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Inequality, Labour Market Dynamics and the Policy Mix: Insights from a FLANK

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August, 2025

Abstract

This paper develops a tractable heterogeneous-agent New Keynesian model with overlapping generations, labour market frictions, and a participation margin that allows households to permanently exit labour and financial markets. The interaction between wage bargaining and stochastic participation generates a structural labour wedge that flattens the Phillips Curve, distorting labour market outcomes and weakening the transmission of monetary policy. A stylised fiscal transfer reduces inequality across regimes, but its aggregate effects hinge on the monetary stance and the persistence of redistribution. Dovish monetary policy consistently amplifies the macroeconomic and welfare gains from redistribution—even when inequality paths are identical—revealing a structural complementarity between accommodative policy and fiscal transfers. These findings are robust across calibrations and reflect the model's endogenous propagation mechanisms rather than specific parameter choices.

Key Words: Heterogeneous Agents Models, Monetary Policy, Fiscal Policy, Inequality, Labour Market Frictions.
JEL Reference Number: E21, E24, E52, E62, D63, D91

Over the past decade, macroeconomic research has increasingly focused on the distributional effects of fiscal and monetary policy. This shift reflects a growing recognition—among researchers and policymakers alike—that inequality influences the transmission and effectiveness of stabilisation policies. Leading policymakers such as Yellen (2016), Carney (2016), and Powell (2020) have called for deeper analysis of these links, while institutions like the Bank of England have placed heterogeneity and redistribution at the heart of their research agendas[1]. At the same time, political leaders continue to emphasise the primacy of economic efficiency and growth. UK Prime Minister Keir Starmer recently declared that "growth is our number one priority," echoing similar positions from the Trump administration in the United States. Although framed in

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[1] See "The monetary toolkit," Bank of England Research Agenda 2024, forwarded by Governor Andrew Bailey.

terms of growth, these agendas reflect a broader policy orientation that prioritises employment and macroeconomic stabilisation over redistribution. This juxtaposition highlights a central policy tension: how to reconcile inequality-reducing measures with the goal of maximising macroeconomic efficiency.

This paper takes that tension as its starting point, examining whether redistributive fiscal interventions—such as temporary increases in government transfers—can be reconciled with inflation-targeting monetary policy regimes. The paper also explores how the effectiveness and welfare implications of such policies vary across different monetary stances.

To address these questions, the paper develops a tractable heterogeneous-agent framework in the tradition of the Blanchard (1985)–Yaari (1965) perpetual youth model, where households face probabilistic death and imperfect debt internalisation. Building on Galí (2021) and Bonchi & Nisticò (2024), the model introduces an additional, novel, source of heterogeneity: in each period, active households face a constant probability of becoming permanently inactive. Once inactive, agents permanently exit both the labour and financial markets, consuming only out of government transfers, and play no further role in production, saving, or future tax liabilities[2].

Unlike Bonchi & Nisticò (2024), who model (financial) market participation status as a two-stage Markov process with reversible transitions between active and inactive states, this paper assumes that once households become inactive, they exit the labour and financial markets permanently. This permanent status better captures long-term detachment and generates persistent heterogeneity in a time-invariant structure that supports tractable aggregation and welfare analysis. While stylised, the model avoids reliance on idiosyncratic income shocks or precautionary saving motives and retains closed-form expressions for key macroeconomic variables.

This framework offers a transparent alternative to more complex quantitative heterogenous-agent models such as Debortoli & Galí (2018), Challe (2020), or Gornemann et al. (2021), which embed uninsurable risk, search frictions, and/or capital heterogeneity. The paper also differs from Dolado et al. (2021), who study inequality under capital–skill complementarity and endogenous participation in a two-skill, heterogeneous-agent search framework with precautionary savings.

A key contribution of the framework is showing how participation frictions and wage bargaining jointly generate a persistent labour wedge that distorts the marginal cost of production and enters the New Keynesian Phillips Curve. This wedge flattens the inflation–output trade-off in a structural—not precautionary—manner, weakening the effectiveness of strict inflation targeting. These results, derived analytically in Propositions 1 and 7, highlight a novel channel through which fiscal and monetary policy interact in the presence of participation-based heterogeneity.

This mechanism is motivated by recent empirical evidence documenting a pronounced flattening of the Phillips Curve in advanced economies. For instance, Del Negro et al. (2020) find that since the 1990s, inflation has become much less responsive to real activity—a phenomenon they describe as a “flat aggregate supply curve.” Follow-up studies reinforce this pattern, suggesting that standard explanations such as labour market slack or improved anchoring of expectations are insufficient. The structural mechanism proposed

[2] This structure captures long-term exits due to disability, retirement, or discouragement. It is calibrated to match the empirically observed stock of inactive households (about 35%, similar to Krueger 2017).

here provides a microfounded explanation for this empirical flattening—one based on persistent participation frictions and nominal rigidity rather than incomplete markets or precautionary saving.

Labour market frictions are introduced using a search-and-matching (SAM) framework (Mortensen & Pissarides 1999), generating endogenous unemployment and wage determination via surplus-sharing. The participation margin interacts with these frictions, allowing redistribution to affect labour market tightness and employment composition. Wages are determined through Nash bargaining between individual workers and firms.

Nominal rigidities are incorporated following Blanchard & Galí (2007, 2010), with both price and wage stickiness included, as both are key features of real economies. The monetary authority follows a standard Taylor rule. The fiscal authority adjusts lump-sum taxes levied only on active households in response to deviations of the debt-to-GDP ratio from the steady-state target. In line with recent fiscal trends (Auerbach & Yagan 2025), the paper assumes a relatively passive fiscal stance, with debt rollovers favoured over immediate consolidation. Because taxation is lump-sum and labour supply is inelastic, redistribution does not generate efficiency losses through incentives or insurance channels (Aiyagari & McGrattan 1998). However, policy adjustments still redistribute wealth and consumption, generating relevant macroeconomic trade-offs.

To preserve analytical tractability, the model abstracts from aggregate risk and focuses on the perfect-foresight equilibrium path following a one-time, autocorrelated fiscal transfer shock. This shock—interpreted as a temporary increase in transfers to inactive households—induces redistribution without altering the long-run tax burden on future generations. The combination of logarithmic preferences and the absence of aggregate uncertainty ensures closed-form dynamics and near-linear aggregation. While introducing aggregate risk would allow for a richer analysis of volatility and model's dynamics, it would require relying exclusively on fully numerical methods—such as those developed by Krusell & Smith (1998) or Maliar et al. (2010)—which makes it more difficult to isolate and interpret the model's core transmission channels.

Consistent with results from the recent HANK literature (e.g., Auclert et al. 2024), the model shows that more accommodative monetary regimes raise efficiency-related outcomes such as output, employment, and consumption-even when direct redistribution alone fails to stimulate the macroeconomy. Section 3.5 computes the aggregate welfare consequences of the transfer shock along the transition path using a microfounded welfare metric derived in Appendix A.4.

To ensure that results are not calibration-driven, Appendix B.1 presents a steady-state sensitivity analysis with respect to debt levels, separation risk, bargaining power, and the share of active households. The model's main findings—regarding inequality, the aggregate effects of redistribution, and fiscal–monetary interaction—remain robust across these dimensions, underscoring that the results reflect structural features of the model rather than specific parameter choices. While the main focus of the paper is on the effects of the transfer shock on macroeconomic efficiency, Appendix B.2 also presents dynamic responses to a TFP shock, confirming the robustness of the results beyond the baseline fiscal intervention.

The remainder of the paper is structured as follows: Section 1 reviews the literature. Section 2 presents the model, calibration, and solution method. Section 3 discusses the results. Section 4 concludes.

1 Related Literature

First, the paper advances the macro-labour literature by exploring the interaction between frictional labour markets and policy frameworks. A substantial body of research has examined how monetary policy affects labour market dynamics, including seminal works by Hall (2003), Faia (2008), Christoffel et al. (2009), Blanchard & Galí (2010), Dennis & Kirsanova (2021), Komatsu (2023), and Cantore et al. (2022), among others. While most studies in this area focus on monetary policy, notable exceptions such as Cantore et al. (2014) and Lama & Medina (2019) analyse the impact of fiscal policy on unemployment and job creation. These contributions underscore how introducing search and matching (SAM) frictions in the labour market alters the transmission mechanisms of monetary and fiscal policies in response to aggregate shocks.

Second, the paper also contributes to the Overlapping Generations (OLG) literature built on the Blanchard (1985)-Yaari (1965) perpetual youth framework. This strand examines policy questions in settings that introduce heterogeneity while retaining analytical tractability. Seminal work includes Leith & Wren-Lewis (2000), Kirsanova et al. (2007), Leith & Von Thadden (2008), Rigon & Zanetti (2018), and Leith et al. (2019), who demonstrated that incorporating Non-Ricardian agents alters well-established results from the representative agent literature. More recent studies extend these frameworks by incorporating uninsurable idiosyncratic income risk and/or heterogeneity in marginal propensities to consume (MPC), offering a richer framework that better aligns with empirical dynamics observed in large-scale HANK models.

Prominent examples include the "Finite-Lifespan Agent New Keynesian" (FLANK) or OLG- NK frameworks of Galí (2021), Bonchi & Nisticò (2024), and Angeletos et al. (2024*a*,*b*), Beaudry et al. (2025), as well as the "OLG-HANK" models of Acharya & Dogra (2020), Acharya et al. (2023) and Karaferis et al. (2024)—which leverage finite lifespans that break the Ricardian equivalence, generating higher short-run MPCs. This feature makes these environments particularly useful for deriving policy insights in heterogeneous-agent environments. Moreover, these OLG frameworks are also closely related to the seminal work of Nistico (2016), which introduces heterogeneity through stochastic transitions in and out of financial markets. This mechanism generates disparities between savers and Hand-to-Mouth (HtM) consumers, similar to Bilbiie (2008), but also within the saver population itself. By highlighting financial wealth fluctuations as a driver of consumption dynamics, these models reveal policy trade-offs between output stabilization, inflation targeting, and inequality. Notably, they suggest that strict inflation targeting may be suboptimal in heterogeneous agent settings (see Auclert et al. 2024). However, to preserve analytical tractability, many studies in this strand adopt simplifying assumptions, such as degenerate wealth distributions or preferences that facilitate simple aggregation. As a result, these models primarily focus on qualitative differences between heterogeneous agent frameworks and their representative agent counterparts.

Third, the paper contributes to the emerging literature integrating search and matching (SAM) labour market frictions into Two-Agent New Keynesian (TANK) and tractable heterogeneous agent New Keynesian (THANK) models to better trace the dynamics observed in richer HANK models. Early contributions, including Ravn & Sterk (2017) and Debortoli & Galí (2018), explore how precautionary saving motives and uninsurable labour income risk influence monetary policy transmission and labour market fluctuations. More recent work by Cantore et al. (2022) and Komatsu (2023) incorporates SAM frictions into THANK or TANK models, enhancing the analysis of monetary policy transmission and its impact on inequality. Cantore et al. (2022), in particular, propose a THANK framework in which labour supply elasticity varies endogenously with household wealth, generating state-dependent responses to monetary policy shocks. Dolado et al. (2021), meanwhile, develop a heterogeneous agent model with high- and low-skilled workers and entrepreneurs, incorporating capital–skill complementarity and endogenous participation to analyse the distributional consequences of monetary policy. While Gornemann et al. (2021) examine how systematic monetary policy affects inequality in a fully-fledged HANK model. They show that dovish versus hawkish Taylor rule coefficients have meaningful redistributive implications and that conventional monetary rules can inadvertently favour richer households by stabilising their incomes more effectively. Relatedly, Challe (2020) studies optimal monetary policy in a zero-liquidity HANK model with uninsured unemployment risk, showing that monetary policy can act as implicit insurance even without fiscal intervention.

This paper synthesizes insights from these three strands by extending the framework of Galí (2021) to develop a "Two-Agent FLANK" model augmented with SAM frictions in the labour market. This approach enables a detailed exploration of the complex interplay between policy choices, inequality, and labour market frictions in response to one-time unanticipated aggregate shocks.

2 The model

The general framework presented below describes a New Keynesian economy augmented with an overlapping generations structure, following the Blanchard (1985)-Yaari (1965) (BY, henceforth) approach, and Search and Matching frictions in the labour market, in the Diamond-Mortensen-Pissarides tradition. The consumer side is modelled after Galí (2021) and Bonchi & Nisticò (2024), with a constant population size normalized to one. Each individual[3] faces a constant survival probability, γ, and a new cohort of size $(1-\gamma)$ enters the economy in each period. All active individuals participate in the labour and financial markets, but face a constant probability $(1-f)$ of transitioning to inactivity, where they permanently lose market access and rely solely on government transfers. At the beginning of each period all households—including those belonging to newly born cohorts— first discover their status (active or inactive) before making consumption and saving decisions. This allows for co-existence of active and inactive households in each period, with constant population shares of ξ and $(1-\xi)$, respectively. Dividends are equally distributed across active individuals but they are not internalised. Following Acharya et al. (2023) and Karaferis et al. (2024), active households smooth consumption using actuarial bonds, which are exchanged for government bonds through frictionless financial firms.

The model incorporates both price rigidity in the tradition of Rotemberg (1982) and wage rigidity following Hall (2003) and Blanchard & Galí (2007, 2010). The frictional labour market is modelled after Faia (2008) and Dennis & Kirsanova (2021), allowing for equilibrium unemployment. Fiscal policy raises revenue through lump-sum taxes levied only on active households to service government debt, finance unemployment benefits, and provide transfers to inactive households. Both monetary and fiscal authorities

[3]The terms 'individual', 'agent', consumer', and 'household' are all used interchangeably. The reason for this is that the model assumes a perfect insurance setup among individuals of the same cohort who also share the same idiosyncratic status (i.e. active or inactive). As such, this system gives us the advantage of examining collective behaviour within each cohort, rather than delving into the intricacies of individual behaviours.

follow simple rules governing the tax and interest rate dynamics.

2.1 Households

2.1.1 The Active Household Type

At any time t, an active or unrestricted[4] individual who belongs to the cohort born at time $s \leq t$ derives utility from real private consumption $c^u_{s|t}$. The paper index agents by $s \in [0,1]$ to refer to the cohort that they belong. Intuitively, s, marks the age of the cohort. The active household s 's optimisation problem is:

$$\max_{\left\{c^u_{s|t}\right\}_{t=0}^{\infty}} \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} u\left(c^u_{s|t}\right)$$

where, the period felicity takes the form

$$u\left(c^u_{s|t}\right) = \log\left(c^u_{s|t}\right)$$

Subject to time t budget constraint

$$P_t c^u_{s|t} + \tilde{P}^M_t \mathscr{A}^M_{s|t+1} + \tilde{P}^S_t \mathscr{A}^S_{s|t+1} = \begin{pmatrix} P_t n_t w_t h^u_{s|t} + P_t (1-n_t)\frac{b}{\xi} + P_t \frac{d_t}{\xi} - P_t \frac{T_t}{\xi} \\ + \left(1+\rho \tilde{P}^M_t\right) \cdot f \cdot \mathscr{A}^M_{s|t} + f \cdot \mathscr{A}^S_{s|t} \end{pmatrix}$$

where, $c^u_{s|t}$ is the period t consumption level of an active consumer who belongs to cohort s. $\tilde{P}^M_t$ and $\mathscr{A}^M_{s|t}$ are the price and the quantity of long-term actuarial bonds, respectively. Similarly, $\tilde{P}^S_t$ and $\mathscr{A}^S_{s|t}$ stands for the price and quantity of short-term actuarial bonds. Newly born individuals enter the market with zero bond holdings, $\mathscr{A}^M_{s|s} = \mathscr{A}^S_{s|s} = 0$. In the benchmark case, there is no fiscal transfer to newborns and/or wealth tax on existing households to ensure *ex ante* equality across all households as in Acharya et al. (2023) or Angeletos et al. (2024*a*,*b*). The paper omits this simplification to allow for the presence of both inter-generational wealth inequality as well as cross-sectional consumption/income inequality. All prices are taken as given by the households. As in Galí (2021), the aggregate labour supply is exogenous[5] and uniformly allocated across all cohorts. As such, the exogenous labour supply of any individual household is normalised to unity ($h^u_{s|t} = 1, \forall t, s$). Next, n_t, refers to the real employment rate. Every cohort has the same fraction of employed and unemployed households. As such, the paper does not include any cohort-specific index in the employment rate ($n^s_t \equiv n_t$). The aggregate dividends, d_t, are also uniformly distributed across all active cohorts but consumers do not internalise them. Consistent with the macro-labour literature, the paper assumes that for each generation, s, there is perfect insurance within type with respect to the idiosyncratic employment shock. This assumption is based on the premise that each household consists of multiple members who may not all (simultaneously) share the same employment status. Household members pool their resources together to ensure that each member consumes an equal amount. The unemployment benefit

[4]The paper uses, u, as a superscript to denote the variables associated with the unrestricted household.

[5]The assumption of exogenous labour supply resolves the well- known of problem of the PY frameworks that the individual labour supply is downward sloping. With, individuals who belong to older generations may exhibit negative labour supply. This issue only occurs when households make endogenous labour/leisure decisions and leisure is considered a normal good (see Ascari & Rankin 2007).

or replacement rate, b, is parametrised to correspond with the empirical evidence (see Shimer 2005). Finally, T_t stands for the period t level of the lump-sum tax, levied only on active households.

As in Leith et al. (2019) and Karaferis et al. (2024), before recasting the individual household s's budget constraint in real terms, the paper needs to introduce a measure of real assets of cohort s

$$\mathscr{W}^u_{s|t} = \frac{\left(1+\rho \tilde{P}^M_t\right) a^M_{s|t} + a^S_{s|t}}{(1+\pi_t)}$$

Where, $a^i_{s|t}$ is the ratio of the number of each type of assets to the price level given as

$$a^i_{s|t} = \frac{\mathscr{A}^{(i)}_{s|t}}{P_{t-1}}, i \in \{M, S\}$$

Intuitively, this measure of real assets of cohort s, $\mathscr{W}^u_{s|t}$, is the portfolio of real actuarial/private bonds held by an individual household belonging to cohort s. Then, the period t budget constraint in real terms takes the form

$$c^u_{s|t} + \frac{\gamma \cdot f}{R_t} \mathscr{W}^u_{s|t+1} = y^u_{s|t} + f \cdot \mathscr{W}^u_{s|t} \tag{1}$$

With the household s's net real non- financial income being denoted as

$$y^u_{s|t} = \frac{w_t n_t \xi}{\xi} + \frac{d_t}{\xi} + (1-n_t)\frac{b}{\xi} - \frac{T_t}{\xi} \tag{2}$$

As discussed above, solving the profit maximisation of the financial intermediaries yields the *ex-ante* real interest rate R_t ,

$$\frac{\gamma \cdot f}{R_t} = \tilde{P}^S_t (1+\pi_{t+1}). \tag{3}$$

and the price of the long-term actuarial bonds as

$$\tilde{P}^M_t \frac{R_t}{\gamma \cdot f} = \frac{\left(1+\rho \tilde{P}^M_{t+1}\right)}{(1+\pi_{t+1})} \tag{4}$$

With both asset prices being taken as given by any active individual. Now, solving the individual household s's optimisation problem yields the individual consumption Euler equation of a representative active agent who belongs to generation s

$$\Lambda^u_{s|t} = (\beta R_t) \Lambda^u_{s|t+1}$$

where,

$$\Lambda^u_{s|t} = \left(c^u_{s|t}\right)^{-1} \tag{5}$$

Thus, allowing us to rewrite the individual Euler equation in the more familiar form as:

$$\left(c^u_{s|t}\right)^{-1} = \beta R_t \left(c^u_{s|t+1}\right)^{-1} \tag{6}$$

Combining the individual household budget constraint, together with the individual Euler equation, and the no-arbitrage condition, yields the individual household s's consumption function

$$c_{s|t} = (1-\beta\gamma)\left(\gamma \cdot f \cdot \mathscr{W}_{s|t} + \zeta_{s|t}\right) \tag{7}$$

where, $\zeta_{s|t}$ represents generation s's human wealth, given as the discounted value of labour income and profits, where the effective discount factor accounts for the probability of survival, γ, as well the probability of becoming inactive, $(1-f)$:

$$\begin{aligned}\zeta_{s|t} &\equiv y_{s|t} + \sum_{k=1}^{\infty} (\gamma \cdot f)^k \prod_{l=0}^{k-1} \left(\frac{1}{R_{t+l}}\right) y_{s|t+k} \\ &= y_{s|t} + \left(\frac{\gamma \cdot f}{R_t}\right) \zeta_{s|t+1}\end{aligned} \tag{8}$$

2.1.2 The Inactive Household Type

Similarly, at any time t, there also exist inactive individuals or Rule-of-Thumbers[6] who belong to the generation born at time $s \leq t$. All constrained individuals are identical and hence, any inactive household s derives utility from real private consumption $c^r_{s|t}$.

