

HANK-Based Fiscal Consolidation for a High-Debt Advanced Euro Area Economy

Prepared by Gee Hee Hong, Naowar Mohiuddin, Rasmane Ouedraogo, Danila Smirnov, Maryam Vaziri

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HANK-Based Fiscal Consolidation for a High-Debt Advanced Euro Area Economy*

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Abstract

High-debt euro area economies face fiscal consolidation in a low-growth environment. We use a Heterogeneous Agent New Keynesian model to assess how consolidation composition shapes aggregate and distributional outcomes in a representative high-debt economy. The status quo is not neutral: delay generates its own costs through lower investment, higher debt service, and damage to constrained households. For a given fiscal effort, expenditure-based consolidation achieves faster debt reduction with lower growth and distributional costs than revenue-based consolidation. As a complementary exercise, pairing the expenditure-based path with growth-enhancing structural reforms further improves outcomes by lifting real wages, a channel that disproportionately benefits hand-to-mouth households. Across both strategies, modest, well-targeted transfers to low-income households can substantially mitigate distributional costs at minimal fiscal expense while supporting aggregate demand.

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1 Introduction

High-debt advanced euro area economies face a difficult policy challenge: reduce public debt decisively while supporting growth and protecting vulnerable households. In many cases, debt ratios remain elevated after the pandemic and the energy shocks and, absent policy adjustment, are set to increase further amid rising spending pressures linked to demographics, green and digital transitions, and geopolitical tensions and defense needs (IMF 2025). When debt is high, the usual trade-offs of a fiscal consolidation become sharper, as debt dynamics is highly sensitive to changes in the growth-interest differential. A given increase in interest rates mechanically raises debt-service costs, while weak potential growth makes debt stabilization more demanding. At the same time, the political economy of fiscal adjustment is increasingly shaped by distributional concerns, as rising spending pressures from ongoing transitions cannot be accommodated without offsetting cost-cutting measures to advance fiscal consolidation efforts that could affect the population unevenly. Inflationary pressures, including from higher energy costs, have impacted real incomes since 2021, exacerbating the distributional stakes of any adjustment. Against this backdrop, the revamped European fiscal frameworks acknowledge medium-term planning and the importance of structural measures alongside fiscal consolidation, allowing for a longer (up to seven-year) adjustment period. Nonetheless, at the implementation stage, a central question for policy design remains: how should the composition of fiscal adjustment be designed across spending, taxes, and structural reforms to minimize macroeconomic and distributional costs while achieving debt sustainability?

The question is not new, but the current environment has amplified its urgency and narrowed policy space. First, in low-growth environments, the scope for growing out of debt is limited and contractionary demand effects can be particularly costly. Second, with high levels of public debt, investors increasingly price fiscal slippages, demanding compensation for perceived risk in high-debt settings. Moreover, the macroeconomic effects of sovereign risk extend well beyond the government's budget constraint. As the risk premium rises, it

passes through to private borrowing costs, raising firms’ cost of funds—particularly for those with greater sovereign bond exposures—and weighing on investment and hiring (Arellano et al. 2018; Arellano et al. 2026; Bocola 2016). In a monetary union, leaving sovereign risk unaddressed can trigger a deflationary spiral: wider spreads contract demand and push down prices, but area-wide monetary policy cannot fully offset country-specific fiscal stress, so real borrowing costs remain elevated and the fiscal position deteriorates further (Arellano et al. 2026; de Ferra and Romei 2023). Roldán 2025 shows that welfare costs in such cases fall disproportionately on the households least able to self-insure. The resulting dynamics make the pace of adjustment a first-order policy choice: how fast a highly indebted sovereign should deleverage, and how long it can postpone doing so before debt dynamics turn destabilizing (Philippon and Roldán 2018; Elenev et al. 2025), depend on the sign and magnitude of the fiscal effort’s effect on spreads and activity (Anzoategui 2022; Bianchi et al. 2023). Third, household heterogeneity matters. Consolidation affects households through changes in disposable income, wages and employment, and asset prices. When a sizable share of households are liquidity constrained (or hand-to-mouth), their consumption responds strongly to changes in after-tax income and transfers. The composition and incidence of consolidation can therefore generate markedly different aggregate outcomes even for the same improvement in the primary balance. These considerations make it essential to evaluate consolidation strategies within a framework that captures general equilibrium feedback, sovereign risk dynamics, and distributional incidence in an integrated way.

A central message of our analysis is that the status quo is not neutral: delaying adjustment generates its own costs in the form of lower investment, higher debt-service burdens, and distributional damage to constrained households. Quantifying this wedge requires characterizing the baseline against which consolidation is evaluated, and we do so explicitly: the unchanged-policies baseline is constructed under a continuation of the post-2025 fiscal stance, which delivers an upward drift in the debt-to-GDP ratio over the simulation horizon, gradually higher sovereign spreads, and progressive crowding-out of private investment.

Welfare comparisons across consolidation paths are therefore meaningful only conditional on this characterization of the baseline. We return to two caveats this implies for interpretation. First, the welfare ranking of any consolidation scenario depends on the assumed status quo: a steeper or flatter debt drift would shift the breakeven point at which consolidation becomes preferable. Second, the comparison between consolidation packages depends on what each package contains: in particular, the apparent dominance of expenditure-based consolidation paired with structural reforms (ExC+SR) over standalone fiscal paths partly reflects the productivity dividend added on top of the fiscal adjustment, which is properly understood as a complementary policy lever rather than as a feature of fiscal consolidation itself.

This paper contributes to the existing literature by employing a state-of-the-art Heterogeneous Agent New Keynesian (HANK) model to assess the macroeconomic and distributional implications of alternative fiscal consolidation packages in a representative high-debt advanced euro area economy. We expand the basic model structure in the seminal paper by [Auclert et al. \(2024\)](#) along two important dimensions: first, we incorporate a broad set of fiscal instruments both on the revenue (labor, corporate taxes) and spending (income-linked social transfers, targeted and untargeted lump-sum transfers, government consumption, and public investment) sides to allow for granular policy advice that resembles real-world budget packages rather than stylized "government spending" or "tax" shocks; second, we embed debt sustainability features that endogenize sovereign risk premium to the public debt-to-GDP ratio, following [Langot et al. \(2025\)](#). Furthermore, we model government debt with a multi-period maturity structure and coupon smoothing which allows changes in spreads to pass through gradually to the average interest bill as bonds roll over. Monetary policy follows a Taylor rule for the European Central Bank (or ECB), with the response coefficient on the representative economy's inflation scaled to reflect the ECB's area-wide rather than country-specific mandate. The model is solved using the sequence-space Jacobian method of [Auclert et al. \(2021\)](#), which allows us to compute dynamic responses efficiently while fully accounting for household heterogeneity and the distribution of marginal propensities

to consume (MPCs).

The central transmission mechanism in our analysis is that fiscal policy operates through heterogeneous MPCs, which vary sharply across households due to borrowing constraints and illiquid wealth. This heterogeneity, which arises endogenously in our model from a two-asset structure with a Calvo-style portfolio adjustment friction, generates a sizable mass of high-MPC households (both poor and wealthy “hand-to-mouth”), allowing the model to better capture the well-documented empirical patterns of household MPCs and liquidity-constrained behavior, as documented in [Kaplan et al. \(2018\)](#).

This structure is motivated by a set of well-documented stylized facts about household balance sheets and consumption behavior that a standard one-asset or representative-agent framework cannot reproduce. First, a substantial share of households in advanced economies hold sizable illiquid wealth (primarily housing and retirement accounts) while simultaneously holding very little liquid wealth, so that their consumption responds strongly to transitory income changes despite not being poor in a net-worth sense; this is the empirical basis for the wealthy hand-to-mouth category. Second, micro-econometric evidence consistently estimates quarterly MPCs out of transitory income shocks in the range of 0.15–0.25 on average and well above 0.5 for liquidity-constrained households, an order of magnitude larger than the permanent-income benchmark and impossible to match without explicit liquidity constraints. Third, the joint distribution of liquid and illiquid wealth in micro data exhibits the characteristic “kink” at zero liquid assets emphasized by [Kaplan et al. \(2018\)](#), with a non-trivial mass of households at the liquid borrowing constraint at any point in time. Embedding these features is essential for our quantitative results, because the size and incidence of fiscal multipliers depend directly on how much of the consolidation effort falls on households whose consumption co-moves one-for-one with disposable income. [Section 2.1](#) discusses the household block in detail.

Within this environment, fiscal consolidation efforts affect the economy through three household-side channels, in addition to direct government spending channel. First, a dispos-

able income channel operates through direct changes in taxes and transfers and indirectly through general equilibrium effects on wages and employment. Second, an interest rate channel operates through disinflation and monetary policy reactions, as consolidation reduces private demand pressures and therefore inflation, prompting lower policy rates and encouraging intertemporal substitution toward current consumption. Importantly, public debt reduction also lowers the sovereign risk premium over time, further reducing borrowing costs economy-wide. Third, an asset revaluation channel operates as changes in real rates reprice equity and bond returns, with effects concentrated among wealthier households with large asset holdings, though illiquidity frictions can delay portfolio adjustment. These channels interact with the sovereign spread-debt feedback, which can generate a self-reinforcing loop under inaction and an additional consolidation component under credible adjustment.

Our quantitative analysis is built around three scenarios. The first is an unchanged-policies baseline, traced under the fiscal stance and macro conditions observed through 2025, which clarifies the costs of postponing adjustment.¹ We then layer on two consolidation scenarios—expenditure-based and revenue-based—each delivering the same cumulative fiscal effort of 1.5 percentage points of GDP over a five-year period (2027–31). Holding the effort constant isolates the role of adjustment composition. As an additional exercise, we examine how complementing the expenditure-based path with growth-enhancing structural reforms, modeled as gradual TFP gains, further shapes both macroeconomic and distributional outcomes. The full setup is described in detail in Section 4.

Three policy-relevant findings emerge. First, the status quo is not neutral: delaying adjustment generates its own costs in the form of lower investment, higher debt-service burdens, and distributional damage to constrained households. Under unchanged policies, the debt-to-GDP ratio drifts upward, sovereign spreads remain elevated, and the resulting interest-debt feedback loop gradually erodes growth and welfare. Under consolidation,

¹The representative high-debt advanced euro area economy is calibrated as the GDP-weighted average of Belgium, France, and Italy. We exclude Greece and Spain because of relatively low revenue share and relatively high growth rate, respectively. The choice of country set and the calibration approach are discussed in detail in Section 3.

sizable spread compression generates meaningful interest savings; the magnitude of this effect depends directly on the strength of the assumed debt drift in the baseline, which we characterize in Section 4.

Second, composition matters for both growth and debt: on one hand, revenue-based consolidation transmits to the primary balance after activity and the tax base absorb part of the contraction, on the other hand, expenditure cuts translate into primary balance gains and affect the disposable income. The wedge between the two consolidation approaches is amplified in economies with a large mass of liquidity-constrained households, because the fiscal multiplier on labor taxation—which falls on the wage income these households depend on and consume out of nearly one-for-one—is substantially larger than the multiplier on transfer or government-consumption cuts. As a result, expenditure-based consolidation (ExC) delivers faster debt reduction with smaller output costs than revenue-based consolidation (ReC) for a given fiscal effort: in our simulations, ExC generates a first-year output cost on the order of 0.2 percent relative to unchanged policies (after accounting for offsetting targeted transfers), compared with about 0.25 percent under ReC. Where revenue effort is unavoidable or warranted, it is best directed toward base-broadening, rationalizing tax expenditures, and strengthening compliance rather than higher statutory rates.

Third, the distributional incidence of the two scenarios differs sharply: under ExC, the burden falls primarily on lower- and middle-income households who receive a disproportionate share of insurance and lump-sum transfers, while under ReC the burden is more evenly spread across the income distribution but the aggregate consumption decline is larger because labor-tax multipliers are high in an economy with many liquidity-constrained households. In both cases, a modest, well-targeted top-up to assistance transfers for low-income households can offset a substantial fraction of the consumption losses in the bottom decile at minimal fiscal cost, because these recipients have near-unit MPCs.

As an additional exercise, we examine the role of growth-enhancing structural reforms layered onto the expenditure-based path (ExC+SR). Higher TFP raises the marginal prod-

uct of labor and capital, supports investment, and helps restore real wages, narrowing and eventually eliminating the output gap relative to unchanged policies over the medium term. The associated distributional gains are progressive: rising real wages benefit hand-to-mouth households disproportionately, since they rely more heavily on labor income. The dominance of ExC+SR over standalone ExC on both growth and equity dimensions underscores that the medium-term success of fiscal adjustment depends critically on the credibility and timeliness of the accompanying structural-reform agenda.

The paper is organized as follows. Section 2 describes the building blocks of the HANK model. Section 3 discusses the calibration. Section 4 describes the steady state properties, the transmission channels of fiscal instruments, and compares the results from alternative policy settings. Finally, Section 5 concludes with policy implications.

