of 240 quarters per case, with seed 271828. These paths check whether consumption and other quantities that must be positive remain within their admissible domain; they are not used to calculate welfare by sample averaging. Among the retained welfare cases, 30 of 136,704 paths leave this domain. All occur under markup risk with high feedback and $\omega_T = 0.4$. At transmission-compensated feedback, 17 of 512 paths fail this check, including paths with nonpositive hand-to-mouth consumption. These failures indicate the limits of the local approximation under Gaussian shocks. The welfare comparisons remain local second-order results at the stated shock scale.

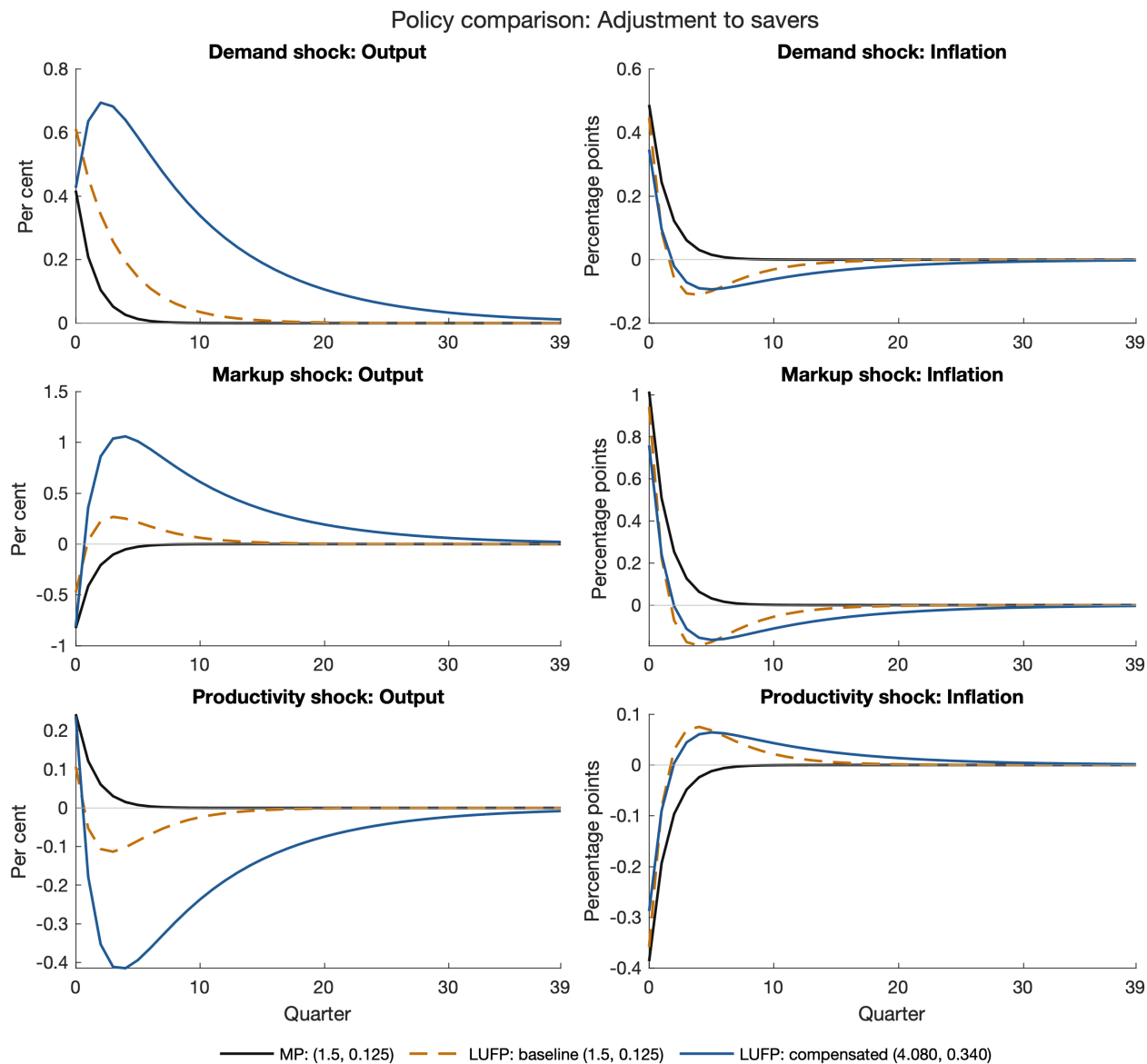


Figure S12: Aggregate responses when the transfer adjustment is assigned to savers.