Although homogeneous, they are indexed by their birth cohort $s \in [0,1]$. The optimisation problem of a representative inactive household born in period s is:

$$\max_{\left\{c^r_{s|t}\right\}_{t=s}^{\infty}} \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} u\left(c^r_{s|t}\right)$$

with period utility function

$$u\left(c^r_{s|t}\right) = \log\left(c^r_{s|t}\right)$$

subject to the time t real budget constraint:

$$c^r_{s|t} = \left(\frac{T^r_t}{1-\xi}\right) \tag{9}$$

As the budget constraint indicates, inactive households consume solely out of exogenous government transfers, distributed in lump-sum fashion. Because they have no access to either the labour market or financial assets, there is no income, consumption, or wealth heterogeneity within this group. The model's inactive population is intended to reflect structurally detached individuals who permanently exit both markets—such as long-term discouraged workers, disabled adults, or prime-age non-participants without savings. These groups are well documented in U.S. data (Bhutta et al. 2023), and are known to rely disproportionately on public transfers. Empirical evidence confirms that transfer-dependent households contribute non-trivially to

[6] The paper uses r as a superscript to denote variables associated with the Rule-of-Thumbers.

aggregate consumption despite reporting zero earnings and holding no financial assets (Melcangi & Sterk 2024). These households also exhibit high marginal propensities to consume out of transfers (Ganong & Noel 2019). Rather than assuming utility from home production or modelling endogenous non-participation, the model captures this behaviour via fixed transfers calibrated to match steady-state consumption inequality. This yields tractable but policy-relevant heterogeneity across households, while maintaining a clear distinction between constrained and optimising agents.

2.2 Financial Intermediaries

As in Acharya et al. (2023) and Karaferis et al. (2024), financial intermediaries operate in a perfectly competitive market. They are just an aggregation device in the sense, that financial firms make no profit and their only purpose is to trade actuarial bonds (households private assets) for government bonds with the same maturity. By definition, the real profit of intermediaries is the difference between total bonds and total amount of actuarial bonds in the economy in $t+1$,

$$\Pi = \left(1+\rho P_{t+1}^{M}\right) b_{t+1}^{M} + b_{t+1}^{S} - \left(1+\rho \tilde{P}_{t+1}^{M}\right) f \cdot \gamma a_{t+1}^{L} - f \cdot \gamma a_{t+1}^{S}, \tag{10}$$

where b_{t+1}^{J} are total government bonds and $f \cdot \gamma a_{t+1}^{J}$ are total actuarial bonds at time $t+1$, i.e. $f \cdot \gamma a_{t+1}^{J} = (1-\gamma) \sum_{s=-\infty}^{t+1} (f \cdot \gamma)^{t+1-s} a_{s|t+1}^{J}$. The intermediaries maximize (10) subject to the constraint,

$$-\tilde{P}_t^M a_{t+1}^M - \tilde{P}_t^S a_{t+1}^S + P_t^M b_{t+1}^M + P_t^S b_{t+1}^S \leqslant 0. \tag{11}$$

and the optimization yields

$$\frac{1}{\tilde{P}_t^S} = \frac{\left(1+\rho \tilde{P}_{t+1}^{M}\right)}{\tilde{P}_t^M}, \tag{12}$$

$$\tilde{P}_t^S = f \cdot \gamma \cdot P_t^S, \tag{13}$$

$$\frac{1}{P_t^S} = \frac{\left(1+\rho P_{t+1}^{M}\right)}{P_t^M}, \tag{14}$$

Notice that the intermediaries' profits are zero and the *ex ante* returns on short and long-bonds are equalized. However, as discussed in Karaferis et al. (2024), one should be careful to note that this does not imply that the *ex post* real interest rates will be equalized in the presence of one-off shocks to the perfect foresight equilibrium path.

The short-term nominal interest rate is denoted as,

$$\frac{1}{1+i_t} = P_t^S, \tag{15}$$

and the real interest rate is,

$$R_t = \frac{\gamma \cdot f}{\tilde{P}_t^S (1+\pi_{t+1})} = \frac{1}{P_t^S (1+\pi_{t+1})} = \frac{1+i_t}{1+\pi_{t+1}}. \tag{16}$$

2.3 Government

The government issues nominal long-term and short-term bonds, for which the maturity matches that of the actuarial bonds used by households. The government budget constraint in nominal terms takes the form

$$P_t^M \mathscr{B}_{t+1}^M + P_t^S \mathscr{B}_{t+1}^S = \left(1 + \rho P_t^M\right) \mathscr{B}_t^M + \mathscr{B}_t^S + P_t b\left(1 - n_t\right) + P_t T_t^r - P_t T_t$$

where P_t^M is price of long-term bonds, and P_t^S is price of short-term bonds. Tax revenue is collected using lump-sum taxes, $P_t T_t$. Taxes follow a simple rule specified below (see eq.(60)). The total unemployment subsidy paid by the government across unemployed households is $P_t b\left(1 - n_t\right)$. While, the total wealth transfer paid to non-participating households in each period, t, is denoted by T_t^r. The government budget constraint can be re-written in real terms as,

$$\left(1 + \pi_{t+1}\right) P_t^S B_{t+1} = B_t + b\left(1 - n_t\right) + T_t^r - T_t \tag{17}$$

where, B_t is a measure of the real value of the government's portfolio

$$B_t = \frac{\left(\left(1 + \rho P_t^M\right) b_t^M + b_t^S\right)}{\left(1 + \pi_t\right)} \tag{18}$$

and

$$b_t^J = \frac{\mathscr{B}_t^J}{P_{t-1}}, J \in \{M, S\}$$

For simplicity, the paper assumes that short-term government bonds are in zero net supply $\left(b_t^S = 0, \forall t\right)$ whilst, due to the inclusion of the tax rule, the equilibrium supply of long-term government bonds is given exogenously to correspond with the average annualised debt-to-GDP ratio observed in the data $\left(b^M = b^{M*}\right)$.

2.4 Aggregation and Market Clearing

Aggregate (per capita) variables are calculated as the weighted sum of individual variables across all cohorts for each type, adjusted by the proportion of that type in the overall population.

$$x_t = (1 - \gamma) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} x_{s|t}^u + \gamma(1 - f) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} x_{s|t}^r \tag{19}$$

$$= \xi \cdot x_t^u + (1 - \xi) \cdot x_t^r \tag{20}$$

Aggregation within each type proceeds as follows:

1. **For Active Households:**

$$\xi \cdot x_t^u = (1 - \gamma) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} x_{s|t}^u \tag{21}$$

This represents the contribution from individuals starting from cohort s up current time t, accounting for both the survival probability γ and the likelihood of remaining active f. The term $(1 - \gamma)$ accounts for newly born cohorts each period, while $(f \cdot \gamma)^{t-s}$ weights the contribution based on the time cohorts have been active.

2. **For Inactive Households:**

$$(1-\xi) \cdot x_t^r = \gamma(1-f) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} x_{s|t}^r \tag{22}$$

Inactive households include individuals who have transitioned from being active. The probability of being inactive by time t is captured by $\gamma(1-f)$, while each inactive cohort is weighted by $(f \cdot \gamma)^{t-s}$, reflecting the survival up to time t.

As such, aggregate (per capita) consumption is defined as

$$c_t = \xi \cdot c_t^u + (1-\xi) \cdot c_t^r \tag{23}$$

Similarly, the aggregate labour supply is

$$h_t = (1-\gamma) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} h_{s|t}^u + \gamma(1-f) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} h_{s|t}^u$$

For active households, the individual labour supply is exogenously fixed to unity $\left(h_{s|t}^u = 1, \forall t\right)$ whilst inactive households do not have access to the labour market $\left(h_{s|t}^{u^r} = 0, \forall t\right)$. However, for the labour market to clear, the aggregate labour supply must equal the aggregate labour demand, hence

$$h_t = \int_0^1 h_t(j)\, dj = \xi \tag{24}$$

Combining eq.(9) and eq.(2) and applying the aggregation rule (see eq.(19)) delivers the aggregate non-financial income as:

$$\begin{aligned} y_t &= w_t n_t \xi + d_t + (1-n_t)\, b + T_t^r \\ &= \xi \cdot y_t^u + (1-\xi) \cdot y_t^r \end{aligned}$$

Now, since actuarial bonds, $J = \{S, M\}$ are only held by the active household type and hence, the expression for the aggregate actuarial bonds is given as:

$$f \cdot \gamma \cdot a_t^J := (1-\gamma) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} a_{s|t}^J$$

Furthermore, in order to derive the aggregate budget constraint for the active household type, one needs to first compute $(1-\gamma)\sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} a_{s|t+1}^J$. Which takes the form

$$a_{t+1}^J = (1-\gamma) \sum_{s=-\infty}^{t} (f \cdot \gamma)^{t-s} a_{s|t+1}^J$$

Since newly born generations enter the market with zero assets $\left(a^J_{t+1|t+1}=0\right)$.

It also follows that,

$$f\cdot\gamma\cdot\mathscr{W}_t^u=(1-\gamma)\sum_{s=-\infty}^{t}(f\cdot\gamma)^{t-s}\mathscr{W}^u_{s|t}$$

$$\mathscr{W}^u_{t+1}=(1-\gamma)\sum_{s=-\infty}^{t}(f\cdot\gamma)^{t-s}\mathscr{W}^u_{s|t+1}$$

And, for the asset market to clear, it follows that the real value of the government portfolio (see eq.(18)) equals the real value of the private portfolio

$$B_t=f\cdot\gamma\cdot\mathscr{W}_t \tag{25}$$

Furthermore, the aggregate household budget constraint is derived by combining the budget constraint of each household type and applying the aggregation rule (see eq.(19)).

$$c_t+\frac{f\cdot\gamma}{R_t}\mathscr{W}^u_{t+1}=y_t+f\cdot\gamma\mathscr{W}_t^u-T_t \tag{26}$$

and, using the asset market clearing condition, I can re- write eq.(26)) as

$$c_t+\frac{1}{R_t}B_{t+1}=y_t+B_t-T_t \tag{27}$$

Now, combing eq.(27) with the government budget constrain eq.(17) yields the product market equilibrium condition. That is

$$c_t=\xi w_t n_t+d_t$$

As shown below in the firms' block, aggregate dividends (45) are given as

$$d_t=\left(1-\frac{\Phi}{2}\pi_t^2\right)Y_t-\xi w_t n_t-\kappa v_t$$

So, the aggregate resource constraint takes the familiar form

$$c_t=\left(1-\frac{\Phi}{2}\pi_t^2\right)Y_t-\kappa v_t \tag{28}$$

Finally, the aggregate consumption Euler Equation for the active population is given as

$$c_t^u=\frac{1}{\beta R_t}\left(c^u_{t+1}+\frac{(1-f\cdot\gamma)}{f\cdot\gamma}\frac{(1-\beta\gamma)}{\xi}B_{t+1}\right) \tag{29}$$

where, the aggregate consumption function of the active types takes the form

$$\xi\cdot c_t^u=(1-\beta\gamma)(f\cdot\gamma\cdot\mathscr{W}_t+\xi\cdot\zeta_t) \tag{30}$$

while, the aggregate human wealth $(\xi \cdot \zeta_t)$ of the active consumers is

$$\xi \cdot \zeta_t = \xi \cdot y_t^u + \left(\frac{f \cdot \gamma}{R_t}\right) \zeta_{t+1} \tag{31}$$

Equations (29)–(31) highlight that active households determine current consumption based on the discounted value of future consumption and their effective wealth. This includes both human wealth and financial assets. Although household intertemporal choices are shaped by the real interest rate, inflation enters these decisions more broadly: because financial wealth is held in nominal bonds and thus, changes in the price level alter the real value of bond holdings. As a result, inflation influences the real budget set and, by extension, the intertemporal allocation of consumption.

2.5 The Cross-Sectional Consumption Inequality Index

Following Debortoli & Galí (2018) and Komatsu (2023), the paper defines a simple measure for capturing the cross-sectional consumption inequality (S_t) as

$$S_t = 1 - \frac{c_t^r}{c_t^u} \tag{32}$$

With S_t capturing how the average consumption of inactive households relates to the average consumption of active households, ignoring their respective shares in the total population. If $S_t = 0$ it means that exogenous wealth transfer paid to inactive households is high enough to eliminate the cross-sectional inequality. In this case, the model still features non-trivial inequality but only among active generations. Whereas, if the probability of becoming inactive approaches zero then, the model collapses to the standard perpetual youth environment as described in Kirsanova et al. (2007), Rigon & Zanetti (2018) and Leith et al. (2019).

2.6 The Production Sector

There is a continuum of monopolistic competitive firms $j \in [0,1]$ with each firm producing a differentiated good j. Firms meet workers on a decentralised matching market. The labour relations are determined according to the standard Mortensen & Pissarides (1999) framework. Workers are hired from the unemployment pool whilst the searching process for a firm involves a fixed cost (κ). This means that there is free entry and any firm who is willing to pay this fixed cost can post vacancies. Workers' wages are determined through a Nash bargaining process which takes place on an individual basis. All active individuals have the same (exogenous) labour supply and thus, there is a single market wage regardless of the workers' cohort.

2.6.1 Search & Matching Frictions in the Labour Market

The description of the frictional labour market closely follows Dennis & Kirsanova (2021). The number of workers employed by firm j, with $j \in [0,1]$, is denoted by $n_t(j)$. At the end of each period, the number of workers employed by a specific firm (j) is determined by the number of retained employees from the previous period, adjusted for exogenous separations and new hires. The search for a worker involves a fixed cost, κ, and the probability of finding a worker depends on a **matching function** $(m(\bar{m}_t, u_t, v_t) \equiv m_t)$ that transforms unemployed agents (u_t) and vacancies (v_t) into matches:

$$m_t = \bar{m}_t (v_t)^{1-\omega} (u_t)^{\omega} \tag{33}$$

where, the **matching elasticity** with respect to unemployment is denoted by $\omega \in (0,1)$ and $\bar{m}_t$ is the matching efficiency. The matching efficiency takes the form:

$$\bar{m}_t = \bar{m} \cdot \exp(2 \cdot \mu \cdot (Y_t - Y_{t-1})) \tag{34}$$

where, $\bar{m}$ refers to the standard (exogenous) equilibrium matching efficiency. However, as in Komatsu (2023), the expression includes a cyclical component, $\exp(2 \cdot \mu \cdot (Y_t - Y_{t-1}))$. This component is included since many empirical studies have found that the matching efficiency tends to be quite pro-cyclical[7]. Labour market tightness (ϑ_t), is defined as the ratio of vacancies (v_t) to unemployment (u_t).

$$\vartheta_t = \frac{v_t}{u_t} \tag{35}$$

The variable ϑ_t is crucial as it reflects the health and efficiency of the labour market. Specifically, it determines two key probabilities: the job-filling rate $(q(\vartheta_t) \equiv q_t)$, indicating the likelihood of a firm's vacancy being filled, and the job-finding rate $(p(\vartheta_t) \equiv p_t)$, representing the probability that an unemployed worker will secure a job. These probabilities are defined as follows:

$$q(\vartheta_t) = \bar{m}_t (\vartheta_t)^{-\omega} \tag{36}$$

$$p(\vartheta_t) = \vartheta_t \cdot q(\vartheta_t) \tag{37}$$

Firms base their decisions on these rates, posting vacancies until the expected payoff from hiring equals the marginal costs. As such, the aggregate employment in the economy evolves over time as:

$$n_t = (1-\rho) n_{t-1} + q(\vartheta_t) \cdot v_t \tag{38}$$

While, the unemployment rate adjusts according to

$$u_t = 1 - (1-\rho) n_{t-1} \tag{39}$$

The transition dynamics in the labour market depends mainly on the **exogenous job separation rate** (ρ). As specified above, the labour market is homogeneous, as all active households have the same skills and supply the same hours regardless of their cohort. As a result, there is no need for cohort specific indexing and thus, $n_{s|t} \equiv n_t$ and $u_{s|t} \equiv u_t$. These relationships capture the dynamics of hiring, separations, and matching efficiency, which together define the evolution of employment and unemployment in the model.

[7]See Elsby et al. 2015 for a recent discussion on the relevant literature.

2.6.2 Firms

If the search process is successful then, the monopolistic firm operates following the production function

$$Y_t(j) = z_t \cdot n_t(j) \cdot h_t(j) \tag{40}$$

where, z_t is the aggregate level of productivity and $n_t(j) \cdot h_t(j)$ denotes the labour demand of firm j. With $n_t(j)$ being the number of the workers and $h_t(j)$ being the working hours demanded by firm j. Firms face quadratic adjustment costs $R(\cdot) = \frac{\Phi}{2} Y_t \left(\frac{P_t(j)}{P_{t-1}(j)} - 1\right)^2$ every time they wish to adjust their prices, as proposed by Rotemberg (1982).

Each intermediate firm j solves the following optimization problem:

$$\max_{\{P_t(j), n_t(j), v_t(j)\}} \Pi_t(j) = \sum_{t=0}^{\infty} (\beta)^t \frac{\Lambda^u_{s|t}}{\Lambda^u_0} \left(\left(\frac{P_t(j)}{P_t} Y_t(j) - w_t n_t(j) h_t(j) \right) - \frac{\Phi}{2} \left(\frac{P_t(j)}{P_{t-1}(j)} - 1 \right)^2 Y_t - \kappa v_t(j) \right)$$

where, $\Lambda^u_{s|t}$ the firms' discount factor comes from the solution of household s's optimisation problem (see eq.(5))).

Subject to

1. The monopolistic demand for its product,

$$Y_t(j) = Y_t \left(\frac{P_t(j)}{P_t} \right)^{-\varepsilon_t} \tag{41}$$

   Where, ε_t is the elasticity of substitution between intermediate varieties.