2 Model

We build the core model framework following [Auclert et al. \(2024\)](#) and extend it along several dimensions. Building on the work done in [Fiscal Monitor \(2024\)](#), we incorporate a broad set of fiscal instruments, including labor and corporate taxes, insurance-based, targeted, and untargeted transfers, subsidies, public investment, and a standalone spending shock, allowing us to assess the macroeconomic and distributional implications of each instrument. Following [Langot et al. \(2025\)](#), we introduce an endogenous sovereign risk premium that rises with the debt-to-GDP ratio, a multi-period debt maturity structure with coupon smoothing, and a euro area Taylor rule. These additions allow us to study debt sustainability in a general equilibrium environment where borrowing costs respond to fiscal conditions. The model is solved using the sequence-space Jacobian method of [Auclert et al. \(2021\)](#).

2.1 Households

The economy is populated by a continuum of households who make consumption, labor, and saving decisions while facing an idiosyncratic income process alongside two financial frictions: households cannot borrow and cannot adjust their illiquid assets whenever needed, which implies that returns on liquid assets are lower than on illiquid assets. Households differ in their idiosyncratic labor productivity and in their holdings of liquid and illiquid assets. The idiosyncratic productivity ε follows a Markov chain over $n_e = 11$ nodes with persistence $\rho_e = 0.91$ and standard deviation $\sigma_e = (1 - \theta) \times 0.92$, where $\theta = 0.20$ is the curvature of the progressive tax retention function following [Heathcote et al. \(2017\)](#). Households save in two accounts. The liquid account a_{it}^{liq} is accessible in every period but earns a below-market return because the financial intermediary providing liquidity services charges a proportional flow cost ζ per period. The illiquid account a_{it}^{illiq} earns the full return r_t but can only be rebalanced when the household receives a portfolio adjustment opportunity, which arrives independently each period with probability ν . This Calvo-type illiquidity friction, as implemented in [Auclert et al. \(2024\)](#), generates two distinct groups of hand-to-mouth households: 'poor' hand-to-mouth households who hold little wealth of any kind and 'wealthy' hand-to-mouth households who behave like cash-constrained consumers despite holding substantial illiquid assets that they cannot tap into without incurring additional costs, as documented in [Kaplan et al. \(2018\)](#). In the calibrated steady state, this balance sheet structure produces a sizable mass of high-MPC households, allowing the model to reproduce the empirical patterns discussed in Section 1: average quarterly MPCs out of transitory income in the 0.15–0.25 range, markedly higher values for liquidity-constrained households, and a non-trivial mass of households at the liquid borrowing constraint documented in the HFCS and SCF micro data ([Kaplan et al. 2018](#)). The resulting heterogeneity in marginal propensities to consume is the central transmission mechanism through which fiscal policy affects aggregate demand in this class of models.

Households maximize lifetime utility by choosing optimal levels of consumption, labor

supply, and holdings of liquid and illiquid assets:

$$\mathbb{E} \left[\sum_{t=0}^{\infty} \beta^t \{u(\tilde{c}_{it}) - v(N_t)\} \right], \quad u(\tilde{c}_{it}) = \frac{\tilde{c}_{it}^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}}, \quad (1)$$

where β is the discount factor, σ the intertemporal elasticity of substitution, and $v(N_t)$ the disutility of supplying aggregate hours N_t . The model differentiates between households who can adjust their asset portfolios ($\text{adj} = 1$) and those who cannot ($\text{adj} = 0$). When households can adjust the illiquid asset ($\text{adj} = 1$), their lifetime utility can be expressed as the value function below:

$$V_t(1, \varepsilon, a_{-,t}^{\text{liq}}, a_{-,t}^{\text{illiq}}) = \max_{c, a_t^{\text{liq}}, a_t^{\text{illiq}}} u(\tilde{c}) + \beta \mathbb{E} \left[V_{t+1}(\text{adj}', \varepsilon', a_t^{\text{liq}}, a_t^{\text{illiq}}) \mid \varepsilon \right] \quad (2)$$

$$\tilde{c} + a_t^{\text{liq}} + a_t^{\text{illiq}} = \varepsilon Z_t + (1 + r_{t-1})(1 - \zeta) a_{-,t}^{\text{liq}} + (1 + r_{t-1}) a_{-,t}^{\text{illiq}} + \text{Tr}_t, \quad a_t^{\text{liq}} \geq 0, a_t^{\text{illiq}} \geq 0 \quad (3)$$

Households who do not reallocate their asset portfolio ($\text{adj} = 0$) face a lifetime utility with the value function:

$$V_t(0, \varepsilon, a_{-,t}^{\text{liq}}, a_{-,t}^{\text{illiq}}) = \max_{c, a_t^{\text{liq}}} u(\tilde{c}) + \beta \mathbb{E} \left[V_{t+1}(\text{adj}', \varepsilon', a_t^{\text{liq}}, a_t^{\text{illiq}}) \mid \varepsilon \right] \quad (4)$$

$$\tilde{c} + a_t^{\text{liq}} + a_t^{\text{illiq}} = \varepsilon Z_t + (1 + r_{t-1})(1 - \zeta) a_{-,t}^{\text{liq}} + (1 + r_{t-1}) a_{-,t}^{\text{illiq}} + \text{Tr}_t, \quad a_t^{\text{liq}} \geq 0 \quad (5)$$

where $V_t(\cdot)$ represents the time t value function, ε represents the individual labor skill units, a is asset holding with superscripts *liq* standing for liquid assets and *illiq* for illiquid assets, respectively; Z_t represents the after-tax aggregate wage rate; $\tilde{c}$ is household consumption, r is the interest rate on the asset, and ζ represents the spread between liquid and illiquid assets. Tr_t is the transfers received from the government that raise disposable income, encompassing universal lump-sum transfers TR_t , and targeted transfers TTR_t . These financial frictions generate large differences in the marginal propensity to consume across households. Not only low-income households but also middle-income households who accumulate wealth in illiquid

assets for higher returns behave like hand-to-mouth agents when adverse shocks occur, as they cannot convert illiquid assets in a timely manner. Aggregating across households, total consumption is

$$C_t = C_t^{\text{spend}} + \zeta(1 + r_t) A_{t-1}^{\text{liq}}, \quad (6)$$

where $C_t^{\text{spend}} = \int \tilde{c}_{it} di$ is expenditure on goods and $A_{t-1}^{\text{liq}} = \int a_{it-1}^{\text{liq}} di$ is aggregate liquid wealth.

Household consumption is influenced by after-tax wage income Z_t , government transfers Tr_t , and idiosyncratic income shocks, with progressivity as detailed by [Heathcote et al. \(2017\)](#). Universal lump-sum transfers TR_t are paid equally to every household. Targeted transfers TTR_t are distributed uniformly among households in the bottom four productivity deciles only, so the per-recipient amount equals $\text{TTR}_t / \sum_{j=1}^4 \pi_{\varepsilon,j}$, where $\pi_{\varepsilon,j}$ is the stationary mass at node j . Aggregate after-tax wage income is

$$Z_t = w_t N_t - T_t + \text{TI}_t - \tau_t^\ell, \quad (7)$$

where w_t is the real wage, T_t lump-sum taxes, TI_t insurance-based transfers such as pensions and unemployment benefits, and τ_t^ℓ the labor income tax.

2.2 Firms and Production

The production structure follows [Auclert et al. \(2024\)](#). Final-goods firms aggregate intermediate goods with a constant elasticity of substitution $\mu_p/(\mu_p - 1) > 1$. Intermediate goods are produced by a unit mass of identical monopolistically competitive firms, whose shares are owned by households. All firms share the same production technology in capital and labor. Public investment improves overall production, and output is given by

$$Y_t = \theta_t K_{G,t}^{\alpha_G} K_t^\alpha N_t^{1-\alpha}, \quad (8)$$

where θ_t is total factor productivity, $K_{G,t}$ the public capital stock, K_t the private capital stock, α_G is the public capital efficiency, and α the capital share of income. The public capital stock accumulates according to

$$K_{G,t} = \text{GI}_t + (1 - \delta_G) K_{G,t-1}, \quad (9)$$

where GI_t is government investment and δ_G the depreciation rate.

Capital is subject to quadratic adjustment costs, so that investment $I_t \equiv K_t - (1 - \delta)K_{t-1}$ requires an additional adjustment cost $\phi(K_t/K_{t-1})K_{t-1}$, where $\phi(x) \equiv \frac{1}{2\delta\varepsilon_I}(x - 1)^2$, δ denotes depreciation, and ε_I is the sensitivity of gross investment to Tobin's Q . Any firm also sets its price subject to [Rotemberg \(1982\)](#) quadratic adjustment costs $\xi(P_t, P_{t-1}) \equiv \frac{1}{2\kappa_p(\mu_p - 1)}\left(\frac{P_t - P_{t-1}}{P_{t-1}}\right)^2$, where κ_p is the slope of the price Phillips curve and μ_p is the price markup. Since all firms are identical, in equilibrium they make the same choices, and the aggregate dividend equals

$$d_t = Y_t - W_t N_t - I_t - \phi\left(\frac{K_t}{K_{t-1}}\right) K_{t-1} - \xi(P_t, P_{t-1}) Y_t, \quad (10)$$

and the stock price satisfies $p_t = \frac{1}{1+r_t}(d_{t+1} + p_{t+1})$.

2.3 Wages, Prices, and Inflation

Nominal rigidities follow [Auclert et al. \(2024\)](#), with both prices and wages subject to [Rotemberg \(1982\)](#) quadratic adjustment costs, equivalent to [Calvo \(1983\)](#) staggered setting to first order. On the wage side, a union sets wages on behalf of households subject to these adjustment costs. With the disutility of labor specified as $v(N_t) = \gamma N_t^{1+1/\phi}$, the union's optimisation yields the nonlinear wage Phillips curve

$$\pi_t^w(1 + \pi_t^w) = \kappa_w \left(\frac{\mu_w \gamma N_t^{1/\phi}}{(C_t^*)^{-\sigma}(1 - \theta) Z_t/N_t} - 1 \right) + \beta \pi_{t+1}^w(1 + \pi_{t+1}^w), \quad (11)$$

describing the dynamics of wage inflation π_t^w as a function of aggregate hours N_t , aggregate post-tax income Z_t , and the consumption aggregate

$$C_t^* \equiv \left(\int \frac{\varepsilon^{1-\theta}}{\int \varepsilon^{1-\theta} di} c_{it}^{-\sigma} di \right)^{-1/\sigma}, \quad (12)$$

which summarises how the distribution of consumption across the population affects the aggregate wealth effect on labor supply. The parameters κ_w , μ_w , γ , and ϕ are the slope of the wage Phillips curve, the wage markup, the labor disutility scale, and the Frisch elasticity of labor supply. Wage inflation is defined as

$$1 + \pi_t^w = (1 + \pi_t) \frac{W_t}{W_{t-1}}. \quad (13)$$

On the price side, intermediate-goods firms set prices subject to the Rotemberg adjustment costs described above, trading off the benefits of deviating from the current price level against the cost of adjustment. This yields the nonlinear price Phillips curve

$$\pi_t(1 + \pi_t) = \kappa_p(\mu_p mc_t - 1) + \frac{1}{1 + r_t} \frac{Y_{t+1}}{Y_t} \pi_{t+1}(1 + \pi_{t+1}), \quad (14)$$

where π_t is net price inflation, μ_p the price markup, and $mc_t \equiv \frac{W_t/P_t}{F_{n,t}}$ real marginal cost.

2.4 Monetary Policy

Following [Langot et al. \(2025\)](#), the central bank sets the nominal interest rate according to a Taylor rule with smoothing parameter ρ_r :

$$i_t = \rho_r i_{t-1} + (1 - \rho_r)[i_{ss} + \phi_\pi(\pi_t - \pi^*)] + u_t^i, \quad (15)$$

where $i_{ss} = r_{ss} + \pi^*$ is the steady-state nominal rate, π^* the inflation target, ϕ_π the Taylor rule coefficient, and u_t^i a monetary policy shock. Here π_t is the inflation rate of the representative

high-debt economy, and the response coefficient ϕ_π is scaled to reflect that the ECB sets policy with respect to euro-area-wide rather than country-specific inflation. This approach is inherited from [Langot et al. \(2025\)](#), who scale the response coefficient on country-specific inflation rather than modeling the rest of the euro area as a separate block; in our case, the model instead represents a stylized high-debt euro-area economy. An alternative used in some euro-area DSGE models would be to introduce an explicit second block with its own inflation dynamics; we do not pursue that route here, as the single-economy specification with a scaled coefficient is sufficient for our policy questions and keeps the model tractable. In the baseline calibration we set $\rho_r = 0$, so the rule responds to current inflation without interest-rate smoothing.

2.5 Sovereign Risk and Debt Maturity

Additionally, following [Langot et al. \(2025\)](#), we introduce two features of government debt finance absent from the [Auclert et al. \(2024\)](#) framework but central to debt sustainability analysis. First, the government faces a risk premium that rises endogenously with the debt-to-GDP ratio, creating a feedback between fiscal positions and financing costs. Second, the outstanding debt stock has a multi-period maturity structure, so that changes in borrowing costs pass through to total debt service only gradually as old bonds are rolled over.