Notes: Rows report demand, markup, and productivity shocks; columns report output and inflation. All three policies use $\omega_T = 0$ and the same debt-stabilising transfer rule. Shock processes, units, and the 40-quarter display horizon are as in Figure 6.

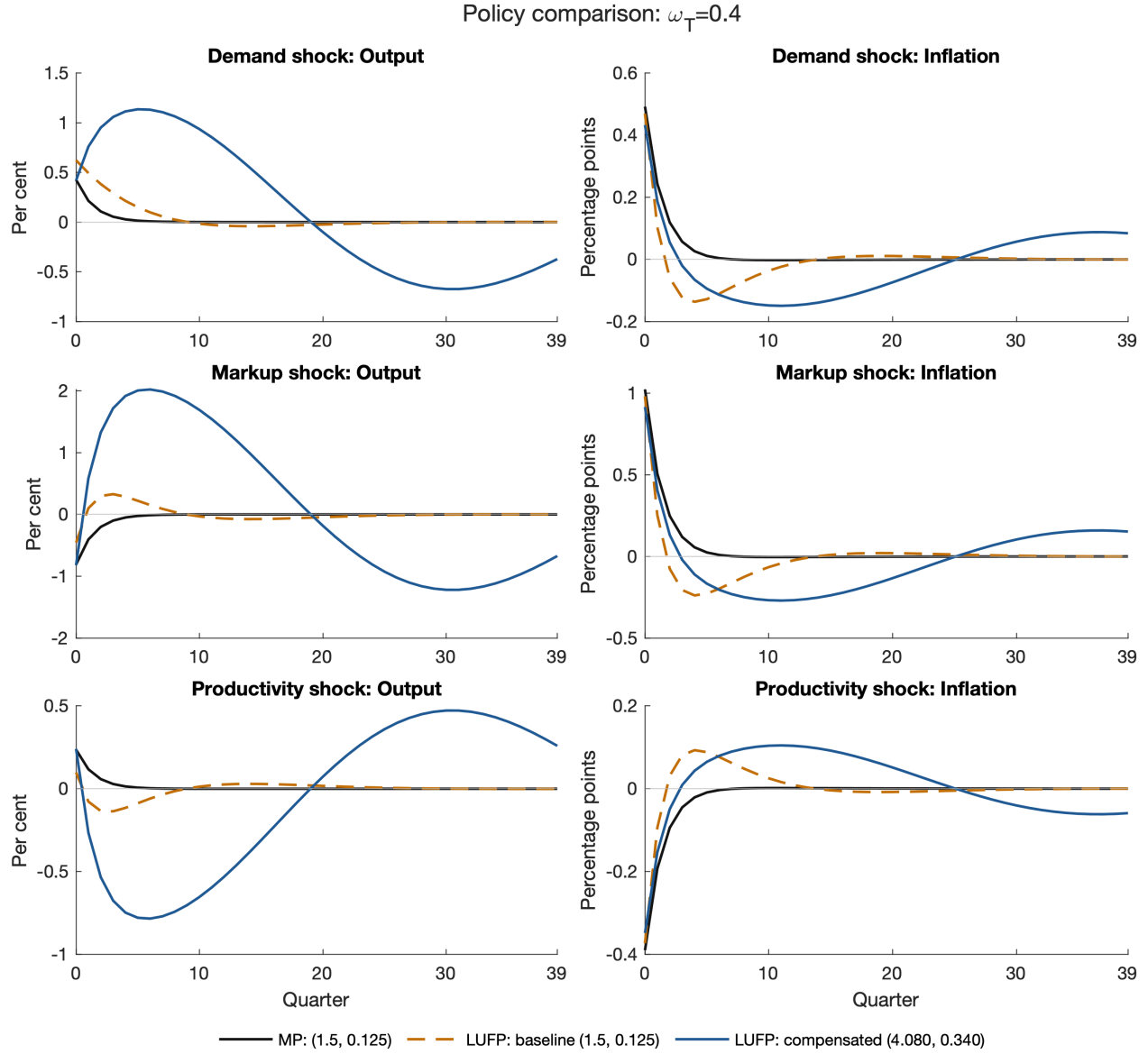


Figure S13: Aggregate responses when $\omega_T = 0.4$.

Notes: Under all three policies, 40 per cent of the aggregate transfer adjustment is assigned to hand-to-mouth households and the same debt-stabilising transfer rule applies. Other definitions are as in Figure 6.