2. The law of motions of employment of firm (j) is given by:

$$n_t(j) = (1-\rho) \cdot n_{t-1}(j) + q_t(j) \cdot v_t(j) \tag{42}$$

where, mc_t captures the marginal cost of production, κ the real cost real cost of opening a new vacancy and μ_t captures the marginal cost of filling a vacancy.

Solving the firms' optimisation problem yield:

1. The New Keynesian Phillips Curve (NKPC)

$$\Phi(1+\pi_t)\pi_t Y_t = ((1-\varepsilon_t) + \varepsilon_t \cdot mc_t) Y_t + \beta \Phi \left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} (1+\pi_{t+1}) \pi_{t+1} Y_{t+1} \right) \tag{43}$$

2. The aggregate hiring condition :

$$\frac{\kappa}{q(\vartheta_t)} = (mc_t \cdot z_t - w_t) \cdot h_t + \beta(1-\rho)\left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} \frac{\kappa}{q(\vartheta_{t+1})}\right) \tag{44}$$

The hiring condition sets the expected cost of posting a vacancy equal to the expected benefits.

Finally, the profits of firm j, $\Pi_t(j)$ specified above, are uniformly distributed as dividends across active cohorts ($d^u_{s|t} = \frac{d_t}{\xi}$). Aggregate dividends, are given as

$$d_t = \int_0^1 \Pi_t(j)\, dj = \Pi_t$$

However, in anticipation of symmetric equilibrium, the subscript j is removed, so the aggregate dividends are

$$d_t = Y_t - \xi w_t n_t - \kappa v_t - \frac{\Phi}{2}\pi^2 Y_t \tag{45}$$

With, the aggregate output being:

$$Y_t = \xi \cdot z_t \cdot n_t \tag{46}$$

2.7 Bellman Equations and Nash Bargaining Over Wages

In each period, the real wage rate is determined through Nash bargaining between an individual worker and a firm. In period t, the value of a household with a member employed, belonging to cohort $s \leq t$, is represented by $V^E_{s|t}$. Conversely, the value of a household belonging to generation $s \leq t$, with a member unemployed is denoted by $V^U_{s|t}$.

$$V^E_{s|t} = w_t h^u_{s|t} + \beta\left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}}\left(\rho\,(1-p(\vartheta_{t+1}))\,V^U_{s|t+1} + (1-\rho\,(1-p(\vartheta_{t+1})))\,V^E_{s|t+1}\right)\right) \tag{47}$$

Here, ρ represents the exogenous job separation rate, and $p_t = \bar{m}_t(\theta_t)^{1-\omega}$ is the probability of finding a job. As noted by Faia (2008), the first term on the right-hand side of the equation represents the real benefit of the worker's real labour income. The second term reflects the discounted benefit for a household in cohort s that is employed in period t, considering the potential change in status to unemployment in period $t+1$.

On the other hand, the value of a household in cohort s with a member unemployed, denoted $V^U_{s|t}$, is given by:

$$V^U_{s|t} = \frac{b}{\xi} + \beta\left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}}\left((1-p(\vartheta_{t+1}))\,V^U_{s|t+1} + p(\vartheta_{t+1})V^E_{s|t+1}\right)\right) \tag{48}$$

The first term, $\frac{b}{\xi}$, represents the immediate real benefit of being unemployed. The second term reflects the discounted payoff for a household in cohort s that remains unemployed in period $t+1$, including the weighted change in value from potentially becoming employed in $t+1$.

The individual surplus of household s from the bargaining process, denoted $S^H_{s|t}$, is calculated as the difference between having an additional household member employed and having one unemployed:

$$\begin{aligned} S^H_{s|t} &= V^E_{s|t} - V^U_{s|t} \\ &= w_t h^u_{s|t} - \frac{b}{\xi} + \beta \frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} \Big((1-\rho)\,(1-p(\vartheta_{t+1}))\, S^H_{s|t+1} \Big) \end{aligned} \tag{49}$$

Now turning to the firm side, due to the symmetry in the firms' problem, the study assumes the existence of a representative firm and omits the firm-specific index. The value of an unallocated vacancy, V^V_t, is zero, while the value of an allocated vacancy, V^J_t, is given by:

$$V^J_t = (mc_t \cdot z_t - w_t) \cdot \xi + (1-\rho)\beta \left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} V^J_{t+1} \right) \tag{50}$$

In equilibrium, the value of posting a vacancy must be zero. Thus, using the aggregate hiring condition, the value of an allocated vacancy can be expressed as:

$$\frac{\kappa}{q_t} = (mc_t \cdot z_t - w_t) \cdot \xi + (1-\rho)\beta \left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} \frac{\kappa}{q_{t+1}} \right) \tag{51}$$

The firm's surplus from wage bargaining is:

$$S^F_t \equiv \frac{\kappa}{q_t} = (mc_t \cdot z_t - w_t) \cdot \xi + (1-\rho)\beta \left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} \frac{\kappa}{q_{t+1}} \right) \tag{52}$$

The first term represents the real profits from goods produced by hiring an additional worker. The second term reflects the payoff from not needing to fill a vacancy in the next period.

The wage bargaining problem is formulated as:

$$\max_{w_t} \Big(\varsigma \log\{S^H_{s|t}\} + (1-\varsigma) \log\{S^F_t\} \Big) \tag{53}$$

where ς is the worker's share of the joint surplus. Solving for the real wage yields:

1. The surplus-sharing rule from Nash bargaining:

$$S^F_t = \frac{1-\varsigma}{\varsigma} \cdot \xi \cdot S^H_{s|t} \tag{54}$$

   As the probability of becoming inactive approaches zero, eq. (54) simplifies to the standard surplus-sharing rule.

2. The real wage per worker, w_t, is a weighted average of the marginal revenue product, the cost of replacing the worker, and the worker's outside option:

$$w_t = \varsigma \cdot \left[mc_t \cdot z_t + \frac{\kappa}{\xi} \cdot \frac{1-\rho}{R_t} \cdot \vartheta_{t+1} \right] + (1-\varsigma) \cdot \frac{b}{\xi} \tag{55}$$

2.8 Wage Rigidity

As in Faia (2008), the paper follows the seminal approach of Hall (2003) and Blanchard & Galí (2007, 2010) to introduce wage rigidity in a parsimonious way. Namely, the prevailing wage rate for any period, t, is

$$w_t = \lambda \cdot w_t + (1-\lambda) \cdot w_{stst} \tag{56}$$

with $\lambda \in [0,1]$. That is, the current wage rate is calculated as a weighted sum of the wage that comes from the Nash bargaining between an individual worker and a firm and the steady-state wage rate. Hence, the current period, t, market wage can be re-written as:

$$w_t = \lambda \cdot \left[\varsigma \cdot \left[mc_t \cdot z_t + \frac{\kappa}{\xi} \frac{(1-\rho)}{R_t} \left(\left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} \right) \vartheta_{t+1} \right) \right] + (1-\varsigma) \frac{b}{\xi} \right] + (1-\lambda) \cdot w_{stst} \tag{57}$$

Equations (54)–(57) highlight how the decentralised wage reflects structural frictions in both search and participation. When the share of active households (ξ) is low, the match surplus from the firm's perspective rises, leading to higher equilibrium wages. This interaction introduces a novel complementarity between participation and bargaining power, with implications for both wage dispersion and marginal cost dynamics.

This mechanism is distinct from the transmission channels in models with incomplete markets, heterogeneous wealth accumulation or capital–labour complementarity. For example, Challe (2020) emphasises uninsured income risk, while Dolado et al. (2021) focus on skill-based wage differentials in the presence of search and capital heterogeneity. In contrast, the FLANK framework isolates a simple and yet empirically salient source of heterogeneity—stochastic participation—and embeds it within an analytically tractable environment with overlapping generations and nominal frictions.

This mechanism gives rise to a persistent and endogenous distortion in the labour market, captured by the following result[8]:

Proposition 1. *In the FLANK model with stochastic participation and SAM frictions in the labour market, the equilibrium labour wedge is strictly increasing in the participation rate (ξ) and in the worker's bargaining power (ς), and decreasing in the degree of wage rigidity (λ). Specifically, holding all else constant, the wedge is given by:*

$$\omega_t \equiv mc_t \cdot z_t - \frac{w_t}{\xi} \tag{58}$$

and depends on the share of active households, the surplus-sharing rule, and the persistence of wage deviations from the flexible benchmark.

[8] The complete proof of proposition 1 can be found in Appendix A.2.

This wedge, emerges independently of aggregate risk or wealth dispersion and plays a central role in shaping the inflation-efficiency trade-off. Its implications for monetary transmission and policy design are explored in Section 3.1.

2.9 Monetary Policy

Following Faia (2008) and Komatsu (2023), the paper assumes that the monetary authority follows a real interest rate reaction function of the form:

$$\log\left(\frac{R_t}{R}\right) = \phi_\pi \log\left(\frac{1+\pi_t}{1+\bar{\pi}^*}\right) + \phi_y \log\left(\frac{Y_t}{Y}\right) \tag{59}$$

In line with the literature, interest rate adjusts in response to a targeted variable deviation from the either the steady-state or the exogenous equilibrium target. Contrary to Faia (2008), this monetary rule omits both an explicit unemployment component and interest rate smoothing. Now, while it is true that including interest rate smoothing leads to higher welfare along the equilibrium path (see Schmitt-Grohé & Uribe 2007), it is often used as an apparatus to mimic optimal discretionary monetary policy and this is not the aim of this paper.

2.10 Fiscal Rule

Consistent with Leith & Von Thadden (2008) and Rigon & Zanetti (2018), the government adjusts lump-sum taxes following a simple rule[9]

$$T_t = \bar{T} + \phi_b\left(\frac{(1+\pi_{t+1})\,P_t^S B_{t+1}}{4Y_t} - \frac{(1+\pi^*)\,P^S B^*}{4Y}\right) \tag{60}$$

where $\bar{T}$ stands for the steady-state level of taxes, and $\phi_b > 0$ captures the reaction of taxation to outstanding debt. Fiscal policy described by eq.(60) implies that the government responds only to deviations of the annualised debt-to-GDP ratio from the exogenous steady-state target.

2.11 Competitive Equilibrium

The private sector equilibrium consists of sequences of prices $(\pi_t, P_t^M, w_t, mc_t)_{t=0}^{\infty}$, aggregate quantities $(c_t, c_t^u, c_t^r, S_t, Y_t, B_t^S, B_t^M, n_t, \vartheta_t, q_t, p_t, v_t, u_t)_{t=0}^{\infty}$ and policy instruments $(R_t, T_t, T_t^r)_{t=0}^{\infty}$ that satisfy the household's and firm's optimality conditions, the Nash bargaining, the government's budget constraint, the monetary and fiscal policy rules, the deterministic process for government transfers, aggregate technology, matching efficiency, and elasticity of substitution between intermediate varieties. Additionally, they also satisfy the aggregate hiring condition, aggregate employment, the job-finding and job-filling rates, the labour market tightness, the asset, labour and goods market clearing conditions|the asset pricing condition, the New Keynesian Phillips curve, the Euler and consumption equations and the transversality conditions.

[9]Unlike Leith & Von Thadden (2008) and Rigon & Zanetti (2018), the tax rule in this model responds to deviations of the annualised debt-to-GDP ratio from its exogenous target, rather than to deviations in the level of debt itself.

2.12 The Social Welfare Function

To derive a closed-form expression for the social welfare metric, it is first necessary to eliminate all inter-generational inequality among active households. The literature offers two primary approaches to address this. The first, developed by Leith et al. (2019) and grounded in the seminal work of Calvo & Obstfeld (1988), separates the inter-temporal and distributional components of welfare to facilitate aggregation. This paper adopts an alternative strategy, following Acharya et al. (2023) and Angeletos et al. (2024*a*,*b*), the study introduces a cohort-specific lump-sum tax/transfer system. This mechanism equalizes wealth across all active individuals within each period, ensuring identical consumption and saving choices. By eliminating inter-generational heterogeneity among active households, this approach simplifies the aggregation of preferences and allows the analysis to clearly focus on the trade-off between efficiency and cross-sectional equity.

The social welfare metric takes the form

$$W_0 = \sum_{t=0}^{\infty} \beta^t \left[\log(c_t^u) + (1-\xi)\cdot\log(1-S_t)\right] \tag{61}$$

The complete derivation of eq.(61) can be found in Appendix A.4.

2.13 Calibration and Simulations

The model is calibrated at a quarterly frequency to match key features of the U.S. economy. Most parameter choices follow Dennis & Kirsanova (2021). The key parameter values are presented in Table 1.

The household discount factor is $\beta = (1.02)^{-1/4}$, consistent with an annual real interest rate of 2%. The elasticity of substitution across goods is set to $\varepsilon = 11$ (Chari et al. 2000), implying a 10% steady-state markup.

Nominal rigidities are introduced via Rotemberg adjustment costs (Rotemberg 1982). Based on empirical evidence from Klenow & Kryvtsov (2008), Nakamura & Steinsson (2008), and Klenow & Malin (2010), prices change every 10 months on average, corresponding to a Rotemberg parameter $\Phi = 60$. This is consistent with Gavin et al. (2015). Wage rigidity follows Hall (2003) and Blanchard & Galí (2007), with $\lambda = 0.6$ (Faia 2008).

The survival probability is $\gamma = 0.996$, implying a 62.5-year post-entry lifespan (starting at age 18), consistent with SSA life tables.[10] Households also face a constant probability of becoming inactive. As in Bonchi & Nisticò (2024), inactive agents permanently lose access to labour and asset markets. Motivated by Krueger (2017), the transition probability is set to $1-f = 0.216\%$, implying a steady-state active population share of $\xi = 65\%$, in line with BLS data (series LNS11300000).

Labour market parameters follow Dennis & Kirsanova (2021). The separation rate is $\rho = 0.12$—a midpoint between Merz (1995) and Andolfatto (1996)—delivering a steady-state unemployment rate of 5.8%, consistent with BLS series LNS14000000. The matching elasticity is $\omega = 0.72$ (Shimer 2005), and the Hosios condition implies $\varsigma = \omega$. Matching efficiency is $\bar{\mu} = 0.66$, which yields $q \approx 0.67$ and $\theta \approx 0.97$.

[10]See www.ssa.gov.

Table 1: Calibration of the Baseline FLANK model

Description	Parameter	Value	Source
Household discount rate	β	$(1.02)^{-1/4}$	Data
Elasticity of substitution among goods	ε	11	Chari et al. (2000)
Price adjustment cost	Φ	59.11	Gavin et al. (2015)
Wage rigidity parameter	λ	0.6	Blanchard & Galí (2007, 2010)
Survival probability	γ	0.996	SSA data
Probability of becoming inactive	$1-f$	0.216%	See text
Active population share	ξ	65%	BLS data
Separation rate	ρ	0.12	Dennis & Kirsanova (2021)
Elasticity of the matching function	ω	0.72	Shimer (2005)
Bargaining power	ς	0.72	Shimer (2005)
Matching efficiency	$\bar{\mu}$	0.66	Dennis & Kirsanova (2021)
Replacement rate	$\frac{b}{h \cdot w}$	0.47	Nickell & Nunziata (2001), Shimer (2005)
Cost of posting a vacancy	$\frac{\kappa}{w \cdot h}$	0.2	Ljungqvist (2002)
Government transfers to inactive households	T^r	0.4819	Karabarbounis & Chodorow-Reich (2014)
Cyclicality of matching efficiency	μ	0;1	See text
Persistence of Total Productivity Shock	ρ_z	0.95	Bayer et al. (2020)
Persistence of Government Spending Shock	ρ_{tr}	0.97	See text
Steady-State Inflation target (p.a)	$\pi^{\star}$	0;2%	See text
Inflation reaction coefficient (Hawkish policy)	ϕ_{π}	1.5	Komatsu (2023), Taylor (1993)
Inflation reaction coefficient (Dovish policy)	ϕ_{π}	0.9	See text
Persistence of monetary policy states	π_{11}, π_{22}	1	See text
Fiscal response coefficient	ϕ_b	0.04	See text
Debt maturity (quarters)	m	20	Atlanta FED
Equilibrium Debt-to-GDP ratio (p.a.)	$\frac{P^M b^M}{4Y}$	46%	Atlanta FED, Leeper & Zhou (2021)
Alternative Debt-to-GDP ratio (p.a.)	$\frac{P^M b^M}{4Y}$	Up to 200%	See text
Persistence of Mit Shocks			
Government Spending Shock	ρ_{tr}	[0; 0.97]	Le Grand & Ragot (2023)
Total Factor Productivity	ρ_z	0.95	Bayer et al. (2020)

The replacement rate is set to $b/(h \cdot w) = 0.47$ (Nickell & Nunziata 2001, Shimer 2005). Vacancy posting costs are calibrated to $\kappa/(w \cdot h) = 0.2$ (Ljungqvist 2002). Transfers to inactive agents are set to 55% of pre-tax wages, targeting a Gini index of approximately 0.26 (Karabarbounis & Chodorow-Reich 2014). The benchmark sets matching efficiency cyclicality to zero ($\mu = 0$), but a pro-cyclical case ($\mu = 1$) is considered as in Elsby et al. (2015) and Hall & Schulhofer-Wohl (2018).

The persistence of exogenous processes is calibrated as follows: $\rho_z = 0.95$ and $\rho_{\varepsilon} = 0.9$ (productivity and substitution elasticity shocks), from Acharya et al. (2023) and Karaferis et al. (2024), using estimates in Bayer et al. (2020). Matching efficiency persistence is $\rho_{\mu} = 0.8$ (Dennis & Kirsanova 2021). While the benchmark persistence of the Transfers to the inactive, modelled as a government spending shock, is set $\rho_{tr} = 0.97$, reflecting institutional inertia in fiscal policy (Leith et al. 2019, Le Grand & Ragot 2023). However, as in Le Grand & Ragot (2023), the paper consider a range of values from 0.0 to 0.97 for the persistence of the government spending shock.

The monetary authority follows a simple inflation-targeting rule, excluding output stabilization (Faia 2008). The inflation coefficient is set to $\phi_{\pi} = 1.5$ (Taylor 1993, Komatsu 2023), satisfying the Taylor principle. For the dovish regime, $\phi_{\pi} = 0.9$. Policy regimes are fully persistent ($\pi_{11} = \pi_{22} = 1$), and perfectly observed by agents under perfect foresight.

The tax rule stabilizes debt via the parameter $\phi_b = 0.04$—the smallest value consistent with determinacy (Leith et al. 2019). This parameter choice reflects the growing passivity of U.S. fiscal policy, as noted by Blanchard (2019) and Auerbach & Yagan (2025). Debt maturity is set to $m = 20$ quarters (5 years), and the benchmark debt-to-GDP ratio is 46%, consistent with Leeper & Zhou (2021). Alternative calibrations consider ratios up to 200%, reflecting post-COVID fiscal conditions.

All computations in this study were conducted using the RISE© toolbox (Maih 2015). The model is first solved non-linearly for the perfect-foresight steady-state, then linearised using first-order perturbation methods to analyse its dynamics. As noted earlier, the model abstracts from aggregate risk, considering only a one-off unanticipated, autocorrelated aggregate shock to the perfect-foresight equilibrium path—commonly referred to as the MIT shock. After the initial impact, households regain perfect foresight. Due to structural similarities between the FLANK model and the nested representative-agent framework, these MIT shocks are introduced in the same fashion, following the approach of Boppart et al. (2018). This approach ensures transparency while preserving key transitional dynamics.