The real interest rate is determined by the Fisher equation, which incorporates both the current nominal rate and the endogenous risk premium $\eta(B_t/Y_t - B_{ss}/Y_{ss})$, where η governs the sensitivity of the spread to the debt-to-GDP gap:

$$1 + r_t = \frac{1 + i_t + \eta\left(\frac{B_t}{Y_t} - \frac{B_{ss}}{Y_{ss}}\right)}{(1 - \tau_t^c)(1 + \pi_{t+1})}, \quad (16)$$

where $\tau_t^c \equiv \tau_t^{\text{corp}}/(A_{ss} + B_t)$ is the effective corporate tax rate, computed as total corporate tax receipts scaled by the sum of steady-state household wealth and the current debt stock. This formulation distributes the tax burden across the aggregate asset base, so that τ_t^c varies

endogenously with debt and corporate tax policy. When debt exceeds its steady-state level, the spread rises, increasing the real cost of borrowing throughout the economy.

Outstanding government debt has average maturity $\bar{M}$. Each period a fraction $1/\bar{M}$ of bonds mature and are refinanced at prevailing rates, so the average coupon on the outstanding stock adjusts gradually:

$$\kappa_t = \lambda \kappa_{t-1} + (1 - \lambda) \left[i_{t-1} + \eta \left(\frac{B_t}{Y_t} - \frac{B_{ss}}{Y_{ss}} \right) + \vartheta_{t-1} \right], \quad \lambda = \frac{\bar{M} - 1}{\bar{M}}, \quad (17)$$

where ϑ_{t-1} is an exogenous spread shock. The risk premium in the coupon target uses the current debt-to-GDP ratio B_t/Y_t , reflecting that new bonds issued in period t are priced at the prevailing spread, while the lagged nominal rate i_{t-1} captures the cost at which the maturing tranche was last refinanced. The gross real rate at which the existing debt stock is serviced is

$$\tilde{R}_t = \frac{1 + \kappa_{t-1}}{1 + \pi_t}. \quad (18)$$

Because λ is close to one when maturity is long, a sudden widening of the spread raises the marginal cost of new issuance but has little immediate impact on the total interest bill, as most bonds were issued at earlier, lower rates.

2.6 Government

The government collects tax revenue and issues debt to finance a range of expenditure instruments. We replace the single bond return $(1+r_{t-1})B_{t-1}$ with the smoothed coupon rate $\tilde{R}_t B_{t-1}$ from equation (18) and disaggregate the transfer and tax instruments into separate instruments each with a distinct distributional incidence. The government's period budget constraint is

$$\tilde{R}_t B_{t-1} + \tau_t^{\text{corp}} + \tau_t^\ell + T_t = B_t + G_t + \text{GI}_t + \text{TR}_t + \text{TTR}_t + \text{TI}_t + G_t^{\text{shock}}, \quad (19)$$

where B_t is the real public debt stock, G_t government consumption, GI_t public investment, TR_t universal lump-sum transfers, TTR_t targeted transfers to the bottom four productivity deciles, TI_t insurance-based transfers, G_t^{shock} an exogenous fiscal spending shock, τ_t^{corp} corporate tax receipts, and τ_t^ℓ labor income tax receipts. Each instrument has a distinct distributional incidence, as described in Section 2.1, and therefore a distinct macroeconomic multiplier. Lump-sum taxes T_t serve as the residual instrument and follow a debt feedback rule:

$$T_t = T_{ss} + \phi_T(B_t - B_{ss}), \quad (20)$$

which ensures long-run stationarity of the debt-to-GDP ratio without distorting labor supply or saving decisions.

2.7 Market Clearing

All markets clear in every period. In the goods market, output is absorbed by private consumption, private investment, government consumption and public investment, adjustment costs, and the fiscal spending shock:

$$Y_t = C_t + I_t + G_t + GI_t + \Phi_t^p + \Phi_t^k + G_t^{\text{shock}}. \quad (21)$$

Transfers and taxes do not appear in goods clearing because they are redistributions between the government and households that net out in the aggregate. In the asset market, total household wealth must equal the supply of government bonds and corporate equity:

$$A_t = B_t + p_t, \quad (22)$$

where $A_t \equiv \int (a_{it}^{\text{liq}} + a_{it}^{\text{illiq}}) di$. This condition determines the equilibrium real interest rate.

Households hold the aggregate portfolio of government bonds and equity in proportion

to the bond share $s_t^b \equiv B_t/(B_t + p_t)$. The ex-post gross portfolio return is

$$R_t^{\text{port}} = s_{t-1}^b(1 + r_{t-1}) + (1 - s_{t-1}^b) \frac{p_t}{p_{t-1}} - \xi_t^{\text{dem}}, \quad (23)$$

where ξ_t^{dem} is an exogenous portfolio return wedge that can capture shifts in asset demand conditions or intermediation costs. In the baseline scenarios $\xi_t^{\text{dem}} = 0$; it is retained as a shock instrument for sensitivity analysis. The return R_t^{port} enters the household block as the relevant ex-post return on the tradable wealth portfolio.

The equilibrium is computed using the sequence-space Jacobian method of [Auclert et al. \(2021\)](#), which represents the solution as a complete mapping from structural shocks to the path of every endogenous variable. The household block’s Jacobian encodes the full matrix of intertemporal marginal propensities to consume, which, as shown in [Auclert et al. \(2024\)](#), is the sufficient statistic for fiscal policy transmission in this class of models.

2.8 Quantitative Experiments

Our quantitative analysis is built around three scenarios. The first is an unchanged-policies baseline that traces the economy under the average fiscal stance and macro conditions observed through 2025, assuming no additional consolidation beyond pre-announced measures; this baseline can be interpreted as a counterfactual that clarifies the costs of postponing adjustment. We then layer on two consolidation scenarios as alternative add-ons to the baseline, each delivering the same cumulative fiscal effort of 1.5 percentage points of GDP over 2027–31 (0.3 percentage point per year) that is calibrated to firmly put the debt on a downward path, with differences arising solely from the composition of the package. The first scenario, expenditure-based consolidation (ExC), combines reductions in social insurance and lump-sum transfers with modest restraint in government consumption, while modestly increasing targeted assistance transfers to protect the most vulnerable. The second scenario, revenue-based consolidation (ReC), relies primarily on higher labor income and corporate taxes, with

limited spending restraint and full protection of social insurance transfers. As an additional exercise, we examine how complementing the expenditure-based path with growth-enhancing structural reforms (ExC+SR), modeled as gradual TFP gains, reshapes both macroeconomic and distributional outcomes; ExC+SR retains the ExC fiscal composition and overlays a TFP profile of 0.1–0.2 percentage points per year. Holding the consolidation effort constant across the two main scenarios isolates the role of adjustment composition, while the ExC+SR exercise isolates the contribution of the productivity dividend.

3 Calibration

The model is calibrated to an annual frequency for a representative high-debt advanced euro area economy, defined by a steady-state debt-to-GDP (gross domestic product) ratio of 125 percent. The representative economy is constructed from three core high-debt euro area economies—Belgium, France, and Italy—which share the defining features of the high-debt advanced euro area sub-group: a debt-to-GDP ratio well above the 60 percent reference value, elevated effective taxation levels, and established access to euro area capital markets.² Fiscal steady-state ratios and factor share parameters are constructed as PPP (purchasing power parity) adjusted real GDP-weighted averages across these three economies, drawing on Eurostat, World Bank national accounts, and Penn World Tables 11.0; full details are reported in Table 1. Household preference and portfolio parameters follow [Auclert et al. \(2024\)](#), and monetary policy parameters follow [Langot et al. \(2025\)](#). The portfolio friction parameters, namely the illiquid-liquid spread $\zeta(1 + r)$ and the portfolio adjustment probability ν , are jointly calibrated to match a weighted average marginal propensity to consume (MPC) of 0.44, constructed as a GDP-weighted average of country-level MPC estimates from [Drescher et al. \(2020\)](#). The resulting distribution of wealth and income heterogene-

²Greece and Spain are excluded from the calibration set despite their high debt levels because their effective tax burdens and revenue compositions differ materially from the core group, as discussed in Section 4; including them would blur the empirical anchor on a homogeneous sub-group. Country-specific applications, particularly for economies with greater residual revenue headroom, are left for follow-up work.

ity, including the shares of hand-to-mouth and wealthy hand-to-mouth households, emerges endogenously and is reported as a set of untargeted moments in Table 2.

Table 1: Calibration: Representative High-Debt Advanced Euro Area Economy

Parameter	Value	Target/Source
<i>Households</i>		
Discount factor (annual), β	0.94	$\frac{A}{Y}$
Elasticity of intertemporal substitution, σ	1	Auclert et al. (2024)
Frisch elasticity of labor supply, ϕ	0.5	–
Tax retention function curvature, θ	0.2	Heathcote et al. (2017)
Persistence of idiosyncratic productivity shock, ρ_e	0.91	Auclert et al. (2024)
Std. deviation of idiosyncratic productivity shock, σ_e	$(1 - \theta) \times 0.92$	Auclert et al. (2024)
<i>Portfolio and Financial Frictions</i>		
Illiquid-liquid spread, $\zeta(1 + r)$	0.09	Weighted average MPC = 0.44*
Portfolio adjustment probability, ν	0.15	Weighted average MPC = 0.44*
Real interest rate (annual), r	0.05	Auclert et al. (2024)
Asset-to-GDP, A/Y	5.94	–
<i>Firms & Union</i>		
Capital share, α	0.4219	Penn World Table 11.0*
Depreciation rate, δ	0.04	Penn World Table 11.0*
Price Phillips curve slope, κ_p	0.22	Auclert et al. (2024)
Wage Phillips curve slope, κ_w	0.10	Auclert et al. (2024)
<i>Government</i>		
Taylor rule coefficient, ϕ_π	1.2	Langot et al. (2025)
Spread sensitivity to debt, η	0.0077	Langot et al. (2025)
Persistence of govt. debt	0.93	Auclert et al. (2024)
Persistence of govt. spending	0.8	–
Debt-to-GDP, B/Y	1.25	Eurostat (Q3 2025)*

Notes: All parameters are at an annual frequency unless otherwise noted. Asterisks (*) denote PPP-adjusted real GDP-weighted averages across selected Euro Area economies, using data from the IMF World Economic Outlook (January 2026). Underlying data sources for weighted parameters: Eurostat (Q3 2025) for debt-to-GDP; World Bank national accounts (2023) for government consumption-to-GDP; Penn World Tables 11.0 (*1 - labsh*) for factor shares and *delta* for average depreciation rates of the capital stock; and [Drescher et al. \(2020\)](#) for marginal propensities to consume (MPC). Household preference and portfolio parameters follow [Auclert et al. \(2024\)](#). Monetary policy parameters follow [Langot et al. \(2025\)](#).

Table 2 reports distributional statistics generated by the model that were not targeted in calibration. The model broadly captures the qualitative patterns of household balance sheet heterogeneity observed in high-debt euro area economies, with untargeted moments reported in Table 2.

Table 2: Untargeted Distributional Moments

Moment	Model	Data
<i>Hand-to-Mouth</i>		
Share of HtM ($a^{liq} = 0$)	0.438	$\approx 0.22^a$
Share with $a^{liq} \leq 0.1$	0.638	–
Share of WHtM ($a^{liq} = 0$, $a^{illiq} > 0$)	0.324	$\approx 0.17^a$
<i>Income Shares</i>		
Share of income to HtM	0.316	–
Share of income to $a^{liq} \leq 0.1$	0.550	–
Share of income to WHtM	0.265	–
<i>Wealth Distribution</i>		
Gini coefficient	0.845	$\approx 0.67^b$
Top 10 percent wealth share	0.798	$\approx 0.52^b$
Post-tax income	0.306	–

Notes: All moments are model outputs and were not targeted in calibration. Dashes (–) indicate moments for which no direct empirical counterpart is available for the sample. HtM denotes hand-to-mouth households; WHtM denotes wealthy hand-to-mouth households holding illiquid assets but no liquid assets. ^a Weighted average across the high-debt euro area sample, from [Kaplan et al. \(2014\)](#), Figure 9. ^b Weighted average across the high-debt euro area sample, from the ECB Household Finance and Consumption Survey (2021 wave), Table J4.

The model somewhat overpredicts the share of strictly HtM households relative to survey estimates, a common feature of two-asset models with a binding no-borrowing constraint

calibrated to match aggregate liquid wealth; the broader measure of households with liquid assets below 10 percent of quarterly income (63.8 percent) is more directly comparable to the empirical share of financially fragile households and lies within the range reported for high-debt euro area countries. The methodological choice underlying this calibration—targeting the aggregate MPC rather than the HtM share directly—and its implications for the level and composition of HtM households are discussed in detail in Annex A.2. As empirical counterparts are not available for all moments reported in Table 2, we report data only where comparable estimates exist in the literature or relevant household surveys, with remaining moments reported as model outputs only.