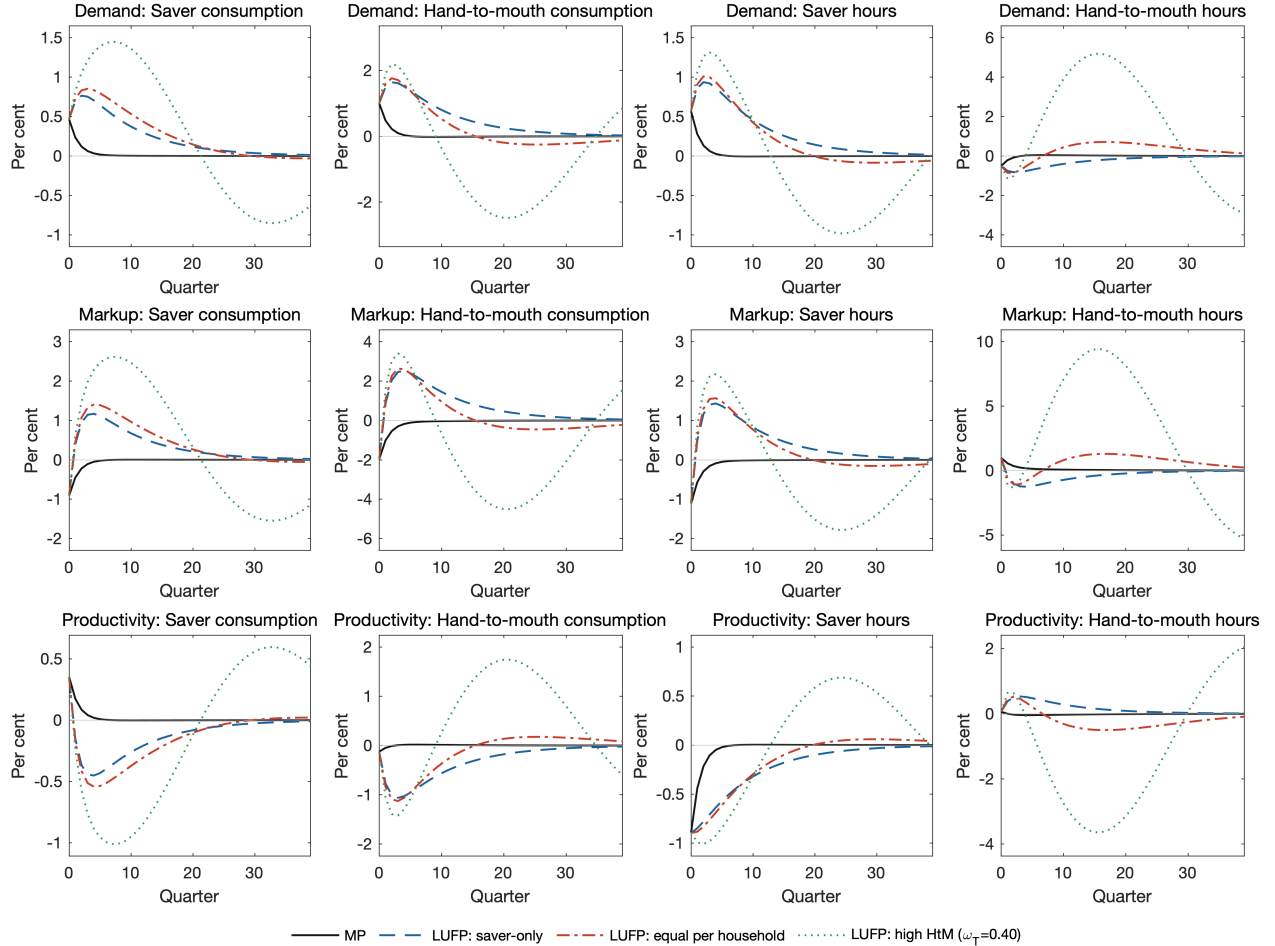


Figure S14: Household responses across transfer distributions under transmission-compensated feedback.

Notes: Rows report demand, markup, and productivity shocks; columns report saver consumption, hand-to-mouth consumption, saver hours, and hand-to-mouth hours. The black MP path uses an equal per-household transfer distribution. All LUF paths use the transmission-compensated coefficients and the same debt-stabilising transfer rule, with $\omega_T = 0$, λ , and 0.4. The figure therefore compares LUF transfer distributions against a common MP reference rather than matching the MP transfer distribution in every curve. Responses are per cent deviations over 40 quarters.

Supplementary Appendix S6. LUFP rules under alternative policy objectives

The inflation- and output-matching rules are derived below with transfers assigned to savers. They differ from the Taylor-type rules used in the quantitative exercises. Exact inflation matching is conditional on the inherited consumption tax, while output matching also depends on the expected future tax sequence and the counterfactual monetary policy inflation path.