3 Discussion

This section synthesizes the main results of the paper, combining analytical insights and numerical experiments to examine how fiscal and monetary policies affect consumption, inequality, and macroeconomic dynamics in the FLANK model.

Monetary policy influences both inter-generational inequality—via interest rate effects on active households—and cross-sectional inequality between active and inactive agents. These channels are analytically tractable within the FLANK framework and show how heterogeneity and nominal frictions jointly shape the transmission of fiscal and monetary policies, even in the absence of aggregate risk.

The paper also shows that a temporary increase in fiscal transfers targeted at inactive households reduce cross-sectional inequality in the short-run. While this result is intuitive given the presence of rule-of-thumb consumers, its quantitative magnitude is shaped by the overlapping generations structure and the population share of active households.

To assess long-run effects, the paper compares steady-state allocations across three versions of the model: the baseline FLANK with stochastic inactivity, the nested representative-agent benchmark, and a version with only active agents (i.e., the Blanchard–Yaari model). These comparisons, summarised in Table 2, reveal how long-run outcomes depend on the inflation target, the debt-to-GDP ratio, and the sources of heterogeneity. Importantly, Appendix B.1 shows that these results are robust to alternative calibrations of key structural and fiscal parameters. The core macroeconomic and distributional patterns persist across plausible variations in debt, separation risk, bargaining power, and participation—highlighting their structural nature.

The analysis then turns to short-run dynamics. Abstracting from aggregate risk, the model focuses on the perfect foresight equilibrium path following a one-time, autocorrelated shock to government spending (in the form of transfers to inactive households). A positive fiscal transfer reduces inequality under all monetary regimes, but the macroeconomic response—output, consumption, and employment—varies systematically with the degree of inflation targeting and shock persistence. Cyclical movements in matching efficiency and their interaction with policy further validate the model's labour market structure and propagation channels.

These dynamics reflect deeper structural differences in how HANK models generate departures from representative-agent benchmarks. The FLANK model isolates marginal propensity heterogeneity via permanent market exit, whereas other frameworks (e.g. Challe 2020, Acharya et al. 2023, Karaferis et al. 2024) emphasise precautionary savings or incomplete insurance. While both approaches introduce heterogeneity, they operate through distinct mechanisms: the FLANK framework captures the behaviour of economically inactive, low-wealth households in a tractable manner without high-dimensional methods.

Building on these dynamics, Section 3.5 shows that more accommodative (dovish) monetary policy regimes consistently deliver higher aggregate welfare—even though the path of inequality remains largely invariant across regimes. These results highlight how monetary-fiscal interactions shape the macroeconomic effectiveness of redistribution. The complete derivation of the welfare function is provided in Appendix A.4.

Although the paper does not include optimal Ramsey policy, it illustrates how simple monetary rules interact with fiscal inertia, nominal frictions, and structural heterogeneity to generate meaningful trade-offs. In this environment, transfers are initially financed by debt and gradually offset through higher lump-sum taxes once the debt-to-GDP ratio exceeds its long-run target. This captures a stylised feature of real-world fiscal policy—especially in the U.S.—where redistribution tends to be front-loaded and consolidation is delayed (e.g. Ramey 2025, Blanchard 2019).

However, even without idiosyncratic risk, finite lifespans and incomplete debt internalisation generate non-Ricardian effects. Under a hawkish Taylor rule, higher real interest rates reduce the present value of labour income and bond wealth, lowering aggregate demand. These contractionary effects stem not only from standard Phillips curve logic, but also from the interaction of sticky prices, delayed fiscal adjustment, and participation heterogeneity.

A broader trade-off emerges: while redistribution is progressive and front-loaded, its macroeconomic effects depend on expectations and the stance of monetary policy. If policy leans aggressively against inflation or agents anticipate future tax hikes, the expansionary effects of transfers may be muted—even when MPCs are high. This complements recent concerns about the fragility of fiscal stimulus under monetary tightening (Blanchard 2019, Ramey 2025).

Importantly, the FLANK model also reveals a structural flattening of the Phillips Curve, as shown in Proposition 7. The labour wedge, driven by participation frictions and bargaining, weakens the sensitivity of inflation to both output and labour market distortions. Moreover, the model's overlapping generations structure implies that higher steady-state government debt raises the long-run real interest rate, which further flattens the NKPC and dampening the transmission of monetary policy. Thus, even under lump-sum taxes that do not directly distort labour supply, maintaining a low or moderate debt-to-GDP ratio can enhance the effectiveness of inflation stabilisation.

While Cantore et al. (2022) highlight how bargaining and matching shape monetary transmission, this paper shows that participation-driven heterogeneity generates additional policy interactions—especially between fiscal design and monetary rules—in a tractable heterogeneous-agent setting.

Finally, as demonstrated in Section 3.3, the inequality-reducing effect of transfers is robust across monetary regimes. However, the aggregate response—spanning output, employment, and consumption—varies systematically with monetary accommodation. These distributional and macroeconomic differences underscore the importance of policy coordination in economies with structural inequality. Supplemental Appendix B.2 extends the results to TFP shocks and discusses alternative disturbances including markup and matching efficiency shocks.

3.1 Policy Trade-offs and Inequality

This section analytically explores how changes in monetary and fiscal policy affect intra- and inter- generational inequality within the FLANK framework. To retain maximal tractability, the focus remains on the direct effects of policy changes, abstracting from feedback loops, to build intuition before turning to the insights of the numerical investigation. Since both monetary and fiscal authorities follow simple, rule-based policies, this setting allows for a transparent assessment of the distributional channels at play.

The model departs from Ricardian equivalence due to three key features: finite lifespans, government bonds in non-zero net supply, and the coexistence of two distinct household types (active and inactive) with different consumption behaviours. These features generate heterogeneity in the marginal propensities to consume (MPC) and highlight trade-offs in the transmission of policy.

In the absence of distortionary taxation and/or endogenous labour supply, fiscal policy redistributes resources across households through bond issuance and targeted transfers. While such redistribution does not directly affect aggregate efficiency, it can shift inequality across and within generations. The study examines these mechanisms by first focusing on monetary policy and then turning to fiscal redistribution.

3.1.1 Monetary Policy and Inequality

Monetary policy affects inequality through three well-known channels (Auclert 2019, Auclert et al. 2024): earnings heterogeneity, the Fisher channel, and interest rate exposure. Active households, who participate in labour and financial markets, experience direct effects through all three channels. In contrast, inactive households—permanently excluded from both markets—are only affected indirectly, primarily through inflation.

The earnings channel operates via changes in employment and wages. Lower real interest rates stimulate aggregate demand and reduce discount rates, encouraging hiring and raising the marginal product of labour. This boosts the non-financial income of active households, while inactive households remain unaffected due to their fixed transfers.

The interest rate exposure channel further distinguishes households by age. Older active cohorts hold more financial wealth and are therefore more sensitive to changes in bond valuations. This is result is easily observable when comparing the effect of an interest rate change on the consumption of a newly born household compared to the effect of on the consumption of any other generation. Proposition 2 formalizes this heterogeneity in sensitivity across generations:

Proposition 2. *Even among active households, a change in the real interest rate has heterogeneous effects due to generational differences:*

$$\frac{\partial}{\partial R_t} c^u_{s|t} \neq \frac{\partial}{\partial R_t} c^u_{t|t} \quad \textit{for } s \neq t$$

Newborn agents—entering the market with no financial wealth—adjust their consumption in response to shifts in expected income and borrowing costs. In contrast, older cohorts revalue existing assets, creating asymmetric consumption responses across generations.

Inactive households, by contrast, consume entirely out of fixed transfers and do not hold assets. As such, they are unaffected directly by interest rate changes:

Proposition 3. *A change in the real interest rate does not directly impact the consumption of inactive agents:*

$$\frac{\partial}{\partial R_t} c^r_{s|t} = \frac{\partial}{\partial R_t} T^r_t = 0, \quad \forall t$$

3.1.2 Aggregate Consumption Effects of Monetary Policy

At the aggregate level, the direct effects of monetary policy are concentrated among active households. Since these agents face no exogenous binding credit constraints and share a common elasticity of inter-temporal substitution, they respond like permanent income consumers:

Proposition 4. *A change in the real interest rate affects aggregate consumption of active households proportionally:*

$$\frac{\partial c^u_t}{c^u_t} = -\frac{\partial R_t}{R_t}$$

Inactive households' consumption remains unaffected:

$$\frac{\partial}{\partial R_t} c^r_t = 0$$

Hence, the per capita effect on total consumption is simply the active agents' response scaled by their population share. Proposition 5 below formalises this result.

Proposition 5. *The direct effect of an interest rate change on per capita (total) consumption depends on how it impacts the consumption of the active agents scaled by the share of this household type (ξ) in the total population.*

$$\frac{\partial}{\partial R_t} c_t = \xi \cdot \frac{\partial}{\partial R_t} c^u_t$$

3.1.3 Fiscal Policy and Redistribution

Fiscal policy redistributes income through government debt issuance and transfers to inactive and unemployed households. Under the fiscal rule, lump-sum taxes on active agents adjust residually to maintain debt sustainability. This structure creates offsetting forces: bond issuance raises active households' wealth, but this is partially undone by higher taxes.

Inactive households, by contrast, respond one-for-one to changes in transfers due to their hand-to-mouth nature. This creates a clear lever for reducing cross-sectional consumption inequality:

Proposition 6. *An increase in transfers to inactive households reduces cross-sectional inequality:*

$$\frac{\partial}{\partial T_t^r} S_t = -\frac{1}{c_t^u}\left(\frac{1}{(1-\xi)} + \Omega_t\right) < 0 \tag{62}$$

where,

$$\Omega_t = (1 - S_t)\left[\frac{(1-\beta\gamma)}{\xi}\left(\frac{\phi_b}{\phi_b + 4Y_t}\right)\right]$$

The magnitude of this inequality reduction depends on the size of the OLG channel, the share of active agents, and the responsiveness of taxes to debt dynamics. With greater MPC dispersion amplifying these effects.

In summary, monetary policy operates primarily through the active population, with heterogeneous responses by age and asset position. Fiscal policy, especially via transfers to the inactive, offers a direct tool for managing cross-sectional inequality without distorting labour supply. These trade-offs—between inter-temporal smoothing, redistribution, and generational equity—will be further explored in the numerical results that follow.

3.1.4 Inflation Dynamics, Labour Wedges, and Policy Trade-Offs

This section connects the structural labour market distortion identified in Proposition 1 to the inflation-efficiency trade-off captured by the New Keynesian Phillips Curve (NKPC).

The FLANK model introduces a novel wedge in the labour market that arises independently of aggregate risk or wealth dispersion. This mechanism–rooted in stochastic participation and wage bargaining under search and matching frictions–differs from those in models with incomplete markets, such as Challe (2020), or capital-skill complementarity, as in Dolado et al. (2021). Instead, the FLANK framework isolates a transparent source of heterogeneity and embeds it within an analytically tractable environment with overlapping generations and nominal rigidities.

This wedge plays a key role in shaping both the transmission and design of monetary policy. The presence of participation frictions introduces a persistent and endogenous distortion, captured in Proposition 1. This wedge affects the marginal cost of production and thus, enters the Phillips Curve, even in the absence of wealth heterogeneity. Since the NKPC that arises from Rotemberg (1982) is non-linear and thus, deriving an intuitive analytical expression for its slope is not straightforward. However, since the quantitative analysis is conducted using a first-order perturbation method, it is reasonable to consider the log-linearised NKPC to better understand the policy trade-offs.

Proposition 7. *Under Rotemberg pricing, the log-linearised New Keynesian Phillips Curve in the FLANK model is given by:*

$$\Pi_t = \Gamma_Y Y_t + \Gamma_\nu \nu_t + \Gamma_\varepsilon \varepsilon_t - \Gamma_z z_t + tip_t$$

where all coefficients $\Gamma_Y, \Gamma_\nu, \Gamma_\varepsilon, \Gamma_z$ are non-negative, and tip_t collects forward-looking terms in $\vartheta_{t+1}, \Pi_{t+1}, Y_{t+1}$.

The slope of the Phillips Curve with respect to contemporaneous output is:

$$\frac{\partial \Pi_t}{\partial Y_t} = \Gamma_Y = \frac{\Omega F + \Phi\Omega \cdot \phi_y}{1 - \Phi\Omega \cdot \phi_\pi},$$

and with respect to the labour market wedge:

$$\frac{\partial \Pi_t}{\partial \nu_t} = \Gamma_\nu = \frac{1}{1 - \Phi\Omega \cdot \phi_\pi} \cdot \frac{\varepsilon \cdot mc}{\Phi(2\Pi - 1)\Pi} \cdot \frac{\xi}{\xi - \varsigma} \cdot \frac{\nu}{mc \cdot z}.$$

As $\Phi\Omega \cdot \phi_\pi \to 1$, both $\Gamma_Y \to -\infty$ and $\Gamma_\nu \to -\infty$,highlighting potential macroeconomic instability and a worsening of labour market conditions under strict inflation targeting. The flatter slope of the NKPC in FLANK is structurally determined by the participation margin ξ, bargaining power ς, and wage rigidity, independently of wealth heterogeneity.

Proposition 7 highlights a structural flattening of the Phillips Curve in the FLANK environment. The participation margin, bargaining power, and wage rigidity jointly reduce inflation's responsiveness to real activity. Importantly, aggressive inflation targeting ($\phi_\pi \to 1$) can destabilise inflation due to amplification via $\Phi\Omega$, especially when labour wedges are large.

Moreover, the interaction with fiscal policy is non-trivial. In the FLANK model, the long-run real interest rate is:

$$R = \frac{1}{\beta}\left(1 + \frac{1}{c^u} \cdot \frac{1 - f\gamma}{f\gamma} \cdot \frac{1 - \beta\gamma}{\xi} B\right), \quad B = P^M b.$$

As $B \to \infty \Rightarrow R \to \infty \Rightarrow \Phi\Omega \to -\infty$, both $\Gamma_Y, \Gamma_\nu \to 0$. This implies that setting a low target for steady-state government debt may be optimal. While higher (lump-sum) taxes reduce cross-sectional inequality, without directly distorting the labour supply, they also dampen aggregate demand. Thus, flatting the Phillips Curve and diminishing the effectiveness of monetary policy to stabilise inflation. The overlapping generations structure in FLANK thus generates a novel complementarity between fiscal and monetary policy: even absent distortionary taxation, the long-run debt position affects inflation dynamics by influencing the slope of the NKPC and thus, the effectiveness of monetary transmission.

The complete proofs of Propositions 2 through 7 are provided in Appendix A.2.

3.2 Steady-State Allocations and Labour Market Equilibrium

This section examines the model's steady-state allocations, comparing the RANK with the traditional FLANK (without stochastic transitions into inactivity) or Blanchard–Yaari (BY) model, and the benchmark FLANK (with stochastic transitions into inactivity) environments. Both monetary and fiscal policies use rule-based approaches, so the steady-state values for inflation and the debt-to-GDP ratio are set exogenously. Additionally, due to the presence of labour market frictions, the separation rate (ρ), workers' bargaining power (ς) and matching efficiency ($\bar{m}$) are also fixed.

Table 2 presents the steady-state outcomes for inflation targets of $\pi^* = 0\%$ and $\pi^* = 2\%$ per annum across three model variants: RANK (columns I–II), FLANK without inactivity (III–IV), and the main FLANK with stochastic inactivity (V–VI), under a common calibration for labour market and public debt.

Table 2: Steady-State: RANK vs. FLANK

Model Specification						
Parameter	**RANK**		**FLANK**			
	I	**II**	**III**	**IV**	**V**	**VI**
Prob. of Survival (γ)	1	1	0.996	0.996	0.996	0.996
Prob. of Inactivity ($1-f$)	0	0	0	0	0.0022	0.0022
Share of Active Households (ξ)	1	1	1	1	0.65	0.65
Steady-State Variables						
Inflation Target (%, p.a.)	0	2	0	2	0	2
Debt-to-GDP (%, p.a.)	46	46	46	46	46	46
Lump-sum Tax (T)	0.03283	0.03282	0.03295	0.03294	0.19035	0.19034
Aggregate Output (Y)	0.94076	0.94079	0.94076	0.94079	0.61146	0.61147
Aggregate Consumption (C)	0.91128	0.90992	0.91128	0.90992	0.59243	0.59199
Real Interest Rate (R)	1.00503	1.00503	1.00509	1.00509	1.00517	1.00517
Nominal Rate (I)	1.00503	1.01001	1.00509	1.01008	1.00517	1.01016
Asset Prices (P^M)	19.90	18.10311	19.87277	18.08043	19.84146	18.05436
Employment Rate (n)	0.94076	0.94079	0.94076	0.94079	0.94033	0.94034
Searching (u)	0.17213	0.17210	0.17213	0.17211	0.17251	0.17250
Vacancy Rate (v)	0.16830	0.16838	0.16830	0.16837	0.16706	0.16710
Job-Filling Rate (p)	0.65586	0.65597	0.65585	0.65596	0.65410	0.65415
Job-Finding Rate (q)	0.67076	0.67049	0.67079	0.67051	0.67542	0.67528
Tightness (θ)	0.97778	0.97834	0.97772	0.97829	0.96843	0.96871
Real Wage Rate (w)	0.87660	0.87685	0.87658	0.87684	0.87679	0.87692
Cross-Sectional Inequality (S)	1.00000	1.00000	1.00000	1.00000	0.26067	0.25990

As expected, without the stochastic transition to inactivity ($f = \xi = 1$), the differences across the traditional BY model and the nested RANK are quantitatively small. Still, the assumption of finite-lived agents ($\gamma < 1$) coupled with positive steady-state government debt breaks Ricardian equivalence and causes the equilibrium real interest rate to exceed the rate of time preference ($R > \frac{1}{\beta}$). These differences become more pronounced as the size of the active population decreases.

For our main calibration, labour market outcomes align with empirical US averages. The benchmark FLANK model yields a steady-state unemployment rate of approximately 5.97%, roughly matching the historical quarterly average of 5.8% (BLS series LNS14000000). The model also predicts that around 17% of the labour force is actively searching in the long-run equilibrium. This variable refers to workers that are actively looking for jobs at the start of the period regardless of their employment status. And, given that the FLANK model results in higher equilibrium unemployment, it naturally reports a higher steady-state of job searching.

The steady-state production technology is normalised to one. Consequently, output is determined by the employment rate (eq. (46)) and the share of active households (ξ). The RANK and BY models generate higher steady-state output than the benchmark FLANK, due to a greater fraction of households participating in the labour market.

Inflation targets affect inequality by differentially impacting borrowers and savers. Higher inflation reduces the real value of transfers, hurting inactive agents, but lowers the debt burden for younger active households. Since older, asset-rich active cohorts dominate, the net effect is a modest reduction in cross-sectional inequality at higher inflation targets.

Importantly, additional sensitivity exercises in Appendix B.1 confirm that these steady-state allocations are robust to alternative calibrations. Varying debt levels, separation rates, bargaining power, and the active population share does not materially alter the qualitative patterns observed in Table 2. This reinforces that the results stem from the model's structural features—such as inelastic labour supply, exogenous participation, and non-distortionary taxation—rather than from specific parameter values.