4 Results

4.1 Steady State and Distributional Structure

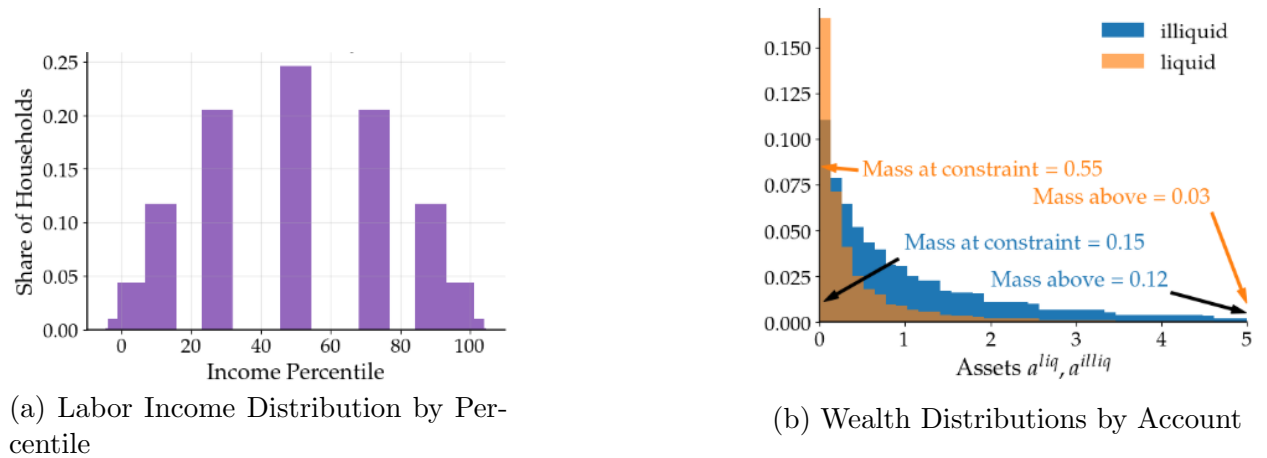
Before analyzing the dynamic effects of fiscal consolidation, we first examine the model’s steady state, which serves as a starting point. The steady state is calibrated to reflect the structural features of a representative high-debt advanced euro area economy, with a debt-to-GDP ratio of 125 percent and aggregate fiscal ratios (revenue, expenditure, transfers, and government consumption shares) consistent with the average across high-debt euro area countries. This calibration ensures that the model captures the key macroeconomic and distributional characteristics relevant for high-debt advanced euro area economies.

A central feature of the steady state is the pronounced heterogeneity in household balance sheets and income sources. The model generates a realistic distribution of liquid and illiquid assets, with approximately 43 percent of households classified as hand-to-mouth (HtM), out of which 32 percent are wealthy hand-to-mouth (WHtM), who hold illiquid wealth but remain liquidity-constrained. Together, these groups account for a substantial share of aggregate consumption and are particularly sensitive to fiscal shocks due to their high marginal propensities to consume (MPCs).

The distribution of MPCs is highly skewed. Households in the bottom income deciles exhibit near-unit MPCs, reflecting their limited ability to smooth consumption in response to income fluctuations. Even among middle-income households, MPCs remain elevated due to the prevalence of illiquidity and borrowing constraints. In contrast, high-income households, who hold the majority of wealth, exhibit significantly lower MPCs, implying a muted consumption response to transitory income changes. This heterogeneity in MPCs is a key mechanism through which fiscal policy transmits to aggregate demand in the model.

The underlying income distribution further amplifies these dynamics. Labor income is dispersed across households according to a persistent idiosyncratic productivity process calibrated to match empirical earnings inequality, as shown in Figure 1a. Figure 1b illustrates the joint distribution of liquid and illiquid asset holdings across the population. The concentration of low liquid assets (high MPCs) among low- and middle-income households underscores the importance of targeting fiscal instruments—such as transfers and taxes—according to their incidence. Distributional structure is central to understanding the heterogeneous effects of fiscal consolidation and the trade-offs between growth and equity that arise from different policy compositions.

Figure 1: **Steady-state distributional properties**



4.2 Transmission Channels of Fiscal Policy

Fiscal measures affect households' consumption and aggregate output through four main channels: (1) government spending; (2) disposable income; (3) interest rate; and (4) asset revaluation. Together, these channels determine both the aggregate demand response and its distribution across the population.

(1) Government spending channel. Changes in government consumption and investment affect aggregate demand directly, on top of the household-side channels above. Cuts to government consumption (G) reduce final demand one-for-one with the size of the cut, with no offsetting endogenous adjustment in private behavior at impact: the multiplier on G is large in the short run because it bypasses the marginal propensity to consume entirely and falls directly on the goods market. Cuts to public investment (GI) operate through two distinct margins. In the short run, they reduce aggregate demand in the same way as cuts to government consumption. In the medium and long run, they erode the public capital stock, lowering the marginal product of private capital and labor, and dragging on potential output, wages, and the tax base. The implication for the composition of consolidation is direct: cuts to current government consumption deliver an immediate fiscal savings but generate large impact multipliers. Cuts to public investment carry the largest headline multiplier.

(2) Disposable income channel. Household consumption depends on disposable income, which is determined by wages, taxes, and government transfers. Fiscal consolidation operates through this channel both directly and indirectly. Direct effects arise from higher taxes or lower transfers, while indirect effects reflect weaker aggregate demand, which depresses wages and employment. Because households differ in their marginal propensity to consume, a contraction in aggregate demand depends on how the adjustment is distributed across households. Measures that fall on liquidity-constrained households, including wealthy hand-to-mouth households, generate larger demand contractions.

(3) Interest rate channel. The real interest rate affects household consumption through the intertemporal substitution channel. Fiscal consolidation reduces demand and is

disinflationary. As a result, interest rates are lowered, making current consumption relatively cheaper than future consumption, encouraging households to consume more and save less. In addition, consolidation reduces sovereign risk premia over time, further lowering borrowing costs throughout the economy and this channel extends well beyond the government's balance sheet: as shown by [Arellano et al. 2018](#), [Bocola 2016](#), [Arellano et al. 2026](#), lower spreads ease bank funding costs, which feed through to cheaper credit for firms and higher private investment, amplifying the aggregate demand benefit of fiscal adjustment beyond what household-side relief alone would generate..

(4) Asset revaluation channel. Changes in real interest rates affect the value of household asset holdings, with their impact varying across the wealth distribution. A decline in real interest rates raises the present value of assets, increasing the wealth of households with significant financial assets. At the same time, lower rates lead to a fall in the return on liquid assets, partially offsetting gains for wealthier households. These gains are mostly concentrated among high wealth households that have significant asset holdings.

The four channels operate simultaneously and their interaction shapes both the size and the persistence of the output response to consolidation. The disposable income channel generates a sizable initial demand contraction, amplified by the distribution of MPCs across the population. The government spending channel adds a direct effect that bypasses MPC heterogeneity and is largest at impact, particularly for cuts to government investment. The interest rate channel can partially offset these contractions when monetary policy is accommodative. The sovereign risk premium, however, introduces an additional impact: when the debt ratio is high and consolidation implies only a gradual improvement, borrowing costs remain elevated, generating a drag on investment and consumption. The asset revaluation channel adds a further layer of persistence, as households with illiquid positions cannot quickly adjust their portfolios in response to changing asset prices.

The distributional implications of fiscal consolidation depend on the composition of fiscal consolidation and who bears them across the income distribution. Cuts to insurance-based

transfers, such as contributory pensions and unemployment benefits, linked to prior earnings reduce income primarily for middle-income households who rely on them as a primary earnings replacement and who hold much of their wealth in illiquid form, limiting their ability to smooth consumption. Cuts to targeted transfers, such as minimum-income benefits, impact low-income households who have higher marginal propensity to consume most directly. Therefore, any reduction in support passes through immediately and leads to lower consumption. Reductions in broad untargeted subsidies and lump-sum transfers, by contrast, generate smaller demand contractions, since higher income households can use their savings to smooth consumption.

Tax-based consolidation introduces additional distributional costs. Higher labor taxes imply a stronger labor supply contraction disproportionately impacting lower-income households who have a higher dependence on labor income and a higher MPC. Higher corporate taxes reduce incentives to invest, leading to lower output, while at the same time reducing dividends with losses concentrated among wealthier households. Consistent with the discussion of channel (4) above, a consolidation strategy that achieves fiscal adjustment through better-targeted transfers and reductions in current government consumption, while preserving public investment, can help limit the aggregate demand contraction, protect long-run growth, and shield the households most vulnerable to income losses.

4.3 Scenarios and Experimental Design

The analysis proceeds in two steps. First, we construct a no-adjustment counterfactual (the unchanged-policies baseline) which traces the economy under the fiscal stance and macro shocks observed through 2025, projected forward assuming no additional consolidation beyond pre-announced measures. This serves both as the reference point for measuring the costs of inaction and as the benchmark against which active adjustment is evaluated.

Second, two consolidation scenarios are layered as add-ons to the baseline. Both scenarios deliver a cumulative fiscal effort of 1.5 percentage points of GDP over a five-year horizon

(2027-31, or 0.3 pp per year), broadly consistent with EU excessive deficit procedures. Holding the effort constant isolates the role of composition.

The composition of each scenario is summarized in Table 3. Under the expenditure-based consolidation (ExC), 60 percent of the effort comes from transfers restraint: reductions in social insurance and lump-sum transfers, 30 percent from cuts to government consumption, a top-up in targeted assistance protects the most vulnerable households and is financed through additional budget-neutral cut in transfers; the remaining 10 percent comes from revenue measures. Under the revenue-based consolidation (ReC), the share is reversed: tax increases (split between labor and corporate taxes) account for 60 percent of the effort, with limited spending restraint of 10 percent, and the same share of government spending cut of 30 percent. Targeted assistance is protected and financed from additional revenue effort.

As an additional experiment, we examine how complementing the expenditure-based path with growth-enhancing structural reforms reshapes outcomes. This scenario—labelled ExC+SR—retains the same fiscal composition as ExC but adds total factor productivity (TFP) gains of 0.1–0.2 percentage points per year over the consolidation horizon, reflecting reforms that lift potential growth. The macroeconomic and distributional consequences of this add-on are discussed separately in Section 4.6.

Table 3: Composition of Consolidation Scenarios

	ExC	ReC
Insurance transfers (TI)	–40% of effort	–5% of effort
Lump-sum transfers (TR)	–40% of effort	–5% of effort
Government consumption (G)	–30% of effort	–30% of effort
Targeted assistance (TTR)	+20% of effort	+18% of effort
Labor income tax	+5% of effort	+50% of effort
Corporate tax	+5% of effort	+28% of effort
Total effort (cumulative, % GDP)	1.5	1.5

Notes: Each entry reports the contribution of a given fiscal instrument to the cumulative consolidation effort, expressed as a share of the 1.5 pp of GDP target. Negative entries denote contractionary measures (spending cuts or tax hikes that improve the primary balance); positive entries on the spending side (TTR) denote offsetting top-ups financed within the package. The contributions sum to 100% in each column. The expenditure-based consolidation with structural reforms (ExC+SR), discussed in Section 4.6, retains the ExC composition and overlays TFP gains of 0.1–0.2 pp/yr over the consolidation horizon.