Under a common productivity path, the productivity terms cancel across the LUFP and MP allocation blocks and are suppressed below. Assume $\Lambda \neq 0$, and also $\Omega_\tau \neq 0$ for the inflation-matching construction:

$$\begin{aligned}\hat{y}_t^F &= \mathbb{E}_t \hat{y}_{t+1}^F - \frac{1}{\sigma \Lambda} [\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} - \mathbb{E}_t \hat{\pi}_{t+1}^F] \\ \hat{\pi}_t^F &= \beta \mathbb{E}_t \hat{\pi}_{t+1}^F + \psi_{mc} \chi \hat{y}_t^F + \psi_{mc} \hat{\tau}_{c,t} \\ \hat{y}_t^M &= \mathbb{E}_t \hat{y}_{t+1}^M - \frac{1}{\sigma \Lambda} [\hat{R}_t^M - \mathbb{E}_t \hat{\pi}_{t+1}^M] \\ \hat{\pi}_t^M &= \beta \mathbb{E}_t \hat{\pi}_{t+1}^M + \psi_{mc} \chi \hat{y}_t^M\end{aligned}$$

Matching the inflation path

Assume $\hat{\pi}_t^F = \hat{\pi}_t^M$ for all t . The two Phillips curves imply

$$\hat{y}_t^M = \hat{y}_t^F + \frac{1}{\chi} \hat{\tau}_{c,t} \tag{S33}$$

Substituting this relation into the two IS equations and simplifying yields

$$\hat{R}_t^M = \left(1 - \frac{\sigma \Lambda}{\chi}\right) (\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1}) = \Omega_\tau (\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1}) \tag{S34}$$

which is equation (46) in the main text. Substituting the Taylor rule gives equation (47). The monetary policy Taylor rule is evaluated at $\hat{y}_t^M$. Using $\hat{y}_t^M = \hat{y}_t^F + \hat{\tau}_{c,t}/\chi$ therefore gives

$$\left(\Omega_\tau - \frac{\theta_Y}{\chi}\right) \hat{\tau}_{c,t} - \Omega_\tau \mathbb{E}_t \hat{\tau}_{c,t+1} = \theta_\pi \hat{\pi}_t^F + \theta_Y \hat{y}_t^F + \mu_t$$

Dividing by Ω_τ shows that the exact rule contains the additional term in the inherited tax

$$\frac{\theta_Y}{\chi \Omega_\tau} \hat{\tau}_{c,t}$$

Given a determinate monetary policy target path, the inherited consumption tax, and the maintained announcement timing, this rule recursively selects a unique announced tax path. Once the counterfactual monetary policy allocation and productivity have returned to steady state and $\hat{R}_t^M = 0$, equation (46) implies $\hat{\tau}_{c,t+1} = \hat{\tau}_{c,t}$, while zero inflation requires $\hat{y}_t^F = \hat{y}_t^{F,\text{flex}} = -\hat{\tau}_{c,t}/\chi$.

Matching the output path

Now assume instead that $\hat{y}_t^F = \hat{y}_t^M$ for all t . Then the two Phillips curves imply

$$\hat{\pi}_t^F - \beta \mathbb{E}_t \hat{\pi}_{t+1}^F - \psi_{mc} \hat{\tau}_{c,t} = \hat{\pi}_t^M - \beta \mathbb{E}_t \hat{\pi}_{t+1}^M \quad (\text{S35})$$

Subtracting the two IS equations gives

$$\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1} = \hat{R}_t^M + \frac{1}{\beta} (\hat{\pi}_t^F - \hat{\pi}_t^M) - \frac{\psi_{mc}}{\beta} \hat{\tau}_{c,t} \quad (\text{S36})$$

The bounded-path condition

$$\lim_{j \rightarrow \infty} \beta^j \mathbb{E}_t (\hat{\pi}_{t+j}^F - \hat{\pi}_{t+j}^M) = 0$$

selects the forward solution

$$\hat{\pi}_t^F - \hat{\pi}_t^M = \psi_{mc} \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t \hat{\tau}_{c,t+j}$$

Substitution into the IS difference gives equation (48) in the main text

$$\hat{R}_t^M = (\hat{\tau}_{c,t} - \mathbb{E}_t \hat{\tau}_{c,t+1}) - \psi_{mc} \sum_{j=1}^{\infty} \beta^{j-1} \mathbb{E}_t \hat{\tau}_{c,t+j} \quad (\text{S37})$$

The monetary policy Taylor rule depends on $\hat{\pi}_t^M$. The forward solution above gives

$$\hat{\pi}_t^M = \hat{\pi}_t^F - \psi_{mc} \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t \hat{\tau}_{c,t+j} \quad (\text{S38})$$

Equations (48) and (S38) jointly characterise the tax path that matches output.