Overall, the FLANK model introduces realistic trade-offs in macroeconomic and distributional outcomes, setting the stage for the dynamic policy analysis that follows.

3.3 Dynamic Responses

This section analyses the perfect foresight equilibrium path following a one-time, positive, and autocorrelated shock to government spending, modelled as a temporary increase in transfers to inactive households. The framework abstracts from aggregate risk and follows the standard MIT shock approach (see Leith et al. 2019; Acharya et al. 2023; Angeletos et al. 2024*a*,*b*; Karaferis et al. 2024, among others), with agents regaining perfect foresight immediately after impact.

Figure 1 shows the responses under four different levels of shock persistence: fully transitory ($\rho_{tr} = 0$), low ($\rho_{tr} = 0.1$), medium ($\rho_{tr} = 0.5$), and high ($\rho_{tr} = 0.97$). The fiscal response coefficient ϕ_b is kept below one throughout, allowing government debt to evolve almost like a random walk—consistent with post-Covid fiscal behaviour (see Ramey 2025) and the theoretical results of Leith et al. (2019).

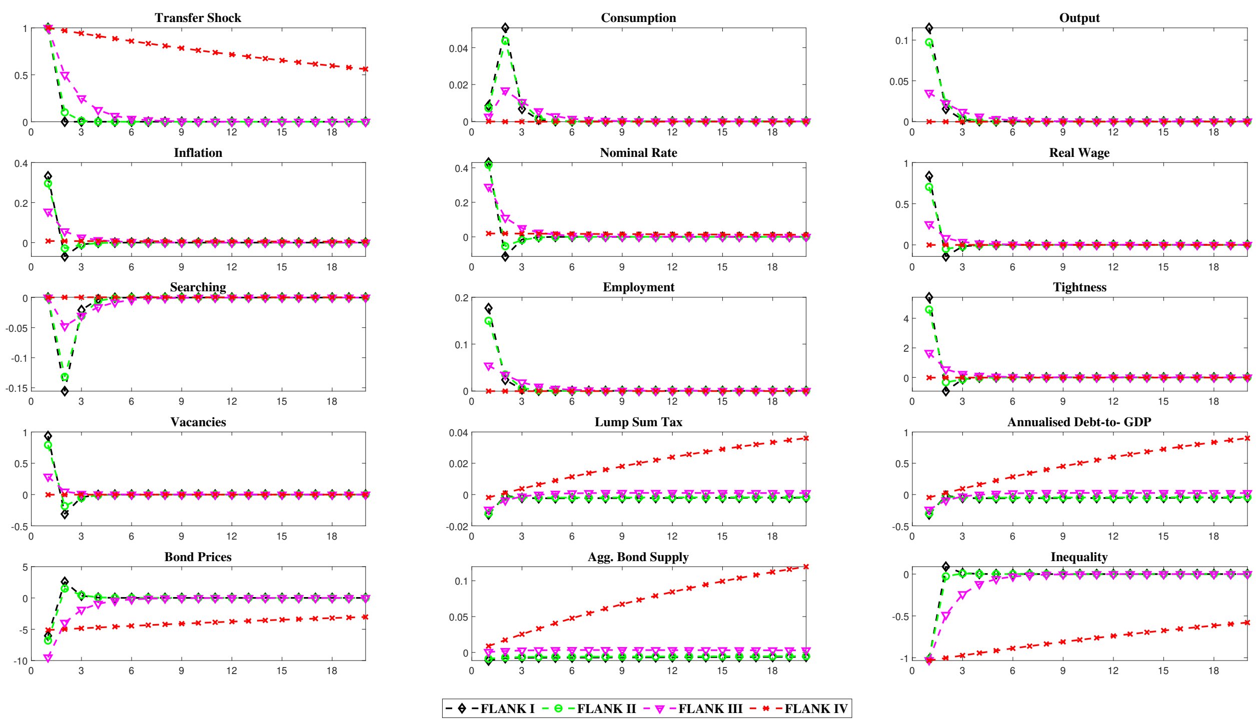

Figure 1: Dynamic responses to a one-time positive transfer shock. FLANK I: fully transitory ($\rho_{tr} = 0$). FLANK II: low persistence ($\rho_{tr} = 0.1$). FLANK III: medium persistence ($\rho_{tr} = 0.5$). FLANK IV: high persistence ($\rho_{tr} = 0.97$).

The initial impact of the transfer uniformly reduces cross-sectional inequality, as inactive households receive a proportional increase in income. However, as the persistence of the fiscal shock rises, its ability to stimulate the macroeconomy diminishes. When transfers are transitory or mildly persistent, aggregate consumption rises: debt accumulation is short-lived, taxes remain low, and active households smooth consumption. In contrast, highly persistent transfers result in sustained debt accumulation that eventually triggers the fiscal rule. Once the debt-GDP ratio exceeds its steady-state target, lump-sum taxes begin to rise, reducing disposable income and offsetting the initial stimulus.

While households are forward-looking, finite lifetimes imply that future taxes are only partially internalised, generating the familiar Non-Ricardian effects typically found in OLG models. Even without inactive types, mortality and gradual fiscal adjustment dampen the aggregate consumption response. The introduction of a participation margin attenuates the response further since active households anticipate a constant probability of exiting labour and financial markets altogether. These two sources of discounting—death and inactivity—are jointly captured by the consumption function and Euler equation for active types, helping explain the muted response of aggregate demand under persistent direct redistribution.

As a result, the consumption dynamics diverge from standard HANK models. Government debt raises active households' financial wealth, while anticipated tax increases reduce the present value of their lifetime income. Inactive households, by contrast, benefit unambiguously: transfers raise permanent income, irrespective of expectations. These asymmetries are magnified under slow fiscal adjustment and underscore the role of the policy mix.

These patterns are reinforced by the endogenous labour wedge highlighted in Proposition 1. As shown in Proposition 7, this wedge directly enters the Phillips Curve and dampens the sensitivity of inflation to output and employment. When fiscal transfers are persistent, the associated increase in public debt raises the long-run interest rate, further flattening the NKPC and weakening the inflationary impact of demand-side policies. Thus, the subdued inflation response under persistent redistribution is not only a monetary phenomenon but also reflects the structural frictions embedded in the labour market.

Consistent with the empirical literature (e.g., Elsby et al. 2015; Hall & Schulhofer-Wohl 2018), expansionary shocks that raise aggregate demand lead firms to expand hiring, increasing vacancies, matching, and employment. As job-finding improves, unemployment falls. Conversely, when the stimulus is dampened—due to high persistence or hawkish monetary policy—vacancies and matches fall, and unemployment rises.

Real wages respond pro-cyclically, consistent with Mortensen & Pissarides (1999). Wages rise in expansions and fall during downturns, but wage rigidity slows their return to steady state. Inflation does not directly enter wage-setting as in the standard New Keynesian model; instead, it works through firm marginal costs and bargaining outcomes.

Inflation responses vary with the persistence of the shock. Low-persistence transfers create a sharp but short-lived boost to output and inflation, triggering more aggressive monetary tightening. Highly persistent transfers generate slower inflation dynamics and smaller interest rate movements.

Beyond its effect on policy rates, inflation shapes real activity through multiple general equilibrium channels. Under Rotemberg pricing, price adjustment costs create time-varying markups that affect the wedge between marginal cost and the real wage (see Galí 2015). In the presence of search frictions and Nash bargaining, these markup dynamics influence vacancy posting and employment. Inflation also erodes the real value of nominal bond holdings, compressing the effective budget set of active households and lowering consumption (see Auclert 2019, Auclert et al. 2024). Finally, inflation enters the Euler equation through the real interest rate, shaping intertemporal choices even in a deterministic setting. These mechanisms together explain the regime-dependent macroeconomic effects of redistribution observed in the model.

3.4 Cyclicality of the Equilibrium Matching Efficiency

Empirical evidence suggests that matching efficiency varies with the business cycle. Using JOLTS data (2001–2013), Elsby et al. (2015) document strong pro-cyclicality in matching efficiency across 17 U.S. industrial sectors, with a sharp rebound following the Great Recession. Hall & Schulhofer-Wohl (2018) report similar patterns. Motivated by this evidence, this subsection examines the role of pro-cyclical matching within the FLANK framework.

The analysis begins with a one-time, nearly transitory ($\rho_{tr} = 0.1$), transfer shock to inactive households. Figure 2 compares two scenarios: one with a-cyclical matching efficiency ($\mu = 0$), and another with pro-cyclical matching ($\mu = 1$).

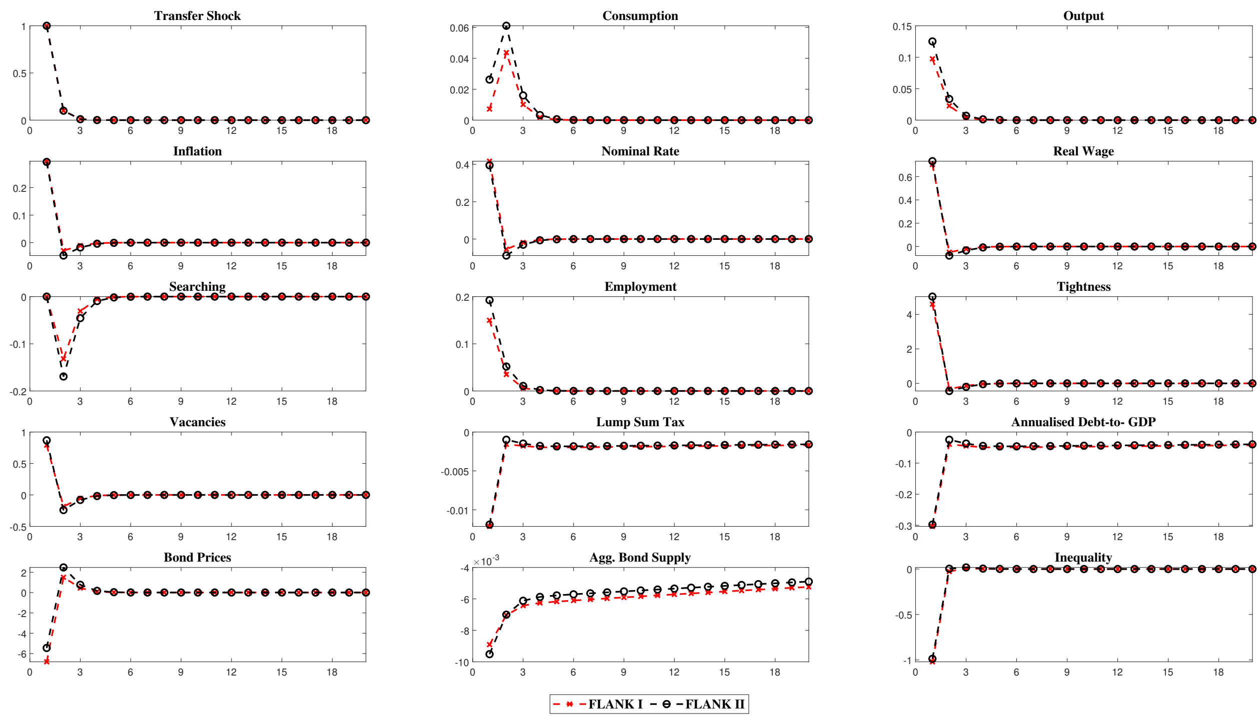

Figure 2: Response to a one-time transfer shock. FLANK I: low persistence ($\rho_{tr} = 0.1$) and a-cyclical matching ($\mu = 0$); FLANK II: pro-cyclical matching ($\mu = 1$).

When matching efficiency is pro-cyclical, the labour market adjusts more elastically: even at unchanged vacancy and unemployment levels, more matches are formed, leading to a sharper rise in employment. Output increases by approximately 25% more than in the a-cyclical case, and labour market tightness rises faster. Searching intensity also declines more quickly and remains subdued for longer, driven by faster job-finding and higher employment retention. Amplified consumption demand leads to stronger inflation and a more pronounced real interest rate response.

Despite this real-side amplification, inequality remains largely unaffected. Inactive (Keynesian) households consume fixed transfers and are insulated from interest rate or price fluctuations, rendering short-run cross-sectional inequality dynamics insensitive to labour market frictions.

The analysis then turns to a highly persistent shock ($\rho_{tr} = 0.97$), shown in Figure 3. The same two matching regimes are compared.

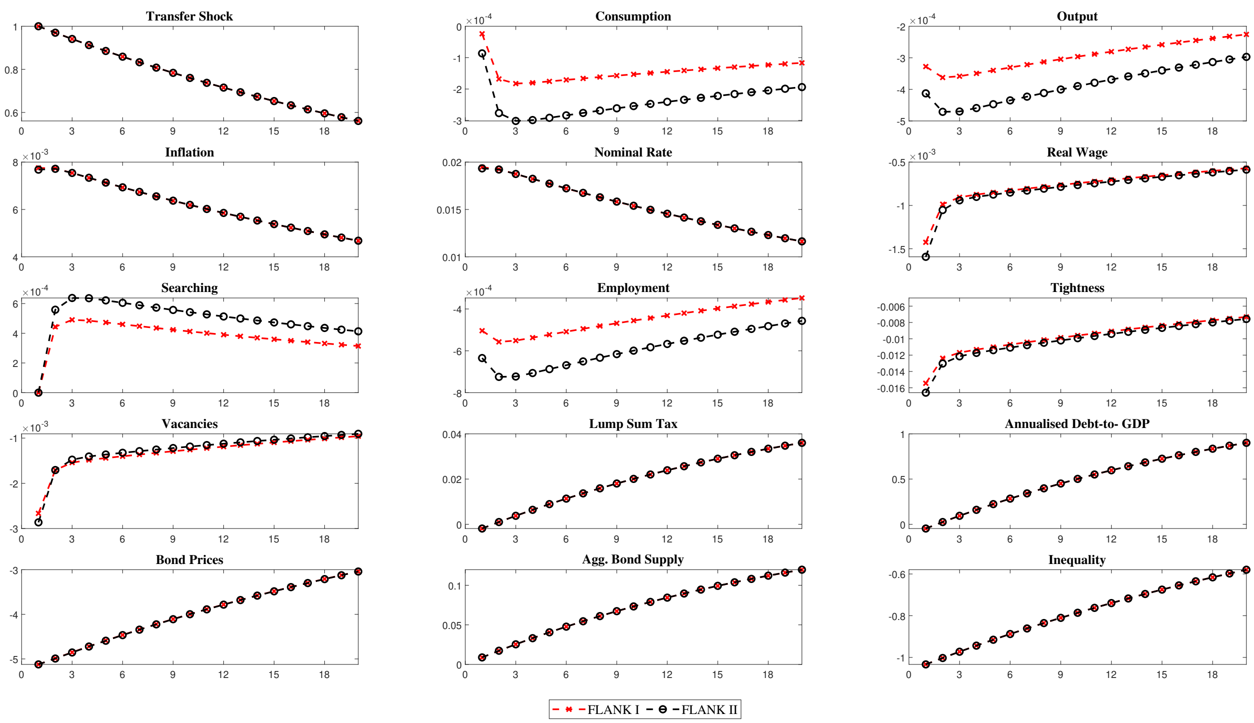

Figure 3: Response to a one-time transfer shock. FLANK I: high persistence ($\rho_{tr} = 0.97$) and a-cyclical matching ($\mu = 0$); FLANK II: pro-cyclical matching ($\mu = 1$).

Under high persistence, the government Transfer shock becomes contractionary, especially when matching is pro-cyclical. With higher government debt and an active monetary response ($\phi_\pi > 1$), interest rates rise, and private demand is crowded out. Output, consumption, and employment decline. This aligns with findings in Ramey (2025), who argue that fiscal transfers may reduce activity when persistent deficits raise debt service costs.

While inequality initially declines due to the direct transfer, the effect is short-lived. With pro-cyclical matching, deteriorating labour market conditions dominate: vacancy postings fall, successful matches decline, and unemployment rises. Wages fall alongside inflation and the interest rate, though less sharply than in the transitory case.

All in all, the cyclicality of matching efficiency significantly shapes the transmission of fiscal policy. When the shock is transitory, pro-cyclical matching amplifies the stimulus—raising employment, output, and labour market tightness. When the shock is persistent, those same mechanisms reinforce the contractionary dynamics triggered by tighter fiscal and monetary conditions. In both cases, the effects on inequality remain muted, as hand-to-mouth consumers are unaffected by interest rate dynamics and asset price movements.

Hawkish vs Dovish Monetary Policy

Recent advances in the HANK literature emphasize that strict inflation targeting may be suboptimal in the presence of household heterogeneity and financial market incompleteness. Building on this insight, this section compares the effects of fiscal transfers under two alternative monetary policy stances: a "hawkish" regime ($\phi_\pi = 1.5$) and a "dovish" regime ($\phi_\pi = 0.9$). The policy regime follows a fully persistent two-state Markov process, which is known to all agents and incorporated into their decision-making under perfect foresight.

Although the inflation coefficient ϕ_π does not alter the model's steady state, it has first-order implications for the transitional dynamics. Following an unanticipated government spending shock at time $t = 0$, all households condition expectations on the observed regime and forecast accordingly. Monetary policy is conducted via a standard Taylor-type rule, and fiscal policy adjusts slowly (with $\phi_b < 1$), allowing debt to follow an approximate random walk.

Figures 4 and 5 display dynamic responses to a low-persistence fiscal shock ($\rho_{tr} = 0.1$) and a high-persistence shock ($\rho_{tr} = 0.97$) under both monetary regimes.

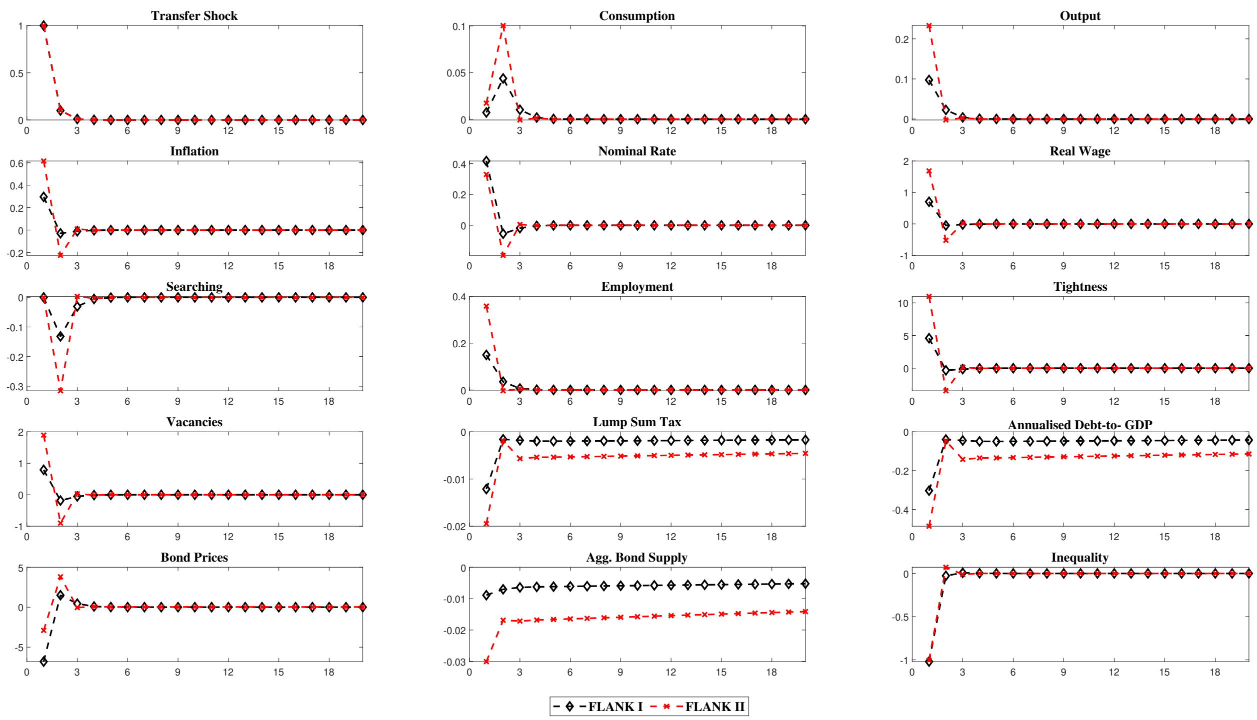

Figure 4: Dynamic responses to a one-off transfer shock with low persistence ($\rho_{tr} = 0.1$). Hawkish ($\phi_\pi = 1.5$) vs. Dovish ($\phi_\pi = 0.9$) monetary policy.