4.4 The Cost of Inaction vis-à-vis Fiscal Consolidation

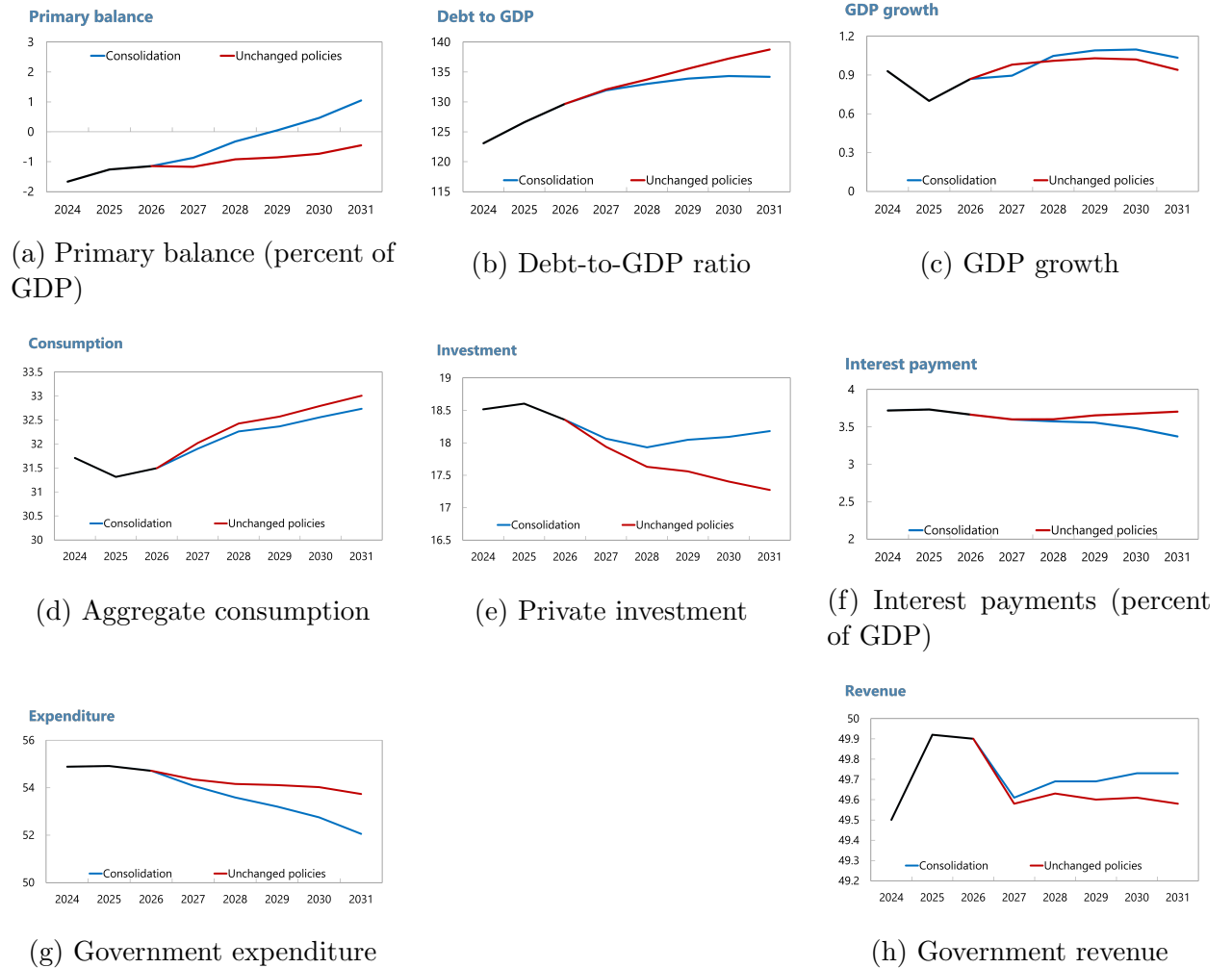
The baseline makes clear that delaying consolidation is not a neutral choice—it is itself costly. Under unchanged policies, the fiscal deficit continues to widen as interest payments rise. The endogenous risk-premium mechanism translates higher debt into a widening sovereign spread, which further raises borrowing costs and accelerates debt accumulation in a self-reinforcing fiscal-financial loop (Roldán 2025) — one in which falling aggregate demand weakens fiscal revenues, pushes spreads higher, and tightens credit to the private sector (Bocola 2016), compounding the original fiscal deterioration. Private investment is crowded out through the asset market: higher public debt absorbs saving that would otherwise finance productive capital, keeping investment below its efficient level. The union wage-setting block transmits the labor wedge into wage dynamics, eroding real wages. As shown by Elenev et al., 2025, this dynamic is not a smooth, linear drag — there is a threshold beyond which active fiscal and monetary policy cannot simultaneously be sustained, so the cost of delay is potentially discontinuous rather than merely cumulative.

The net result is lower-quality growth. As shown in Figure 2, over 2027–31, cumulative investment under unchanged policies falls short of the ExC+SR consolidation scenario by approximately 0.7 percentage points, while the debt-to-GDP ratio rises by 5 pp. This result has a direct policy implication: the trade-off between consolidation and growth is often framed as consolidation imposing costs relative to the status quo. Our model shows the status quo is not neutral—delaying adjustment generates its own costs in the form of lower investment, higher debt-service burdens, and distributional damage to constrained households.

Two caveats on interpretation are worth flagging at this point. The magnitude of the cost of inaction shown in Figure 2 depends on the characterization of the baseline: the upward drift in debt-to-GDP, the resulting path of sovereign spreads, and the implied crowding-out of investment together set the wedge against which any consolidation path is evaluated. A baseline with a flatter debt trajectory would generate a correspondingly smaller cost-of-inaction wedge, while a steeper baseline would amplify it. Relatedly, Figure 2 uses ExC+SR

for the active consolidation line, which bundles fiscal adjustment with a productivity dividend from structural reforms. This bundling makes the wedge against inaction visually larger than it would be the case for the pure ExC or ReC paths discussed in Sections 4.5 and 4.6, where the fiscal-only effect of consolidation against the same baseline is isolated. The qualitative conclusion that delay is costly carries over to those scenarios, but the quantitative magnitude in the figure should not be read as the cost of fiscal consolidation alone.

Figure 2: Aggregate Macro-Fiscal Effects. Unchanged Policies vs. Consolidation Scenario.

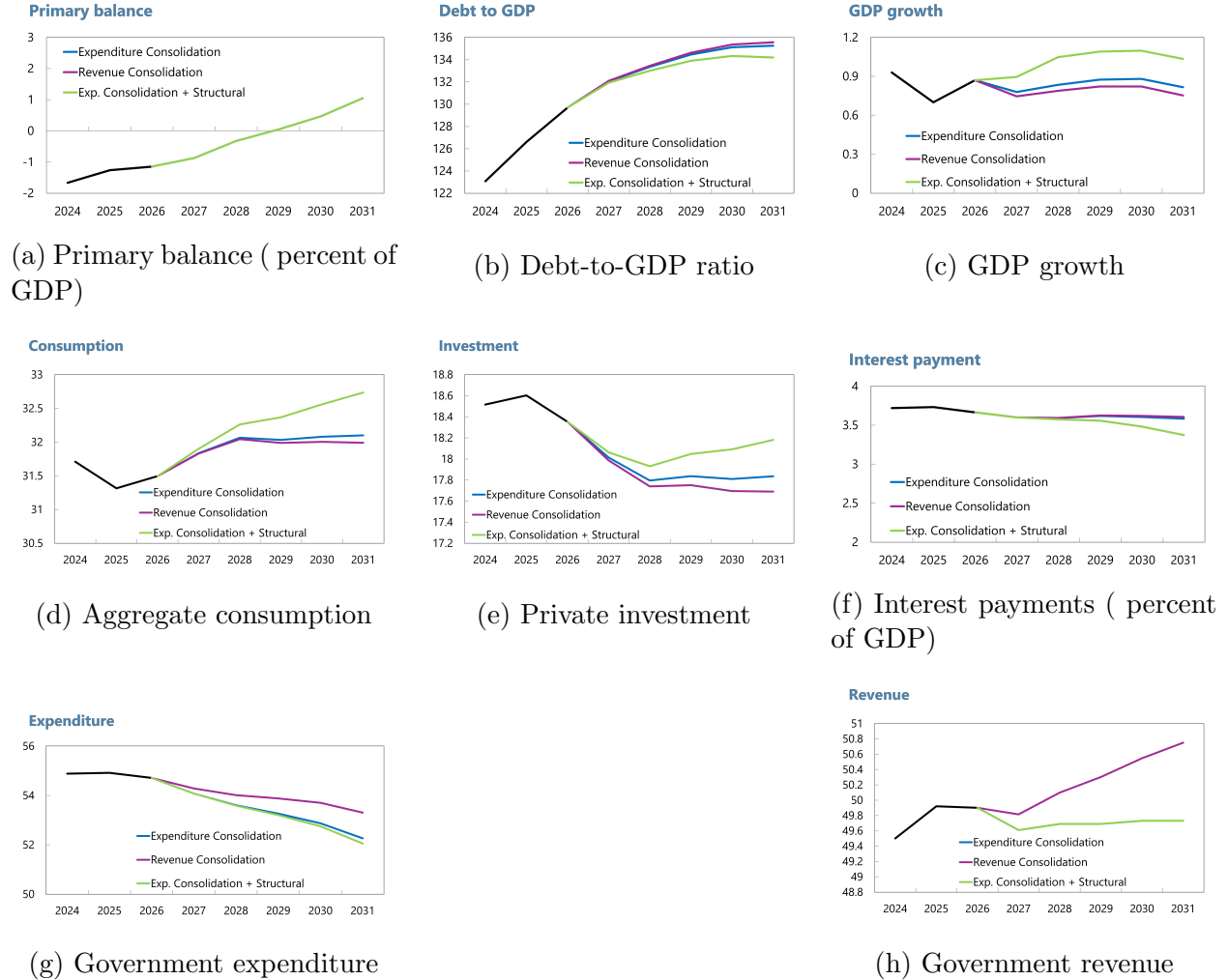


Impulse responses under expenditure-based consolidation with structural reforms (ExC+SR, blue), unchanged policies (red).

4.5 Macro-Fiscal Effects: Why Composition Matters

Figure 3 compares the primary balance, debt-to-GDP ratio, GDP growth, and aggregate consumption across the three consolidation scenarios. Three results stand out.

Figure 3: **Aggregate Macro-Fiscal Effects Under Alternative Consolidation Scenarios.**



Impulse responses under expenditure-based consolidation (ExC, blue), revenue-based consolidation (ReC, purple), and expenditure-based consolidation with structural reforms (ExC+SR, green). All three packages deliver the same cumulative structural primary balance improvement of 1.5 pp of GDP over 2027–31

First, both packages are set to deliver the same cumulative structural primary balance improvement. However, ExC reduces the debt-to-GDP ratio faster because spending cuts directly improve the primary balance. ReC is slower: higher taxes weaken activity and

compress the tax base, so the headline debt trajectory improves more slowly for the same structural effort which is consistent with [Philippon and Roldán \(2018\)](#), who find that the composition and pace of deleveraging interact with precautionary saving motives to shape both the aggregate and distributional macroeconomic response. This finding should be read with the caveat that many high-debt euro area economies already operate with elevated taxation levels, so the marginal output cost of further revenue-based adjustment is on the high end of the range.

Second, the HANK framework distinguishes four transmission channels that are conflated in representative-agent models, and whose relative weight depends on the instrument mix. The net effect is that ExC imposes an output cost of approximately -0.2 percent in the first year relative to unchanged policies, after accounting for the offsetting top-up in targeted assistance transfers; ReC imposes a larger cost of approximately -0.25 percent. The smaller multiplier under ExC reflects the lower demand impact of cuts to transfers received in part by unconstrained households, relative to the broad-based income contraction induced by labor taxation in an economy with many liquidity-constrained households.

Third, the endogenous spread mechanism creates a meaningful reduction in interest payments under both consolidation packages. As debt declines, the sovereign risk premium compresses, reducing borrowing costs and reinforcing the improvement in debt dynamics. Under ExC, the faster debt reducer of the two, spread compression amounts to approximately 50 basis points by the end of the projection period, translating into annual interest savings of around 0.2 percent of GDP. This effect is absent in models with fixed spreads and provides a strong argument for front-loaded, credible adjustment when fiscal-credibility concerns are operative, a point underscored by [Hatchondo, Martinez, and Roch \(2020\)](#), who show in an optimal sovereign borrowing framework that the gains from manipulating the spread process are of first-order relevance.

The two consolidation strategies differ not only in their aggregate footprint but also in who bears the cost. Because households are heterogeneous in income sources, balance-sheet

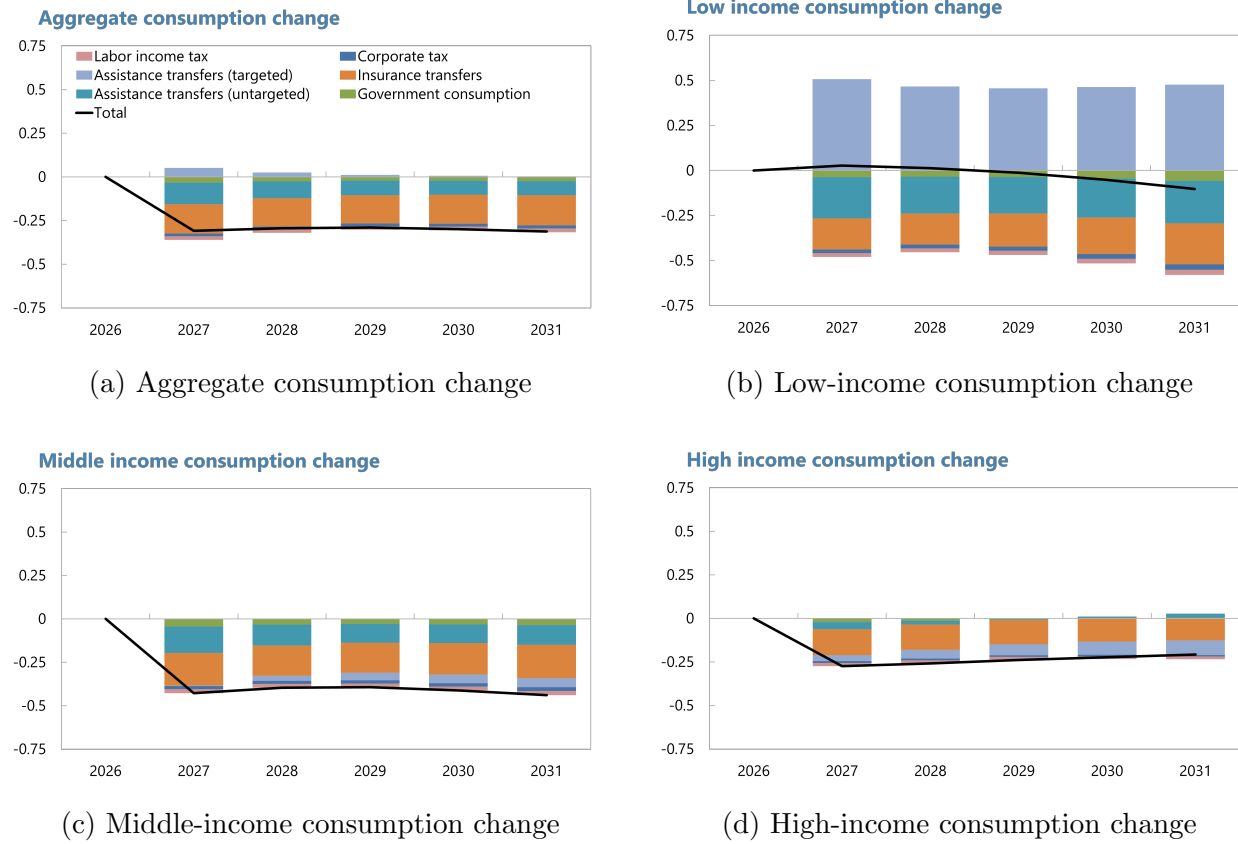
positions, and marginal propensities to consume, the same headline fiscal effort generates very different incidence patterns across the income distribution depending on the instrument mix. We discuss the distributional implications of expenditure- and revenue-based consolidation in turn, before comparing the two side by side in Figure 6.³

Expenditure-based consolidation. Absent targeted assistance transfers, cuts to social insurance (TI) and lump-sum transfers (TR) under ExC fall disproportionately on lower- and middle-income households, who receive around 60 percent of total transfer income and have near-unit MPCs. Consumption in the lowest decile falls by approximately 0.5 percent in the first year. Higher deciles are more insulated, as their income relies more on wages and capital income. As shown in Figure 6, the middle-income group bears the largest absolute decline under ExC because insurance-based and lump-sum transfers are concentrated in that part of the distribution.

A modest top-up in targeted assistance transfers (TTR) to the bottom deciles, embedded in the ExC scenario, substantially offsets the direct distributional impact at minimal net fiscal cost. Because TTR recipients have MPCs near one, even a small fiscal outlay translates into a sizable consumption stabilization. In the model, a 20 percent effort toward TTR offsets the consumption decline in the bottom decile. This illustrates that well-targeted social protection is not just equitable—it is macroeconomically efficient. Figure 4 reports the instrument-by-instrument decomposition of the consumption response under ExC, by income group: it shows that the cuts to insurance transfers (TI) and lump-sum transfers (TR) account for the bulk of the negative contribution, particularly in the middle of the distribution, while the targeted assistance top-up (TTR) provides a partial but durable offset concentrated in the bottom deciles.

³Throughout this section, income groups refer to deciles of steady-state assets: 'low-income' aggregates bottom decile (the bottom 10 percent), 'middle-income' decile 5, 'high-income' decile 10. The grouping is by wealth.

Figure 4: **Instrument Decomposition of Consumption Change Under ExC, by Income Group.**

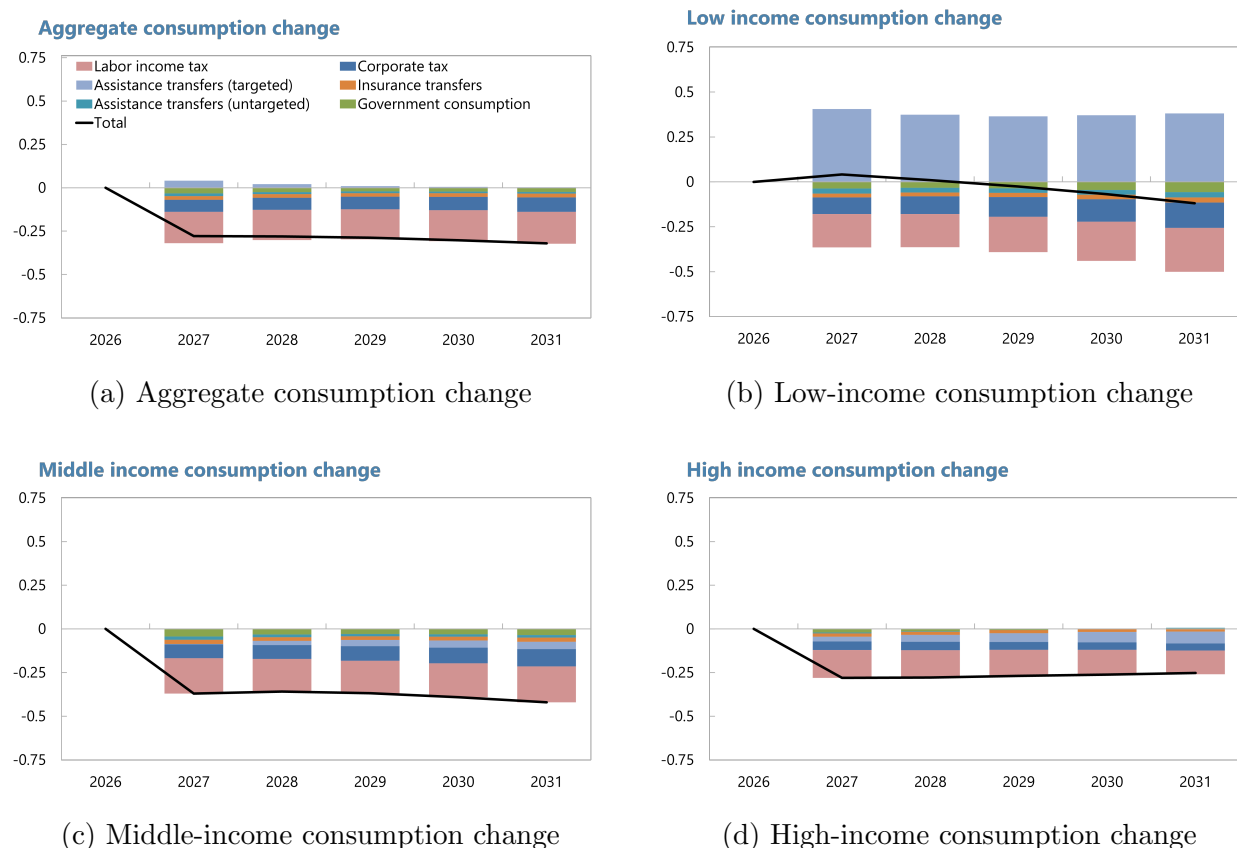


Stacked bar charts decompose the annual change in consumption under the expenditure-based consolidation scenario (ExC) into contributions from individual fiscal instruments (colours), with the black line showing the total. Bars below the horizontal axis denote negative contributions (instruments that reduce consumption); bars above the axis denote positive contributions (instruments that support consumption). The persistent negative contribution of insurance transfers (TI) and lump-sum transfers (TR) is concentrated in the middle of the distribution, while the targeted assistance top-up (TTR, positive) is concentrated in the bottom decile and partially cushions the consumption decline there.

Revenue-based consolidation. Under ReC, the incidence is more evenly spread across the income distribution but the aggregate consumption decline is larger. Higher labor income taxes reduce after-tax wage income for all workers, with the impact concentrated among middle- and lower-income households who derive a larger share of their total income from labor and tend to have higher MPCs. Corporate tax increases compress dividends and equity valuations, which incidentally falls more heavily on top-decile households who hold the bulk of financial wealth, but the asset-revaluation channel is muted by illiquidity frictions

and operates with a lag. Because labor taxes scale with earnings and apply broadly, ReC affects higher deciles more, though all groups see consumption decline, and the aggregate fall is larger than under ExC because the labor-tax multiplier is high in an economy with many liquidity-constrained households. Figure 5 reports the corresponding instrument decomposition under ReC: the labor-tax contribution dominates the negative response across all income groups, with the corporate-tax contribution adding a smaller but more progressive negative term at the top of the distribution.

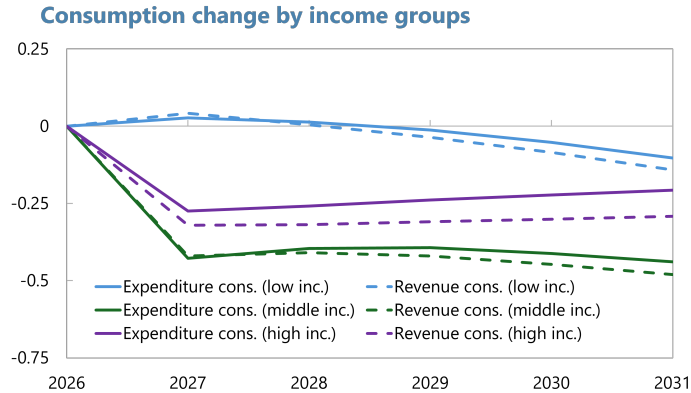
Figure 5: **Instrument Decomposition of Consumption Change Under ReC, by Income Group.**



Stacked bar charts decompose the annual change in consumption under the revenue-based consolidation scenario (ReC) into contributions from individual fiscal instruments (colours), with the black line showing the total. Bars below the horizontal axis denote negative contributions (instruments that reduce consumption); bars above the axis denote positive contributions. The labor-tax contribution dominates the negative response across all income groups, broadly reflecting its uniform incidence on wage income; the corporate-tax contribution adds a smaller but more progressive negative term that is largest at the top of the distribution; and the small TTR top-up (positive) is concentrated in the bottom decile.

Figure 6 brings the two scenarios together. The solid lines (ExC) show a steep but recoverable hit to the middle-income group, with the bottom-decile decline largely cushioned by TTR. The dashed lines (ReC) show a stronger incidence pattern on middle deciles and a deeper aggregate trough, with high- and middle-income households experiencing persistently lower consumption over the horizon. The contrast underscores that the distributional consequences of consolidation are not merely a side effect to be mitigated—they feed back into aggregate demand through MPC heterogeneity and are therefore central to the macroeconomic analysis, as Roldán (2025) formalizes in a model linking sovereign risk, aggregate demand, and inequality, and as Tran-Xuan (2026) confirms in a limited-commitment setting where distributional frictions make the optimal fiscal consolidation more gradual.

Figure 6: **Consumption Change by Income Group: Expenditure-Based vs. Revenue-Based Consolidation.**



Deviation of consumption from the unchanged-policies baseline for low-income (decile 1, blue/dashed-blue), middle-income (decile 5, green/dashed-green), and high-income (decile 10, purple/dashed-purple) households. Solid lines: expenditure-based consolidation (ExC). Dashed lines: revenue-based consolidation (ReC).

An additional channel that is crucial for the bottom decile, particularly under ExC, is the general equilibrium interaction between aggregate demand and labor market vulnerability—specifically, the employment–unemployment extensive margin—that is not captured by our model but can be quantitatively important. Our HANK framework models earnings risk through stochastic productivity shocks within continuous employment, so aggregate demand contractions compress wages and intensive-margin earnings but do not separate households

into employed and unemployed states. In reality, lower aggregate demand reduces labor demand, accelerates separations, and slows job-finding, with the resulting unemployment risk falling disproportionately on informal, part-time, and low-wage workers who are overrepresented in the bottom decile, a channel that [Balke \(2023\)](#) documents quantitatively in the context of sovereign risk, finding significant employment costs that are absent from models without an extensive labor market margin. These extensive-margin second-round effects imply that the true incidence of expenditure cuts on the bottom decile can be larger than our model accounting suggests, while under ReC the same channel amplifies the broad-based decline in wage income. A complementary HANK–search-and-matching framework that incorporates this extensive margin explicitly and analyzes alternative income-stabilization policies is developed in [Grancini, Poplawski-Ribeiro, and Smirnov \(2026\)](#), whose results reinforce the case for targeted transfer protection as a cost-effective buffer.

4.6 The Complementary Role of Structural Reforms

The two consolidation scenarios examined so far take potential growth as given. In practice, however, fiscal adjustment in high-debt euro area economies is rarely contemplated in isolation: the revamped EU fiscal framework explicitly recognizes growth-enhancing structural reforms as a complementary lever, and EU policy discussions consistently emphasize that durable debt reduction requires lifting the productivity frontier alongside fiscal effort. To assess how reforms reshape the picture, we layer onto the expenditure-based path a stylized productivity dividend—total factor productivity (TFP) gains of 0.1–0.2 percentage points per year over the consolidation horizon—and label the resulting scenario *ExC+SR*. The fiscal composition is identical to ExC; the only difference is the TFP profile, which is meant to capture, in reduced form, the cumulative impact of product- and labor-market reforms, deregulation, and other supply-side measures that gradually raise the productivity frontier.