Across both scenarios, the stance of monetary policy has limited impact on inequality dynamics but significant consequences for the output, employment, and consumption path. In the case of a transitory fiscal shock, both regimes produce short-run output gains, but the dovish policy stance yields significantly stronger macroeconomic performance. The real interest rate rises by less, reducing the inter-temporal distortion faced by active consumers. Aggregate demand expands more robustly, encouraging vacancy creation, employment gains, and higher consumption. Since taxation is lump-sum and labour is inelastic, the policy does not distort labour supply directly, but it does affect lifetime wealth and, hence, consumption-savings decisions.

As the persistence of the spending shock increases, so does the fiscal burden—via greater issuance of government debt and higher taxes required for solvency. Since the fiscal authority issues bonds with longer maturities, the rise in interest rates induces valuation effects, as emphasized by Leeper & Leith (2016), Auclert (2019), Auclert et al. (2024). Even though taxation is lump-sum and labour supply is inelastic, the fiscal drag leads to a demand-driven contraction. Figure 5 shows that under both regimes, output and employment fall relative to the transitory case, but the contraction is notably milder under the dovish policy.

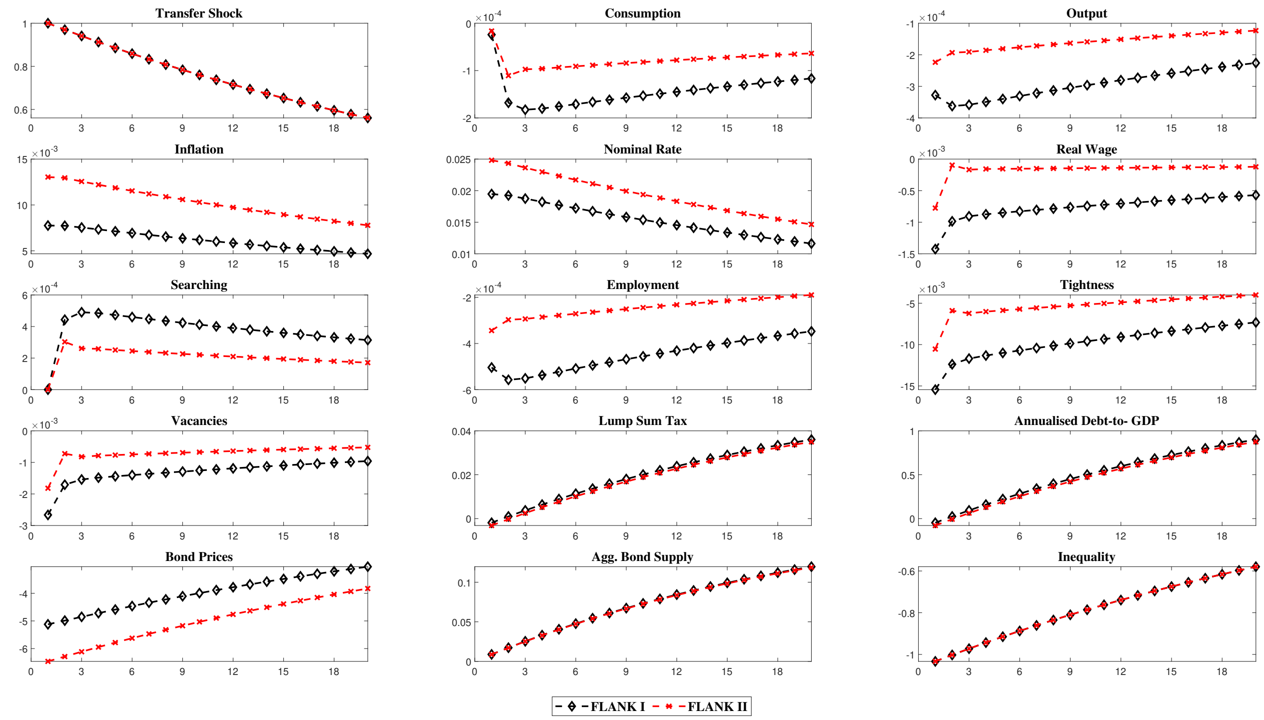

Figure 5: Dynamic responses to a one-off transfer shock with high persistence ($\rho_{tr} = 0.97$). Hawkish ($\phi_\pi = 1.5$) vs. Dovish ($\phi_\pi = 0.9$) monetary policy.

The labour market adjusts more elastically under dovish policy: vacancy posting is stronger, matching rates improve, and unemployment falls more quickly. Market tightness rises faster, and the search pool shrinks accordingly. Nonetheless, the presence of nominal rigidities implies that real wages return to steady state only gradually, amplifying differences across monetary regimes. Importantly, these dynamics occur despite the absence of distortionary taxation or endogenous labour supply responses.

These differences are amplified by the structural flattening of the Phillips Curve derived in Proposition 7. The labour wedge—linked to participation frictions and wage bargaining—enters the NKPC and weakens the sensitivity of inflation to output and labour market dynamics. As a result, the contractionary impulse under hawkish policy is magnified, whereas a dovish stance allows more of the fiscal stimulus to pass through to real activity.

The effect on inequality remains minimal in both regimes. Inactive agents—by design—do not participate in asset or labour markets and are thus insulated from interest rate and inflation fluctuations. Their consumption tracks the transfer path closely. Consequently, the implications of alternative monetary stances are driven almost entirely by macroeconomic efficiency: higher output path, smoother transitions, and lower consumption volatility for active consumers.

While monetary policy does not affect the steady state, it critically shapes the economy's dynamics in response to the government spending shock. A dovish stance consistently improves short-run macroeconomic outcomes by mitigating the contractionary effects of fiscal drag and smoothing consumption dynamics. These findings reinforce results in the recent HANK literature (e.g., Auclert et al. 2024), suggesting that deviating from strict inflation targeting enhances macroeconomic efficiency even when fiscal transfers are only partially effective.

3.5 Welfare Analysis Along the Equilibrium Path

In models without aggregate uncertainty, expected social welfare coincides with its deterministic counterpart along the perfect-foresight transition path. This modelling choice enhances transparency while preserving tractability. Introducing aggregate risk would permit richer precautionary behaviour and volatility, but would preclude closed-form aggregation and require either strong assumptions on preferences—such as unit elasticity of intertemporal substitution and unit risk aversion—or fully numerical global methods (e.g., Krusell & Smith 1998, Maliar et al. 2010). These tools often obscure the macro-distributional channels this paper aims to highlight. For these reasons, the deterministic approach is standard in the Blanchard (1985)–Yaari (1965) tradition and remains widely adopted (e.g., Benhabib et al. 2016, Leith et al. 2019).

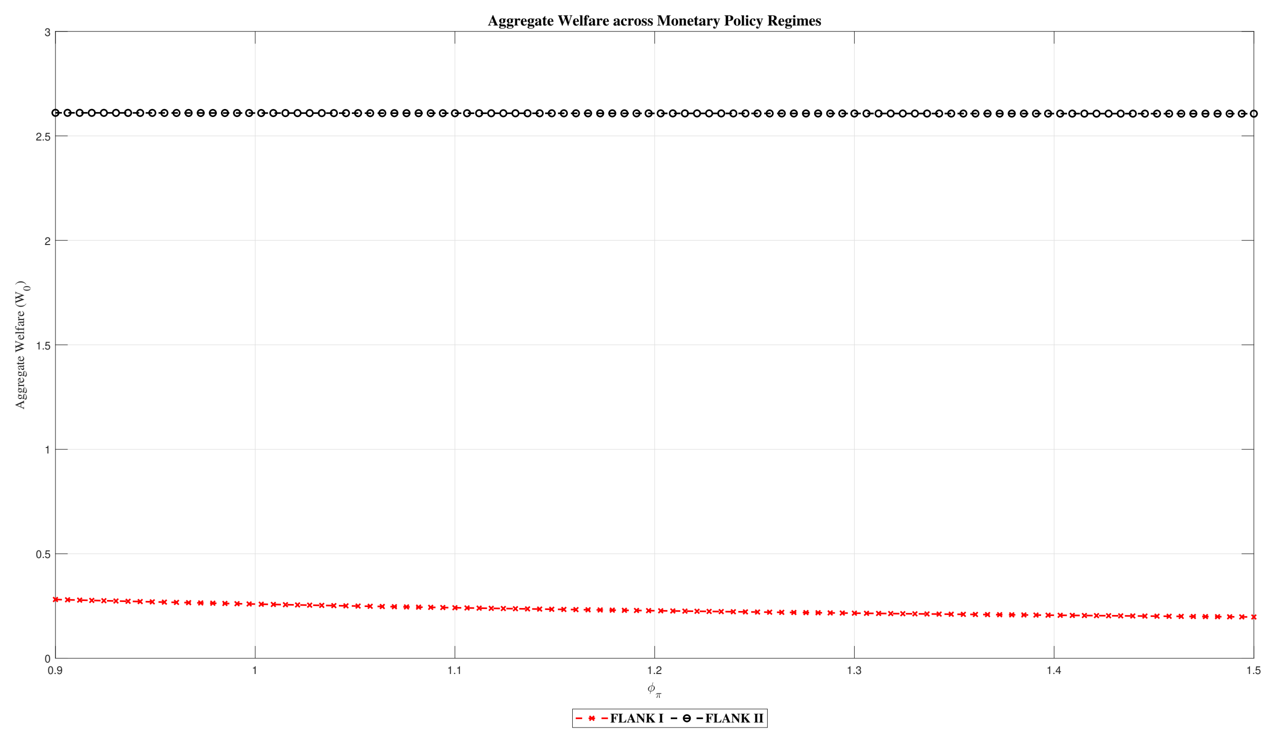

Figure 6: Aggregate welfare along the transition path following a one-time transfer to inactive households, under varying degrees of inflation targeting. FLANK I: Low persistence shock ($\rho_{tr} = 0.1$). FLANK II: High persistence shock ($\rho_{tr} = 0.97$).

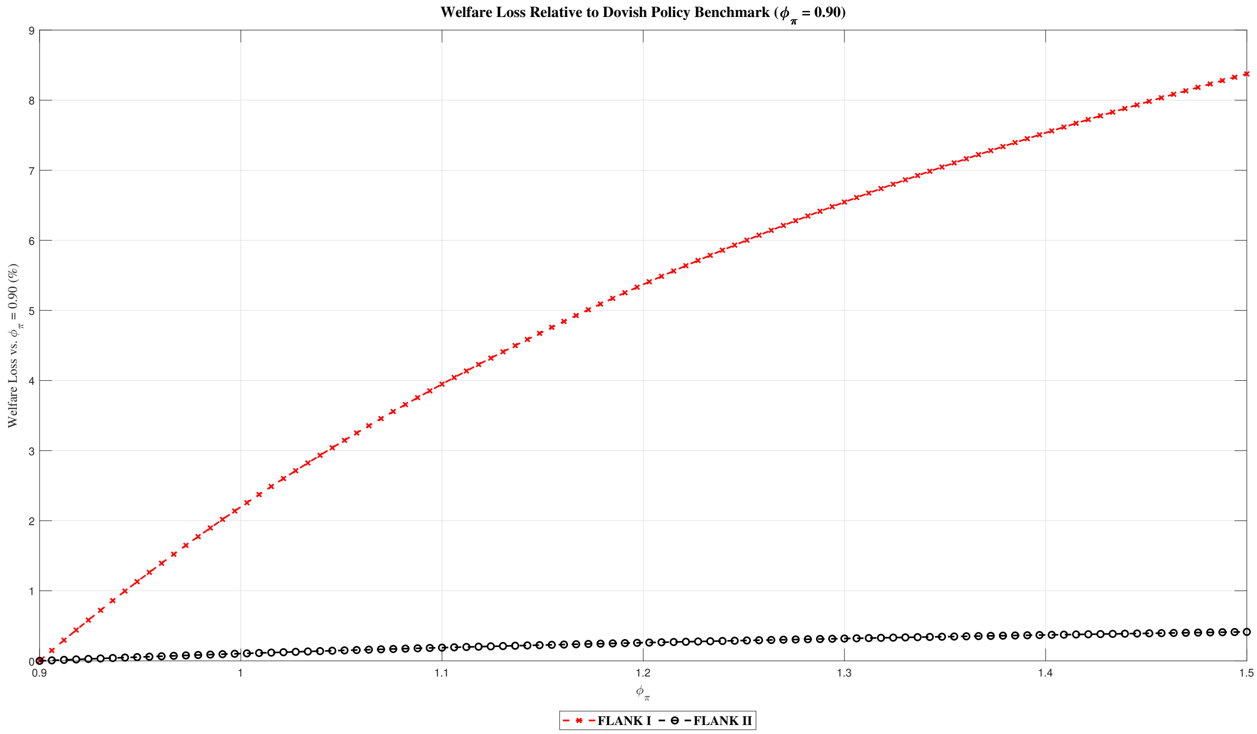

Figure 7: Welfare loss relative to the dovish benchmark ($\phi_\pi = 0.9$) following a one-time transfer shock, under varying degrees of inflation targeting. FLANK I: Low persistence shock ($\rho_{tr} = 0.1$). FLANK II: High persistence shock ($\rho_{tr} = 0.97$).

To evaluate the welfare consequences of alternative monetary regimes, the analysis considers the transition path following a one-off fiscal transfer to inactive households. The transfer is financed through a temporary increase in government debt. A fiscal rule ensures that, when debt deviates from its steady-state level, lump-sum taxes on active households rise gradually to close the gap. This structure captures a common real-world fiscal mechanism: redistribution is front-loaded and initially debt-financed, with tax-based consolidation delayed. While the transfer has the same initial distributional impact across regimes, the macroeconomic response—particularly in output, employment, and consumption—varies significantly with the degree of inflation targeting. In the case of a highly persistent shock, a more hawkish stance may suppress demand due to anticipations of tighter monetary policy and fiscal adjustment.

To enable tractable welfare comparisons, the model incorporates a cohort-specific transfer adjustment that equalises lifetime resources among active households while preserving heterogeneity between active and inactive types. This yields a closed-form expression for social welfare, derived in Appendix A.4. Welfare is computed as the discounted sum of aggregate utility (equation (61)) over a 100,000-period horizon to ensure full convergence.

The inflation coefficient ϕ_π is varied from 0.9 (dovish) to 1.5 (hawkish), holding all other parameters fixed. Figure 6 presents aggregate welfare levels under each regime; Figure 7 shows the corresponding welfare losses relative to the dovish benchmark.

The results confirm that, although the direct redistributive effect of the transfer is invariant to monetary stance, aggregate welfare is substantially higher under more accommodative regimes. These differences arise not from inequality—whose path is unaffected by ϕ_π—but from macroeconomic efficiency. Dovish regimes mitigate the contractionary effects of inflation stabilisation, leading to faster recoveries in output and employment.

Unlike recent contributions that characterise Ramsey-optimal policy in heterogeneous-agent models with idiosyncratic risk and endogenous insurance mechanisms (e.g. Challe 2020, Acharya et al. 2023), the analysis here compares welfare outcomes across fixed-rule monetary regimes. The focus is on the deterministic transition triggered by a one-time fiscal redistribution, financed through debt issuance and a tax rule that restores public debt to its steady state. Since the framework abstracts from risk-sharing and precautionary motives, welfare differences are driven entirely by real allocations. This explains the relatively muted sensitivity of welfare to changes in ϕ_π: in the absence of endogenous volatility, inflation enters the welfare metric only indirectly, through its effects on demand and price dispersion.

In summary, although monetary policy does not alter the direct distributional effect of the fiscal shock, it plays a key role in shaping the macroeconomic response. A more accommodative stance—i.e., a lower ϕ_π—delivers higher welfare by dampening the real costs of nominal rigidities. These results are amplified by the structural flattening of the Phillips Curve documented in Proposition 7: the presence of labour market wedges and participation frictions reduces the responsiveness of inflation to real activity, thereby attenuating the contractionary impulse under dovish regimes. In FLANK economies, the policy mix thus influences not only inflation but the efficiency of redistribution.

4 Conclusion

This paper develops a tractable heterogeneous-agent framework that combines overlapping generations, stochastic transitions into inactivity, and frictional labour markets. The model provides a structured but transparent environment for analysing inequality dynamics and the joint roles of fiscal redistribution and monetary policy. A key feature is the presence of permanently inactive, hand-to-mouth, households who do not participate in asset or labour markets. This feature generates a realistic participation margin and contributes to cross-sectional heterogeneity in consumption without requiring idiosyncratic income risk or precautionary saving.

The analysis focuses on the perfect-foresight transition path following a one-time, unanticipated, and autocorrelated increase in fiscal transfers to inactive households, interpreted as a stylised redistribution shock. While the transfer directly reduces cross-sectional inequality, its aggregate effects depend critically on the monetary regime and the persistence of the shock. Under lump-sum taxation and inelastic labour supply, the fiscal shock generates no direct efficiency loss. However, under more hawkish policy rules, its effects are muted by anticipations of future taxes and the presence of nominal rigidities. By contrast, more accommodative (dovish) monetary policy delivers smoother transitions in output and employment and amplifies the short-run gains from redistribution.

The welfare analysis evaluates these same dynamics along the equilibrium path. Even when inequality follows an identical path across regimes, aggregate welfare differs significantly. These differences arise not from volatility or risk-sharing, but from variation in macroeconomic efficiency. In particular, monetary policy affects markups, the return on assets, and the valuation of public debt—channels that remain operative even in the absence of aggregate uncertainty. The results show that real allocations matter for welfare even when inflation enters household decisions only indirectly.

The strength of the framework lies in its analytical tractability. By abstracting from aggregate risk and assuming log utility, the model delivers closed-form expressions for all per capita variables and preserves a near-linear aggregation structure. Introducing uncertainty would either require strong assumptions (e.g. recursive preferences) or a fully numerical solution method (e.g. Krusell & Smith 1998; Maliar et al. 2010), which would obscure the key general equilibrium channels the paper aims to isolate.

The model is stylised, and the quantitative magnitudes should not be over-interpreted. The goal is not to perfectly match empirical multipliers or optimal policies, but to provide clarity of the structural conditions under which redistribution is expansionary—and how monetary rules and participation frictions shape that response. Within that scope, the results provide a benchmark for thinking about macro-distributional policy in a transparent, analytically tractable setting.