Reform composition matters for both aggregate and distributional outcomes. The TFP gains modeled here are a reduced-form summary of what is, in reality, a heterogeneous set

of reform measures, each with its own transmission channel and distributional footprint. Domestic product- and labor-market deregulation typically raises TFP fastest but with the most contested incidence: lowering employment protection accelerates job reallocation toward more productive uses, but can in the short run compress the incomes of workers in protected sectors, who tend to be concentrated in the middle of the distribution. Single-market measures—harmonizing regulations across the EU, reducing intra-EU trade barriers, and deepening the capital markets union—generate gains that are more diffuse but distributed more broadly across sectors and household types, and that typically materialize over a longer horizon. Upskilling and active labor market policies are slower to feed into aggregate TFP but have a notably progressive incidence: by raising labor productivity at the lower end of the skill distribution, they deliver disproportionate income gains to the same hand-to-mouth households that bear the largest direct burden of expenditure-based consolidation. The implication is that the reform package paired with fiscal adjustment is itself a distributional policy choice, not just a growth lever: a reform mix that leans on single-market and upskilling measures will deliver a more progressive medium-term incidence than one that relies primarily on domestic deregulation, even if the aggregate TFP gain is similar in magnitude. The stylized productivity profile used in our ExC+SR scenario should therefore be read as an envelope across these alternatives; the macro and distributional results that follow describe the aggregate dividend, while the underlying choice of reform mix would shift the incidence around that aggregate.

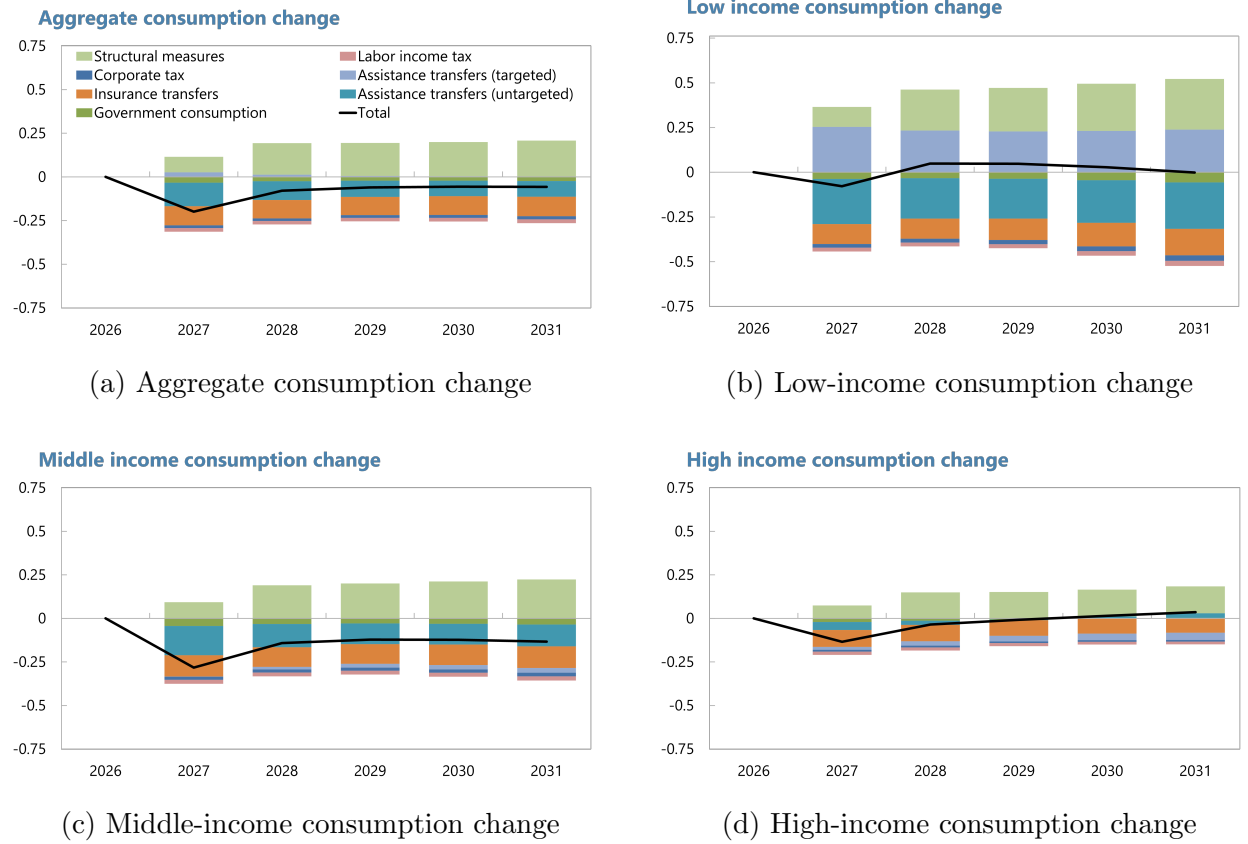
Macroeconomic effects. The TFP channel materially changes the macroeconomic trajectory of consolidation. Higher productivity raises the marginal product of both labor and capital, supports private investment, and gradually restores real wages. In our simulations, the output gap relative to unchanged policies turns mildly positive after year 2, in sharp contrast to the standalone ExC path on which output remains modestly below baseline throughout the horizon (Figure 3, green lines). Higher activity broadens the tax base, generating revenue feedback that reinforces the fiscal effort, while faster debt reduction triggers

a more pronounced compression of the sovereign risk premium. Cumulative investment over 2027–31 is several percentage points higher than under ExC alone, and the debt-to-GDP ratio reaches a lower level by the end of the horizon for the same headline fiscal effort. In this sense, structural reforms do not merely complement fiscal consolidation—they convert a contractionary adjustment into a growth-friendly one over the medium term.

Distributional effects. The productivity dividend has a markedly progressive incidence. Productivity gains raise labor demand and real wages, providing income support that is particularly valuable to hand-to-mouth households who depend on wage income and cannot benefit from capital gains. By year 4, our simulations imply that real wages under ExC+SR are approximately 0.2 percent higher than under the standalone ExC scenario. The consumption decline in lower deciles is substantially mitigated relative to ExC, even though consumption in those deciles remains modestly below the unchanged-policies baseline within the simulation horizon (Figure 7b). Because the bottom of the distribution earns a larger share of income from labor, the wage channel does relatively more work there than at the top, where consumption is supported less by current wages and more by smoothing against the unchanged-policies baseline. Additionally, this allows to substantially reduce the targeted transfers that are required to offset the impact of consolidation effort on the consumption of the poor.

Figure 7 decomposes the consumption response under ExC+SR into the contribution of each fiscal instrument and the structural/TFP channel. The light-green “Structural measures” bar grows steadily as a share of the total response over time, providing an increasingly important positive offset to the contractionary fiscal instruments. The TFP contribution is largest relative to the total for low-income households—confirming the wage-channel mechanism above—while the persistent negative contribution of insurance transfers (orange) reflects the steady-state level of the TI cut, partly cushioned for low-income deciles by the targeted assistance top-up (teal).

Figure 7: **Instrument Decomposition of Consumption Change Under ExC+SR, by Income Group.**



Stacked bar charts decompose the annual change in consumption into contributions from individual fiscal instruments (colours) and the structural/TFP channel (light green), with the black line showing the total. Bars below the horizontal axis denote negative contributions (instruments that reduce consumption); bars above the axis denote positive contributions (instruments that support consumption). Panels show aggregate consumption and three income sub-groups. The growing light-green (structural measures) bar over time captures the TFP dividend, which is largest relative to the total for low-income households because they depend on wage income and gain disproportionately from rising real wages. The persistent negative contribution of insurance transfers (orange) reflects the steady-state level of the TI cut, while targeted assistance transfers (teal, positive) provide a partial but durable offset for low-income households.

Taken together, these results suggest that ExC+SR dominates the standalone expenditure-based path on both growth and equity dimensions, and underline that the medium-term success of fiscal adjustment in high-debt euro area economies depends critically on the credibility and timeliness of the accompanying structural reform agenda.

4.7 Implications for Fiscal Design

The simulation results offer important insights for the design of fiscal adjustment:

Acting now is cheaper than waiting. Our model shows the status quo is not neutral. The cost-of-inaction analysis in Section 4.4 makes clear that delay is itself costly through the spread-debt feedback loop and crowding out of investment. Front-loaded consolidation activates the reduction of sovereign-spread channel earlier, generates larger and faster interest savings, and reduces the period during which the debt-feedback loop operates. Commitment to a durable path—rather than annual discretionary adjustments—is what generates the expectation effects that compress spreads and support investment: the gains from adjustment are larger precisely because credibility changes equilibrium spread dynamics from the outset, truncating the feedback loop before it compounds (Philippon and Roldán 2018). Under favorable conditions, this compression is strong enough that consolidation becomes expansionary on net, with crowding-in of private investment through lower spreads barring the strong contractionary alternative (Corsetti et al., 2013). As panels 3b and 3f illustrate, the ExC+SR scenario achieves the sharpest compression of both debt and interest payments over the horizon, consistent with this mechanism.

Composition of expenditure savings matters. Our model quantifies the growth cost of different expenditure cuts. Cutting transfers that go mainly to HtM and Wealthy HtM households imposes larger aggregate demand costs per unit of fiscal saving than cuts to spending that is partly smoothed by wealthy unconstrained recipients. Conversely, eliminating inefficient subsidies or reforming poorly targeted universal transfers costs relatively little in aggregate demand terms. The composition of the expenditure side of the budget matters as much as its overall size.

Public investment should be protected. Government investment is held constant across all our scenarios, consistent with the principle that growth-enhancing public capital should not be sacrificed for short-term fiscal arithmetic. In the model, private investment rises as debt falls (via lower spreads and higher Tobin’s Q), providing an endogenous growth

dividend that does not require new public capital expenditure. Protecting the public investment floor preserves the complementarity between public and private capital that underpins long-run growth.

Targeted transfers are fiscally cheap and distributionally powerful. A modest, well-directed increase in targeted assistance to the most vulnerable can largely offset the adverse distributional effects of transfer rationalisation at minimal net fiscal cost. This is the opposite of across-the-board transfer protection, which is fiscally expensive and poorly targeted. The model’s result that TTR is both fiscally cheap and distributionally powerful follows directly from the high MPCs of the households at the bottom of the distribution. Effective social protection systems that can scale up targeted assistance quickly—automatic stabilizers in the true sense—are therefore a key complement to structural consolidation.

Structural reforms shape both the aggregate impact of consolidation and its incidence. The dominance of expenditure-based consolidation paired with structural reforms (ExC+SR) over standalone fiscal paths is not simply about higher productivity raising aggregate output, which would be a near-tautology once a positive TFP profile is layered on. The stronger claim, established in Section 4.6, is that the TFP channel transmits primarily through real wages, so hand-to-mouth households at the bottom of the distribution benefit disproportionately, partially offsetting the regressive incidence of expenditure cuts. This distributional cushion also matters for the feasibility of the consolidation path itself: when inequality is high, debt sustainability is endogenous to the wealth distribution, and adjustment that leaves constrained households exposed enough undermines the plan’s own viability (Tran-Xuan 2026). The combination of expenditure rationalisation and targeted relief is therefore not only a welfare argument, it is what keeps the consolidation on a path the economy can sustain. The composition of the reform agenda further shapes who gains, with domestic deregulation, single-market deepening, and upskilling each delivering distinct distributional footprints for comparable aggregate productivity effects. The complementarity between fiscal consolidation and growth-enhancing reforms is also at the center of recent

IMF policy guidance for Europe (IMF 2025), which finds that a moderate reform package—including domestic reforms closing one quarter of the productivity gap with top-performers and first steps toward deepening the single market—can reduce cumulative adjustment needs by roughly 1.5 percentage points of GDP and bring debt paths materially closer to sustainability. The cost of inaction is most consequential here: the productivity dividend takes time to build, so delaying reforms compounds the cost of delayed fiscal action.

5 Conclusion

This paper provides an integrated quantitative framework for thinking about consolidation in high-debt advanced euro area economies. The analysis is built around two main consolidation scenarios that deliver the same headline fiscal effort but differ in composition—expenditure-based (ExC) and revenue-based (ReC)—and a complementary exercise in which the expenditure-based path is paired with growth-enhancing structural reforms (ExC+SR).

Comparing the two main scenarios, we find that consolidation strategies delivering the same headline fiscal effort can lead to materially different macroeconomic and distributional outcomes. Expenditure-based adjustment is associated with lower short-run output costs and faster debt reduction than revenue-based measures, reflecting lower fiscal multipliers and more favorable household incidence. By contrast, revenue-based consolidation—particularly through labor taxation—induces larger demand contractions, especially in economies with a high share of liquidity-constrained households and already-elevated taxation levels, as is the case for many high-debt euro area economies. The distributional incidence also differs: the burden under ExC is concentrated in the middle of the distribution where insurance and lump-sum transfers are largest, while under ReC the burden is more evenly spread but the aggregate decline is deeper. Across both, modest and well-targeted assistance to the most vulnerable households can substantially mitigate the cost in the bottom decile at minimal fiscal expense, while also supporting aggregate demand.

The additional exercise on structural reforms shows that complementing expenditure-based consolidation with sustained TFP gains can convert a contractionary adjustment into a growth-friendly one over the medium term. Higher productivity supports real incomes, investment, and the tax base, and the wage channel delivers disproportionate gains to hand-to-mouth households, making the package both more growth- and more equity-friendly. The composition of the reform agenda itself matters for who gains, with domestic deregulation, single-market deepening, and upskilling each delivering distinct distributional footprints for comparable aggregate productivity effects. Beyond confirming the static composition lessons familiar from the literature, our HANK-based framework underscores that in high-debt euro area economies, delaying adjustment is a costly policy stance through the sovereign-spread feedback channel, and that the choice of consolidation path is also a choice about the distribution of who bears its cost.

References

- [1] Anzoategui, D. (2022). Sovereign spreads and the effects of fiscal austerity. *Journal of International Economics*, 139, 103658.
- [2] Arellano, C., Bai, Y., and Mihalache, G. (2018). Default risk, sectoral reallocation, and persistent recessions. *Journal of International Economics*, 112, 182–199.
- [3] Arellano, C., Bai, Y., and Mihalache, G. (2026). Monetary policy and sovereign risk in emerging economies (NK-Default). *The Quarterly Journal of Economics*, 141(2), 1635–1703.
- [4] Arellano, C., Bai, Y., and Bocola, L. (2026). Sovereign default risk and firm heterogeneity. *Journal of the European Economic Association*, jvaf067.
- [5] Arroyo, C., & Tisnés, E. (2023). *What drives cross-country differences in the share of hand-to-mouth households?* (Working Paper). CEMFI.
- [6] Auclert, A., Bardóczy, B., Rognlie, M., & Straub, L. (2021). Using the sequence-space Jacobian to solve and estimate heterogeneous-agent models. *Econometrica*, 89(5), 2375–2408.
- [7] Auclert, A., Rognlie, M., & Straub, L. (2024). The intertemporal Keynesian cross. *Journal of Political Economy*, 132(12), 4068–4121.
- [8] Balke, N. (2023). *The employment cost of sovereign default*. Working Paper 2023-55, University of Chicago Becker Friedman Institute for Economics.
- [9] Bianchi, J., Ottonello, P., and Presno, I. (2023). Fiscal stimulus under sovereign risk. *Journal of Political Economy*, 131, 2328–2369.
- [10] Bilbiie, F. O. (2020). The New Keynesian cross. *Journal of Monetary Economics*, 114, 90–108.

- [11] Bocola, L. (2016). The pass-through of sovereign risk. *Journal of Political Economy*, 124, 879–926.
- [12] Calvo, G. A. (1983). Staggered prices in a utility-maximizing framework. *Journal of Monetary Economics*, 12(3), 383–398.
- [13] Corsetti, G., Kuester, K., Meier, A., & Müller, G. J. (2013). Sovereign risk, fiscal policy, and macroeconomic stability. *The Economic Journal*, 123, F99–F132.
- [14] de Ferra, S. and Romei, F. (2023). *Sovereign default in a monetary union*. Mimeo, University of Oxford.
- [15] Debortoli, D., & Galí, J. (2024). *Heterogeneity and aggregate fluctuations: Insights from TANK models* (NBER Working Paper No. 32557). National Bureau of Economic Research.
- [16] Drescher, K., Fessler, P., & Lindner, P. (2020). Helicopter money in Europe: New evidence on the marginal propensity to consume across European households. *Economics Letters*, 195, 109416.
- [17] Elenev, V., Landvoigt, T., & Van Nieuwerburgh, S. (2025). *The austerity threshold*. (NBER Working Paper 34397). National Bureau of Economic Research.
- [18] Grancini, S., Poplawski-Ribeiro, M., & Smirnov, D. (2026). *Welfare analysis of income-stabilization policies in a HANK model with unemployment risk* (IMF Working Paper). International Monetary Fund.
- [19] Hatchondo, J. C., Martinez, L., and Roch, F. (2020). *Constrained efficient borrowing with sovereign default risk* (IMF Working Paper 2020/227). International Monetary Fund.

- [20] Heathcote, J., Storesletten, K., & Violante, G. L. (2017). Optimal tax progressivity: An analytical framework. *Quarterly Journal of Economics*, 132(4), 1693–1754.
- [21] International Monetary Fund. (2024). *Fiscal monitor: Putting a lid on public debt*. International Monetary Fund.
- [22] International Monetary Fund, European Department. (2025). *How can Europe pay for things that it can't afford?* (IMF Note No. 2025/004). International Monetary Fund.
- [23] Kaplan, G., Violante, G. L., & Weidner, J. (2014). The wealthy hand-to-mouth. *Brookings Papers on Economic Activity*, 45(1), 77–153.
- [24] Kaplan, G., Moll, B., & Violante, G. L. (2018). Monetary policy according to HANK. *American Economic Review*, 108(3), 697–743.
- [25] Langot, F., Maillard, J., Malmberg, S., Tripier, F., & Hairault, J.-O. (2025). *Fiscal consolidation: Balancing growth, debt and inequality* (Working Paper). CEPREMAP.
- [26] Pamies, S., Carnot, N., & Pătăraș, A. (2021). *Do fundamentals explain differences between euro area sovereign interest rates?* (European Economy Discussion Paper No. 141). Directorate General Economic and Financial Affairs, European Commission.
- [27] Philippon, T. and Roldán, F. (2018). On the optimal speed of sovereign deleveraging with precautionary savings. *IMF Economic Review*, 66, 375–413.
- [28] Roldán, F. (2025). The aggregate-demand doom loop: Precautionary motives and the welfare costs of sovereign risk. *American Economic Journal: Macroeconomics*, 17(3), 160–204.
- [29] Rotemberg, J. J. (1982). Monopolistic price adjustment and aggregate output. *Review of Economic Studies*, 49(4), 517–531.

- [30] Tran-Xuan, M. (2026). *Sovereign debt sustainability and redistribution* (IMF Working Paper 2026/042). International Monetary Fund.

Annex: Robustness Checks

The quantitative results in the main text depend on two parameters whose empirical counterparts span a meaningful range: the sensitivity of the sovereign spread to the debt-to-GDP ratio (η), which governs the strength of the sovereign-spread feedback channel and therefore the additional size of consolidation; and the fraction of hand-to-mouth households, which governs aggregate MPCs and the strength of fiscal multipliers. We report robustness checks for both below.

A.1 Sensitivity of spread to debt (η)

As a robustness check, we recalibrate the model with alternative values of the parameter η (sensitivity of spread to debt-to-GDP), drawing on empirical estimates from various high-debt euro area economies. Following [Langot et al. \(2025\)](#)’s approach, we re-estimate the spread equation with an AR(1) residual, using the AMECO effective interest rate on government debt minus the ECB deposit facility rate as the spread, and the Eurostat debt-to-GDP ratio. We also draw on existing empirical estimates from [Pamies et al. \(2021\)](#).

Table 4: Alternative calibrations of η

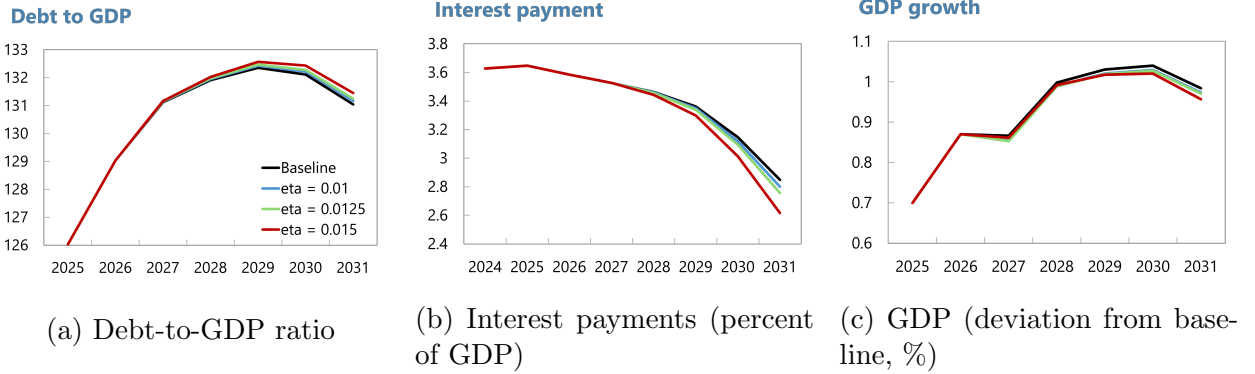
η	Source
0.0100	Pamies et al. (2021) , Graph 3, debt spline above 90% GDP
0.0125	Pamies et al. (2021) , Graph 3, quadratic marginal impact at debt $\approx 125\%$ GDP
0.0150	Own estimate, high-debt euro area economy, AMECO effective rate

Notes: We interpret the marginal-impact lines in Graph 3 of [Pamies et al. \(2021\)](#) as estimates of η , since they plot the additional spread (in bps) from a 1 pp increase in debt-to-GDP at different debt levels. Their spread is defined relative to the German Bund rather than the ECB policy rate as in our specification, so we use these values as approximate reference points for calibration.

Figure 8 illustrates the macro-fiscal response under the expenditure-based consolidation with structural reforms scenario (ExC+SR) across the baseline and three alternative calibrations of η . A larger η marginally amplifies the sovereign-spread compression triggered by debt reduction, generating slightly larger interest savings and a faster decline in the debt-

to-GDP ratio for the same headline fiscal effort. The qualitative ranking of consolidation outcomes is preserved across the range of η considered, indicating that the main results are robust to plausible variation in the strength of the spread-debt feedback channel.

Figure 8: **Macro-Fiscal Effects Under ExC+SR, Across Alternative Calibrations of η .**



Impulse responses under the expenditure-based consolidation scenario with structural reforms (ExC+SR) for three alternative values of the spread-debt sensitivity parameter η : 0.0100 (blue), 0.0125 (green), and 0.0150 (red), drawing on the empirical estimates in Table 4. A higher η generates a larger compression of the sovereign spread for the same debt reduction, translating into larger interest savings and a faster decline in the debt-to-GDP ratio. The qualitative profile of the consolidation response is preserved across calibrations.

A.2 Fraction of Hand-to-Mouth (HtM) households

The HtM share governs the aggregate MPC and the strength of fiscal multipliers in HANK models, and is therefore a critical input to any quantitative exercise. Following [Kaplan et al. \(2018\)](#), we distinguish *wealthy* HtM households (with positive illiquid wealth but a binding liquid borrowing constraint) from *poor* HtM households (with no assets of either type). Disciplining the HtM share empirically is, however, far from settled, and the literature broadly follows two complementary strategies.

The first is to estimate HtM shares directly from household-level micro data on liquid and illiquid wealth holdings, typically using the Household Finance and Consumption Survey (HFCS) for European economies or the Survey of Consumer Finances (SCF) for the United States. [Arroyo and Tisnés \(2023\)](#) provide the most comprehensive recent application of

this approach for Europe and document a striking regularity: cross-country differences in total HtM shares are driven almost entirely by differences in the share of *wealthy* HtM households, while the share of poor HtM is broadly similar across countries. They further show that observable differences in income risk, life-cycle earnings profiles, and retirement benefits cannot, on their own, account for the cross-country variation in WHtM, suggesting that the underlying determinants—likely financial frictions and country-specific institutional features—are difficult to capture in a single calibrated model and remain an active research agenda.

The second approach, which we adopt, is to target the aggregate marginal propensity to consume directly and let the HtM share and its composition emerge as endogenous model objects. The justification rests on a robust theoretical result: for the aggregate dynamics that are the focus of this paper, the average MPC is the sufficient statistic linking household heterogeneity to aggregate outcomes. [Debortoli and Galí \(2024\)](#) show that a simple two-agent New Keynesian (TANK) model with a constant share of constrained households—and hence a constant aggregate MPC—approximates the aggregate output dynamics of a quantitative HANK model very closely under standard calibrations. [Bilbiie \(2020\)](#) reinforces this conclusion analytically, expressing aggregate demand objects in HANK—the MPC out of aggregate income, fiscal and monetary multipliers, and forward-guidance multipliers—as closed-form functions of the average MPC and a small set of redistribution parameters. Targeting the aggregate MPC therefore pins down the model’s aggregate behavior even when the underlying composition of HtM households is not separately identified.

Our calibration follows this second route. As reported in [Section 3](#), we match an empirically estimated aggregate quarterly MPC of 0.44; the resulting steady-state HtM share is approximately 43 percent of all households, comprising 32 percent of households classified as wealthy HtM (holding illiquid assets but no liquid wealth) and 11 percent classified as poor HtM (with no assets of either type). These untargeted moments are within the range documented for high-debt euro area economies in [Arroyo and Tisnés \(2023\)](#), providing re-

assurance that the model’s implied wealth distribution is empirically plausible even though the HtM composition is not separately targeted. The distributional analysis in the main text should therefore be interpreted as conditional on the average-MPC calibration: an analysis that directly targeted the WHtM and PHtM shares would require additional identifying parameters (notably the borrowing limit and the functional form of the portfolio adjustment friction) as well as country-specific empirical inputs, and is left for future work.



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