Still, the broader message is clear: even in the absence of shocks, the policy mix matters. Across all regimes studied, more accommodative monetary policy consistently delivers better macroeconomic outcomes—supporting stronger recoveries in output and employment, improving macroeconomic efficiency, and raising social welfare. These gains do not arise from changes in inequality alone, but from the interaction of nominal rigidities, fiscal dynamics, and participation-driven heterogeneity. In particular, the labour market wedge and the structural flattening of the Phillips Curve—both derived analytically within the FLANK framework—weaken the inflation-output trade-off and amplify the real effects of monetary policy. In economies with finite-lived and structurally constrained households, monetary policy plays a critical role in shaping the real effects of redistribution.

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A Online Appendix

A.1 Proof of Proposition 1

Proposition 1. *In the FLANK model with stochastic participation and wage rigidity, the equilibrium labour wedge is strictly increasing in the participation rate* (ξ) *and in the worker's bargaining power* (ς)*, and decreasing in the degree of wage rigidity* (λ).

Proof. Start from the decentralised real wage equation derived under Nash bargaining with Rotemberg-type wage rigidity:

$$w_t = \lambda \cdot (\varsigma \cdot (mc_t \cdot z_t + \frac{\kappa}{\xi} \cdot \frac{1-\rho}{R_t} \cdot \vartheta_{t+1}) + (1-\varsigma) \cdot \frac{b}{\xi}) + (1-\lambda) \cdot w_{stst} \tag{63}$$

The labour wedge is defined as the gap between the marginal product of labour and the real wage per efficiency unit:

$$\nu_t \equiv mc_t \cdot z_t - \frac{w_t}{\xi} \tag{64}$$

Substituting (63) into (64), we obtain:

$$\nu_t = (1 - \lambda \cdot \varsigma) \cdot mc_t \cdot z_t - \lambda \cdot \varsigma \cdot \frac{\kappa}{\xi^2} \cdot \frac{1-\rho}{R_t} \cdot \vartheta_{t+1} - \lambda \cdot (1-\varsigma) \cdot \frac{b}{\xi^2} - \frac{(1-\lambda)}{\xi} \cdot w_{stst}$$

1. **Effect of participation ξ:**

$$\frac{\partial \nu_t}{\partial \xi} = 2 \cdot \lambda \cdot \varsigma \cdot \frac{\kappa}{\xi^3} \cdot \frac{1-\rho}{R_t} \cdot \vartheta_{t+1} + 2 \cdot \lambda \cdot (1-\varsigma) \cdot \frac{b}{\xi^3} + \frac{(1-\lambda)}{\xi^2} \cdot w_{stst} > 0$$

   Hence, the wedge ν_t is strictly decreasing in ξ.

2. **Effect of bargaining power ς:**

$$\frac{\partial \nu_t}{\partial \varsigma} = -\lambda \cdot [mc_t \cdot z_t + \frac{\kappa}{\xi^2} \cdot \frac{1-\rho}{R_t} \cdot \vartheta_{t+1} - \frac{b}{\xi^2}]$$

   Under standard calibrations, the term in brackets is positive, so ν_t is decreasing in ς.

3. **Effect of wage rigidity λ:**

$$\frac{\partial \nu_t}{\partial \lambda} = -\varsigma \cdot mc_t \cdot z_t - \varsigma \cdot \frac{\kappa}{\xi^2} \cdot \frac{1-\rho}{R_t} \cdot \vartheta_{t+1} - (1-\varsigma) \cdot \frac{b}{\xi^2} + \frac{w_{stst}}{\xi}$$

   This is generally positive when w_{stst} is close to the flexible wage benchmark. Thus, the wedge is decreasing in λ.

□

A.2 Proofs for Propositions 2-6

Proposition 2 *Even among active households, a change in the real interest rate has heterogeneous effects due to generational differences.*

Proof. Consider the consumption function for an active household of generation s (see eq. (7)):

$$c^u_{s|t} = (1-\beta\gamma)\left(f \cdot \gamma \mathscr{W}^u_{s|t} + \zeta^u_{s|t}\right)$$

Differentiating with respect to R_t yields:

$$\frac{\partial c^u_{s|t}}{\partial R_t} = (1-\beta\gamma)\left(f \cdot \gamma \cdot \frac{\partial \mathscr{W}^u_{s|t}}{\partial R_t} + \frac{\partial \zeta^u_{s|t}}{\partial R_t}\right)$$

For newly born households ($s=t$), $\mathscr{W}^u_{t|t} = 0$, so:

$$\frac{\partial c^u_{t|t}}{\partial R_t} = (1-\beta\gamma) \cdot \frac{\partial \zeta^u_{t|t}}{\partial R_t}$$

Since older cohorts hold positive financial wealth, it follows that:

$$\frac{\partial c^u_{s|t}}{\partial R_t} \neq \frac{\partial c^u_{t|t}}{\partial R_t} \quad \text{for all } s<t$$

□

Proposition 3. *There is no direct effect of interest rate changes on the consumption of inactive households.*

Proof. Inactive households consume entirely out of government transfers (see eq. (9)):

$$c^r_{s|t} = \frac{T^r_t}{1-\xi}$$

Since T^r_t is exogenous to monetary policy, it follows that:

$$\frac{\partial c^r_{s|t}}{\partial R_t} = 0$$

□

Proposition 4. *In a Blanchard–Yaari setting, active households respond to interest rate changes in the same manner as permanent income consumers.*

Proof. From the aggregate Euler equation for active households (see eq. (29)):

$$c^u_t = \frac{1}{\beta R_t} c^u_{t+1} + \frac{(1-f\gamma)}{f\gamma} \cdot \frac{(1-\beta\gamma)}{\xi\beta} P^M_t b^L_{t+1}$$

and the bond pricing formula (see eq. (14)):

$$P_t^M = \frac{f\gamma}{R_t} \cdot \frac{1+\rho P_{t+1}^M}{1+\pi_{t+1}} \Rightarrow \frac{\partial P_t^M}{\partial R_t} = -\frac{P_t^M}{R_t}$$

Substituting this result yields:

$$\frac{\partial c_t^u}{\partial R_t} = -\frac{1}{\beta R_t^2} c_{t+1}^u - \frac{(1-f\gamma)}{f\gamma} \cdot \frac{(1-\beta\gamma)}{\xi\beta} \cdot \frac{P_t^M b_{t+1}^L}{R_t}$$

Recognizing that the right-hand side equals $-\frac{c_t^u}{R_t}$, we obtain:

$$\frac{\partial c_t^u}{c_t^u} = -\frac{\partial R_t}{R_t}$$

□

Proposition 5. *The effect of an interest rate change on aggregate per capita consumption is proportional to the share of active households.*

Proof. Aggregate consumption is given by (eq. (23)):

$$c_t = \xi c_t^u + (1-\xi) c_t^r$$

Using the result of Proposition 2 and Proposition 3, we have:

$$\frac{\partial c_t}{\partial R_t} = \xi \cdot \frac{\partial c_t^u}{\partial R_t} = -\xi \cdot \frac{c_t^u}{R_t}$$

□

Proposition 6. *An increase in lump-sum transfers to inactive households reduces cross-sectional consumption inequality.*

Proof. The consumption inequality index (eq. (32)) is defined as:

$$S_t = 1 - \frac{c_t^r}{c_t^u}$$

Transfers increase c_t^r proportionally (see eq. (9)):

$$\frac{\partial c_t^r}{\partial T_t^r} = \frac{1}{1-\xi}$$

Through the fiscal rule (eq. (60)), increased transfers raise B_{t+1}, which then increases current taxes T_t:

$$\frac{\partial T_t}{\partial T_t^r} = \frac{\phi_b}{\phi_b + 4Y_t}$$

This reduces the human wealth of active agents and hence their consumption (eq. (30)):

$$\frac{\partial \tilde{c}_t^u}{\partial T_t^r} = -(1-\beta\gamma)\cdot\frac{\phi_b}{\phi_b + 4Y_t}$$

Differentiating S_t with respect to T_t^r yields:

$$\frac{\partial S_t}{\partial T_t^r} = -\left(\frac{c_t^u \cdot \frac{\partial c_t^r}{\partial T_t^r} - c_t^r \cdot \frac{\partial c_t^u}{\partial T_t^r}}{(c_t^u)^2}\right) = -\frac{1}{c_t^u}\left(\frac{1}{1-\xi} + \nu_t\right)$$

where:

$$\Omega_t = (1-S_t)\cdot\frac{(1-\beta\gamma)}{\xi}\cdot\frac{\phi_b}{\phi_b + 4Y_t}$$

Since both terms inside the parentheses are positive, it follows that:

$$\frac{\partial S_t}{\partial T_t^r} < 0$$

Hence, redistribution toward inactive consumers reduces inequality. □

A.3 Proof of Proposition 7

Proposition 7. *Under Rotemberg pricing, the log-linearised New Keynesian Phillips Curve (NKPC) in the FLANK model is given by:*

$$\Pi_t = \Gamma_Y Y_t + \Gamma_\nu \nu_t + \Gamma_\varepsilon \varepsilon_t - \Gamma_z z_t + \text{tip}_t,$$

where all coefficients are positive and $\text{tip}_t \equiv \Gamma_\vartheta \vartheta_{t+1} + \Gamma_\Pi \Pi_{t+1} + \Gamma_{Y'} Y_{t+1}$.

Proof. We begin with the non-linear NKPC under Rotemberg pricing:

$$\Phi(1+\pi_t)\pi_t Y_t = ((1-\varepsilon_t) + \varepsilon_t \cdot mc_t)Y_t + \beta\Phi\left(\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}}(1+\pi_{t+1})\pi_{t+1}Y_{t+1}\right)$$

Define gross inflation as $\Pi_t = 1+\pi_t$, and substitute the stochastic discount factor using $\beta\frac{\Lambda^u_{s|t+1}}{\Lambda^u_{s|t}} = \frac{1}{R_t}$. Then:

$$(\Pi_t - 1)\Pi_t Y_t R_t = \left(\frac{1-\varepsilon_t}{\Phi} + \frac{\varepsilon_t}{\Phi} mc_t\right)Y_t R_t + (\Pi_{t+1}-1)\Pi_{t+1}Y_{t+1}.$$

Log-linearising this expression around a non-stochastic steady state yields the linearised NKPC. To relate inflation to labour market frictions, we express the marginal cost mc_t using the log-linearised wage equation from Nash bargaining:

$$mc_t = -z_t + \left(\frac{\xi}{\xi-\varsigma}\right)\left(\frac{\nu_t}{mc\cdot z}\right) + \left(\frac{\varsigma}{\xi-\varsigma}\right)\left(\frac{\kappa}{\xi}\cdot\frac{1-\rho}{R}\cdot\frac{\vartheta_{t+1}}{mc\cdot z}\right) - \left(\frac{\varsigma}{\xi-\varsigma}\right)\left(\frac{\kappa}{\xi}\cdot\frac{1-\rho}{R}\cdot\frac{R_t}{mc\cdot z}\right).$$

Substitute this into the NKPC and use the monetary rule $R_t = \phi_\pi \Pi_t + \phi_y Y_t$. After collecting terms, we obtain the linearised Phillips Curve:

$$\Pi_t = \Gamma_Y Y_t + \Gamma_V \nu_t + \Gamma_\varepsilon \varepsilon_t - \Gamma_z z_t + \Gamma_\vartheta \vartheta_{t+1} + \Gamma_\Pi \Pi_{t+1} + \Gamma_{Y'} Y_{t+1},$$

where all coefficients $\Gamma_Y, \Gamma_V, \Gamma_\varepsilon, \Gamma_z$ are non-negative. In particular, we highlight:

$$\frac{\partial \Pi_t}{\partial Y_t} = \Gamma_Y = \frac{\Omega F + \Phi\Omega \cdot \phi_y}{1 - \Phi\Omega \cdot \phi_\pi}, \quad \frac{\partial \Pi_t}{\partial \nu_t} = \Gamma_V = \frac{1}{1 - \Phi\Omega \cdot \phi_\pi} \cdot \frac{\varepsilon \cdot mc}{\Phi(2\Pi - 1)\Pi} \cdot \frac{\xi}{\xi - \varsigma} \cdot \frac{\nu}{mc \cdot z}.$$

As $\Phi\Omega \cdot \phi_\pi \to 1$, the denominators shrink, making both $\Gamma_Y \to -\infty$ and $\Gamma_V \to -\infty$. This implies that strict inflation targeting destabilises inflation and weakens the link between inflation and real activity. In the FLANK framework, this flattening is driven structurally by the participation margin ξ, wage bargaining power ς, and price rigidity λ, independently of wealth heterogeneity. □

Proposition 7 highlights a structural flattening of the Phillips Curve in FLANK. The participation margin , bargaining power, and wage rigidity jointly reduce inflation's responsiveness to real activity. Importantly, aggressive inflation targeting (high ϕ_π) can destabilise inflation due to amplification via $\Phi\Omega$, especially when labour wedges are large. This flattening emerges independently of wealth heterogeneity or precautionary savings—as opposed to models like Challe (2020) or Dolado et al. (2021)—and interacts non-trivially with fiscal policy via the long-run interest rate.

A.4 The Social Welfare Function

To derive a closed-form expression for the social welfare metric, it is first necessary to eliminate all intergenerational inequality among active households. The literature offers two primary approaches to address this. The first, developed by Leith et al. (2019) and grounded in the seminal work of Calvo & Obstfeld (1988), separates the inter-temporal and distributional components of welfare to facilitate aggregation. This paper adopts an alternative strategy, following Acharya et al. (2023) and Angeletos et al. (2024*a*,*b*), the study introduces a cohort-specific lump-sum tax/transfer system. Specifically, each cohort of active households receives a differentiated lump-sum transfer such that $(1-\gamma)\sum_{s=-\infty}^{t}(f \cdot \gamma)^{t-s} G^u_{s|t} = 0$, $\mathscr{W}^u_{s|t} = \mathscr{W}^u_{s+1|t} = \dots = \mathscr{W}^u_{t|t} = \mathscr{W}^u_t$ and thus, $c^u_{s|t} = c^u_{s+1|t} = \dots = c^u_{t|t} = c^u_t, \forall t$. This mechanism equalizes wealth across all active individuals within each period, ensuring identical consumption and saving choices. By eliminating intergenerational heterogeneity among active households, this approach simplifies the aggregation of preferences and allows the analysis to clearly focus on the trade-off between efficiency and cross-sectional equity. In particular, all heterogeneity in consumption is attributed to institutional or life-cycle transitions—namely, the transition of a fraction of active households to inactivity-rather than differences within the active population itself.

The social welfare metric is defined as the weighted sum of the lifetime utility of all generations both current and future. Formally:

$$W_0 = \sum_{s=-\infty}^{\infty} \omega_s W_s$$

where the lifetime utility of a cohort born at time s is:

$$W_s = f \cdot W_s^u + (1-f) \cdot W_s^r$$

Here, W_s^u and W_s^r are the lifetime utilities of an active and inactive household born at time s, respectively, and f is the probability of remaining active. These utilities are given by:

$$\begin{aligned} W_s^u &= \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^u) \\ W_s^r &= \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^r) \end{aligned}$$

And, the weights ω_s account for both the demographic structure and inter-temporal aggregation, following the perpetual youth tradition. More specifically,

$$\omega_s = \begin{cases} (1-\gamma)\gamma^{-s}, & s \leq 0 \\ \gamma^s, & s > 0 \end{cases}$$

For $s \leq 0$, the weight reflects the mass of individuals from each past cohort who are still alive today, accounting for both mortality and the declining size of past generations. For $s > 0$, the weight represents the planner's valuation of unborn cohorts, combining time discounting and survival probability.

Substituting into the social welfare definition gives:

$$\begin{aligned} W_0 = (1-\gamma) \sum_{s=-\infty}^{0} \gamma^{-s} \left[f \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^u) + (1-f) \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^r) \right] \\ + \sum_{s=1}^{\infty} \gamma^s \left[f \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^u) + (1-f) \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^r) \right] \end{aligned}$$

To ensure maximal tractability, the study swaps the order of summation. Thus, summing over calendar time t instead of cohort birth time s. This change exploits the law of large numbers: in each period, the cross-sectional distribution of household types converges to the population shares of active (ξ) and inactive ($1-\xi$) households, given constant probabilities for mortality and activity transitions. As a result, the period t social welfare metric can be expressed, as a deterministic weighted sum of the felicity functions of the two groups[11].

The active utility terms become:

[11] As in the THANK literature (e.g. Bilbiie & Ragot 2021, Chien & Wen 2021) this result is motivated from the existence of perfect insurance within type.

$$\sum_{s=-\infty}^{\infty} \omega_s \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^u) = \sum_{t=0}^{\infty} \beta^t \log(c_t^u) \cdot \underbrace{\sum_{s=-\infty}^{t} \omega_s \gamma^{t-s}}_{=\xi}$$
$$= \sum_{t=0}^{\infty} \beta^t \xi \cdot \log(c_t^u)$$

Similarly, the inactive terms are:

$$\sum_{s=-\infty}^{\infty} \omega_s \sum_{t=s}^{\infty} (\beta\gamma)^{t-s} \log(c_t^r) = \sum_{t=0}^{\infty} \beta^t \log(c_t^r) \cdot \underbrace{\sum_{s=-\infty}^{t} \omega_s \gamma^{t-s}}_{=1-\xi}$$
$$= \sum_{t=0}^{\infty} \beta^t (1-\xi) \cdot \log(c_t^r)$$

Putting it together, we obtain:

$$W_0 = \sum_{t=0}^{\infty} \beta^t \left[\xi \cdot \log(c_t^u) + (1-\xi) \cdot \log(c_t^r)\right] \tag{65}$$

Reformulating the Social Welfare Function via Inequality

Interestingly, the welfare function can also be expressed in terms of the cross-sectional consumption inequality index (see eq.(32)). The cross-sectional consumption inequality takes the form

$$S_t = 1 - \frac{c_t^r}{c_t^u}$$

And, since both sides are strictly positive as long as $(1-f) > 0$ then, a logarithmic transformation can be applied. Hence,

$$\log(c_t^r) = \log(c_t^u) + \log(1 - S_t) \tag{66}$$

Substituting this into eq.(65) gives:

$$W_0 = \sum_{t=0}^{\infty} \beta^t \left[\xi \cdot \log(c_t^u) + (1-\xi) \cdot (\log(c_t^u) + \log(1-S_t))\right]$$
$$= \sum_{t=0}^{\infty} \beta^t \left[\log(c_t^u) + (1-\xi) \cdot \log(1-S_t)\right] \tag{67}$$

This expression highlights the planner's trade-off: welfare is increasing in average (active) consumption c_t^u, but decreasing in cross-sectional inequality S_t, with the strength of the inequality penalty scaled by the stationary share of inactive households, $(1-\xi)$.

B Supplemental Appendix: Sensitivity Analysis

B.1 Steady-State Robustness

This subsection evaluates how the FLANK model's steady-state allocations respond to plausible variation in key structural and fiscal parameters. The focus is on four dimensions: the government's debt-to-GDP ratio, the separation rate (ρ), workers' bargaining power (ς), and the share of active households (ξ). The goal is to assess whether core macroeconomic and distributional outcomes are sensitive to these recalibrations or whether they reflect deeper structural features of the model.

- **Debt-to-GDP Ratio.** Table 3 reports allocations across different public debt targets. As expected, higher debt raises lump-sum taxes and the equilibrium interest rate. However, labour market variables and inequality remain nearly unaffected. Only at very high debt levels do taxes rise sufficiently to slightly depress active consumption, marginally reducing inequality.

- **Active Population Share.** Table 4 varies ξ. As $\xi \to 1$, the model converges to the Blanchard–Yaari (BY) benchmark (e.g. Kirsanova et al. 2007, Leith et al. 2019, Rigon & Zanetti 2018): transfers vanish, cross-sectional inequality disappears, and lump-sum taxes match those found in the nested RANK model. Labour market allocations are broadly stable, though output and employment increase with ξ. Since debt is fixed in GDP terms, higher output reduces the equilibrium interest rate (eq. (29)), raising bond prices (eq. (14)). From Nash bargaining (eq. (55)), this raises the discounted benefit of employment and thus, the equilibrium wage. Consistent with the empirical evidence of Elsby et al. (2015), Hall & Schulhofer-Wohl (2018) as the share of the active population as well as aggregate output increases, tighter labour markets emerge: higher employment, fewer vacancies, and lower search intensity.

- **Separation Rate.** Table 5 shows that increasing ρ lowers employment and output, while raising unemployment and searching intensity. These effects are gradual. Since inactive households are permanent-income consumers, lower output depresses only the consumption of active consumers thus reducing S. As in previous cases, lower output reduces interest rates and lifts bond prices. Wages also decline as the discounted benefit of employment falls.

- **Bargaining Power.** Table 6 varies ς, which affects both matching elasticity and the worker's surplus share. Higher ς raises wages but reduces employment and tightness, leading to higher unemployment and lower matching efficiency. The result is a modest decline in inequality, as inactive consumption becomes relatively less disadvantaged.

Across these exercises, labour market allocations—employment, vacancies, job-finding and job-filling rates—are largely stable with respect to public debt and household turnover. Instead, they are shaped primarily by ξ, ρ, and ς, which determine the underlying matching dynamics.

This insensitivity reflects key features of the model: labour supply is inelastic, participation is exogenous conditional on activity, and there are no distortionary taxes on labour. As a result, fiscal instruments such

Table 3: Steady-State: FLANK under Increasing Debt-to-GDP Ratios

FLANK with Stochastic Inactivity Transitions					
Debt-to-GDP (%, p.a.)	46	60	100	123	200
Lump-sum Tax (T)	0.19035	0.19219	0.19761	0.20084	0.21227
Aggregate Output (Y)	0.61146	0.61146	0.61146	0.61145	0.61145
Aggregate Consumption (C)	0.59243	0.59243	0.59242	0.59242	0.59242
Real Interest Rate (R)	1.00517	1.00522	1.00535	1.00542	1.00567
Nominal Rate (I)	1.00517	1.00522	1.00535	1.00542	1.00567
Inflation (π)	0	0	0	0	0
Asset Prices (P^M)	19.84146	19.82371	19.77317	19.74423	19.64795
Employment Rate (n)	0.94033	0.94033	0.94032	0.94032	0.94031
Searching (u)	0.17251	0.17251	0.17252	0.17252	0.17253
Vacancy Rate (v)	0.16706	0.16706	0.16704	0.16704	0.16701
Job-Filling Rate (p)	0.65410	0.65409	0.65407	0.65406	0.65401
Job-Finding Rate (q)	0.67542	0.67544	0.67550	0.67553	0.67564
Tightness (θ)	0.96843	0.96839	0.96827	0.96821	0.96799
Real Wage Rate (w)	0.87679	0.87678	0.87675	0.87674	0.87669
Cross-Sectional Inequality (S)	0.26067	0.26067	0.26067	0.26067	0.26066

as transfers or debt affect wealth and consumption allocations, but not the matching process or employment directly.

By contrast, the cross-sectional inequality index S responds more visibly. It declines with higher ξ and ς, and increases with greater separation risk. Lump-sum taxes also rise with both debt and unemployment, as fiscal needs expand to cover transfers and replacement income.

Overall, the results confirm that steady-state outcomes are robust to alternative calibrations. The qualitative patterns observed are not artifacts of parameter tuning, but stem from structural features of the model.

Finally, although labour market quantities exhibit limited sensitivity to fiscal parameters, the model features a persistent structural labour market wedge—the gap between the marginal rate of substitution and the marginal product of labour—arising from incomplete participation and wage bargaining frictions. This wedge remains active across calibrations, and is especially responsive to ξ and ς, which govern labour force attachment and surplus division. Importantly, it flattens the Phillips Curve and weakens the steady-state transmission of monetary policy. Thus, even when observable labour outcomes are stable, the underlying distortions and policy trade-offs remain shaped by structural frictions.

Table 4: Steady-State: FLANK under Varying Share of Active Population

FLANK with Stochastic Inactivity Transitions									
Share of Active Pop. (ξ)	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
Aggregate Output (Y)	0.55420	0.60588	0.65740	0.70884	0.76024	0.81163	0.86304	0.91446	0.95628
Aggregate Consumption (C)	0.53972	0.58928	0.63874	0.68818	0.73763	0.78712	0.83666	0.88625	0.93114
Interest Rate (R)	1.00519	1.00517	1.00516	1.00515	1.00515	1.00514	1.00514	1.00513	1.00509
Nominal Rate (I)	1.00519	1.00517	1.00516	1.00515	1.00515	1.00514	1.00514	1.00513	1.00509
Inflation (π)	0	0	0	0	0	0	0	0	0
Bond Price (P^M)	19.83519	19.84154	19.8460	19.84931	19.85186	19.85389	19.85555	19.85692	19.87291
Debt-to-GDP ($B/4Y$)	0.46000	0.46000	0.46000	0.46000	0.46000	0.46000	0.46000	0.46000	0.46000
Real Wage Rate (w)	0.80622	0.80490	0.80389	0.80310	0.80248	0.80200	0.80162	0.80133	0.88182
Employment Rate (n)	0.92367	0.93212	0.93914	0.94511	0.95030	0.95486	0.95893	0.96259	0.95628
Searching (u)	0.18717	0.17974	0.17356	0.16830	0.16374	0.15972	0.15614	0.15292	0.15848
Vacancy Rate (v)	0.12709	0.14570	0.16374	0.18128	0.19840	0.21513	0.23153	0.24762	0.22067
Job-Finding Rate (q)	0.87215	0.76768	0.68826	0.62561	0.57478	0.53262	0.49701	0.46648	0.52003
Job-Filling Rate (p)	0.59220	0.62233	0.64933	0.67388	0.69645	0.71740	0.73697	0.75536	0.72410
Tightness (θ)	0.67902	0.81066	0.94343	1.07715	1.21168	1.34693	1.48281	1.61926	1.39242
Cross-Sectional Inequality (S)	0.16657	0.25522	0.31732	0.36331	0.39876	0.42694	0.44989	0.46896	–
Lump-sum Tax (T)	0.21850	0.19262	0.16712	0.14190	0.11689	0.09205	0.06735	0.04275	0.02884

Table 5: Steady-State: FLANK under Varying Separation Rates

FLANK with Stochastic Inactivity Transitions						
Separation Rate (ρ)	0.07	0.09	0.12	0.13	0.14	0.15
Aggregate Output (Y)	0.62485	0.61741	0.60615	0.60237	0.59858	0.59478
Aggregate Consumption (C)	0.61444	0.60441	0.58954	0.58463	0.57975	0.57490
Nominal Rate (I)	1.00517	1.00517	1.00517	1.00517	1.00517	1.00518
Inflation (π)	0	0	0	0	0	0
Bond Price (P^M)	19.84312	19.84251	19.84157	19.84125	19.84093	19.8406
Debt-to-GDP ($B/4Y$)	0.46000	0.46000	0.46000	0.46000	0.46000	0.46000
Real Wage Rate (w)	0.81554	0.81117	0.80489	0.80287	0.80089	0.79893
Employment Rate (n)	0.96092	0.94948	0.93216	0.92635	0.92052	0.91467
Searching (u)	0.10635	0.13597	0.17970	0.19408	0.20836	0.22253
Vacancy Rate (v)	0.09135	0.11416	0.14580	0.15568	0.16524	0.17449
Job-Finding Rate (q)	0.73636	0.74855	0.76721	0.77352	0.77989	0.78630
Job-Filling Rate (p)	0.63249	0.62846	0.62248	0.62049	0.61852	0.61655
Tightness (θ)	0.85893	0.83957	0.81135	0.80217	0.79309	0.78412
Cross-Sectional Inequality (S)	0.29718	0.28100	0.25560	0.24682	0.23788	0.22878
Lump-sum Tax (T)	0.18496	0.18795	0.19248	0.19400	0.19553	0.19706

Table 6: Steady-State: FLANK under Varying Bargaining Power of Workers

FLANK with Stochastic Inactivity Transitions						
Bargaining Power (ς)	0.4	0.5	0.6	0.65	0.72	0.75
Aggregate Output (Y)	0.67072	0.64712	0.62573	0.61659	0.60615	0.60266
Aggregate Consumption (C)	0.63645	0.61710	0.60140	0.59542	0.58954	0.58801
Nominal Rate (I)	1.00517	1.00517	1.00517	1.00517	1.00517	1.00517
Inflation (π)	0	0	0	0	0	0
Bond Price (P^M)	19.84182	19.84145	19.84133	19.84138	19.84157	19.84169
Debt-to-GDP ($B/4Y$)	0.46000	0.46000	0.46000	0.46000	0.46000	0.46000
Real Wage Rate (w)	0.78031	0.78519	0.79298	0.79770	0.80489	0.80812
Employment Rate (n)	1.03146	0.99517	0.96228	0.94822	0.93216	0.92679
Searching (u)	0.09232	0.12425	0.15319	0.16557	0.17970	0.18442
Vacancy Rate (v)	0.30081	0.26350	0.21354	0.18585	0.14580	0.12854
Job-Finding Rate (q)	0.41147	0.45321	0.54076	0.61224	0.76721	0.86524
Job-Filling Rate (p)	1.34077	0.96115	0.75377	0.68725	0.62248	0.60304
Tightness (θ)	3.25850	2.12077	1.39392	1.12252	0.81135	0.69697
Cross-Sectional Inequality (S)	0.33023	0.30135	0.27601	0.26585	0.25560	0.25290
Lump-sum Tax (T)	0.16651	0.17600	0.18461	0.18828	0.19248	0.19389

B.2 Dynamic Responses to a TFP Shock

In this section, the paper explores the dynamic effects of a one-time positive total factor productivity (TFP) shock within the FLANK model. As in the main paper, the analysis abstracts from aggregate risk and focuses on the perfect foresight equilibrium path following an unanticipated autocorrelated aggregate shock.

This section first considers the effect of a one-off increase in aggregate productivity, comparing the dynamic responses across three model variants: the nested RANK, the standard FLANK with only active households (FLANK I), and the main FLANK model with stochastic transitions into inactivity (FLANK II). To avoid confusion, the study refers to FLANK II as the "baseline FLANK" environment.

Figure 8 compares the responses across models. While all specifications yield qualitatively similar directional responses, key quantitative differences emerge. In particular, the coexistence of active and inactive agents in FLANK II amplifies marginal propensity to consume (MPC) heterogeneity, leading to more sluggish aggregate responses.

The $+1\%$ TFP shock raises output proportionally, scaled by the employment rate and the share of active participants. Because FLANK II has a lower participation margin and consistently higher unemployment, leading to a smaller initial output response than that of FLANK I or the RANK model. Moreover, the shock is highly persistent, and none of the specifications fully converge back to steady state within the 20-period (5-year) horizon.

In line with the empirical evidence of Elsby et al. (2015) and Hall & Schulhofer-Wohl (2018), the shock stimulates hiring with vacancies, wages, and employment rising, while search effort declines as more matches are made. These responses are dampened in FLANK II, where higher discounting reduces the value of employment, weakening household and firm surpluses and flattening the hiring condition.

Figure 9 presents monetary policy comparisons under two Taylor-type rules in the benchmark FLANK model. In Case I, the central bank targets both inflation and output ($\phi_\pi = 1.5, \phi_y = 0.125$). Output rises and inflation initially falls, prompting a modest increase in the real interest rate. In Case II, the central bank prioritizes inflation alone($\phi_\pi = 1.5, \phi_y = 0$). Here, inflation rises and the nominal interest rate responds more aggressively. These contrasting responses affect real interest rate dynamics and, consequently, the paths of asset prices and consumption.

Wage responses are consistent with Mortensen & Pissarides (1999): wages are pro-cyclical but lag behind output due to wage rigidities and Nash bargaining. Inflation affects wages indirectly—via marginal cost—rather than through standard New Keynesian Phillips curve dynamics. The path for aggregate consumption closely follows output, moderated by price-induced efficiency losses.

Inequality dynamics also differ across regimes. In Case II, a larger nominal interest rate response reduces bond prices, triggering valuation losses and a fall in financial wealth for active households. Since inactive agents consume fixed transfers, they are insulated. As shown in Proposition 5, only active agents' consumption responds to real interest rate changes, scaled by their population share. As a result, cross-sectional inequality rises initially.

Furthermore, interest rate shifts benefit younger/poorer active households through reduced borrowing costs, while older/richer cohorts see declines in asset income. However, strong revaluation effects from long-duration bonds amplify inequality. With persistent shocks and rigidities, convergence toward steady-

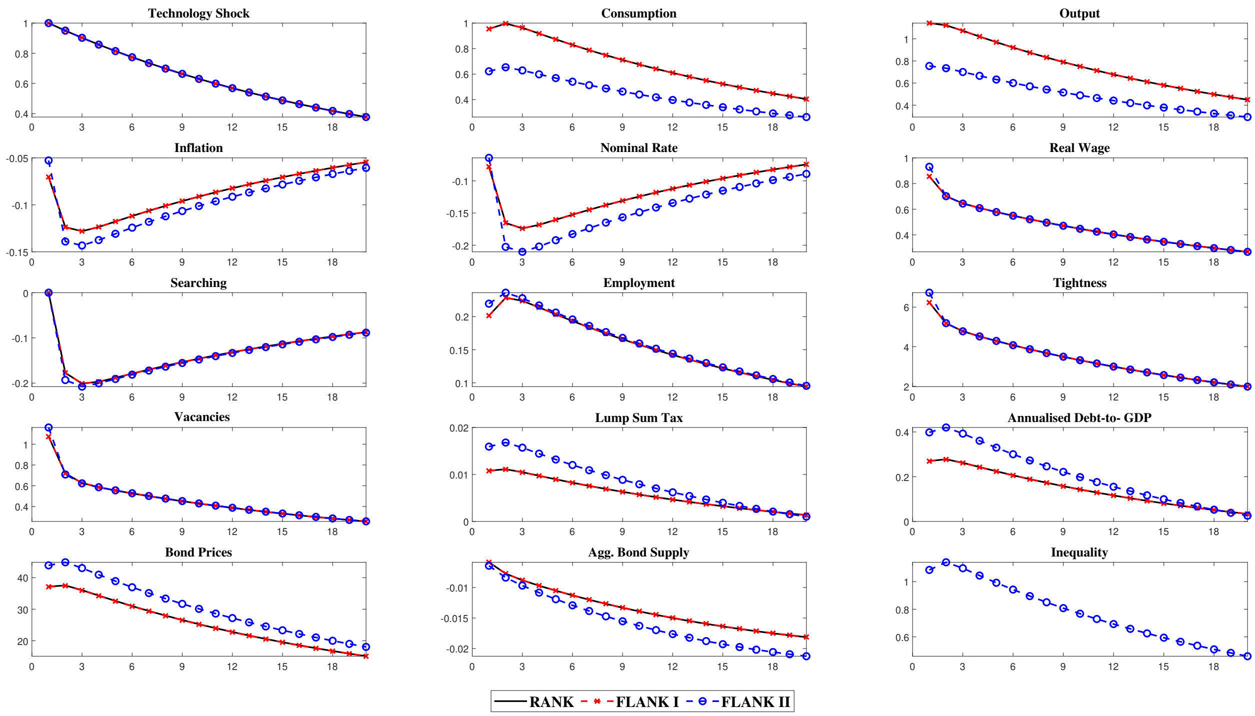

Figure 8: Dynamic responses to a positive technology shock. FLANK I refers to the standard FLANK model with only active consumers. FLANK II allows for stochastic transition to "inactivity".

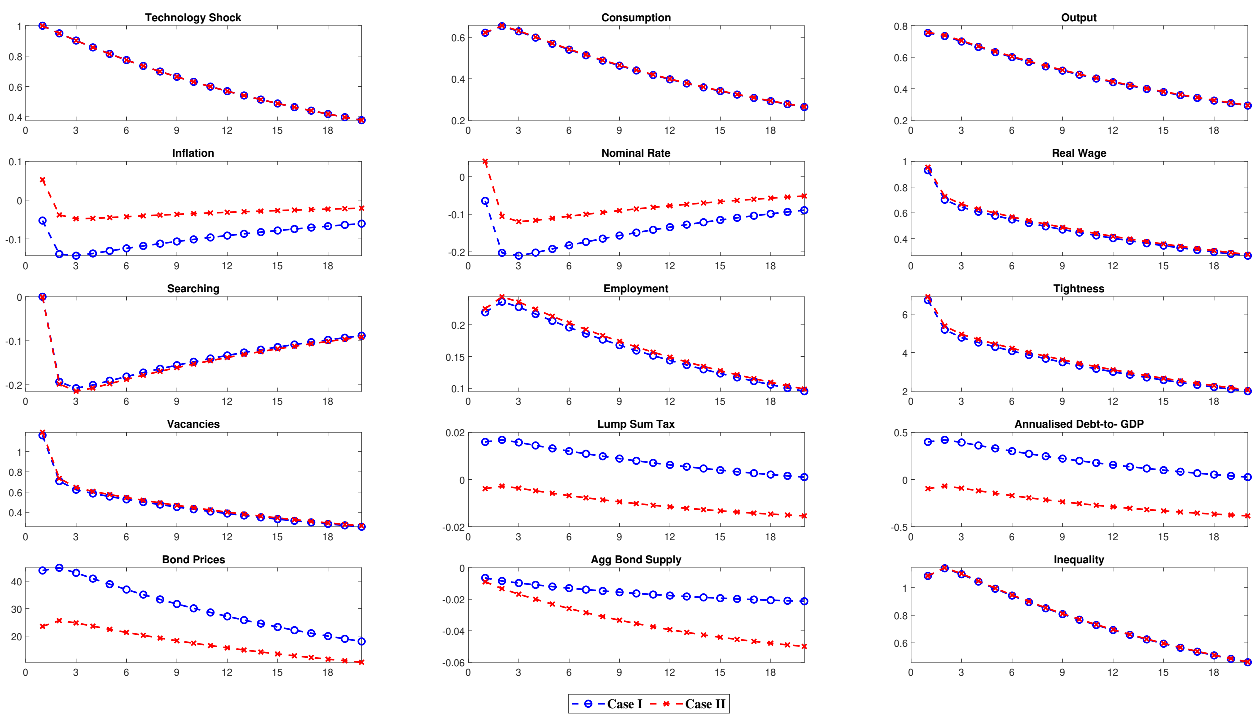

Figure 9: Dynamic responses to a positive technology shock. Case I refers to the benchmark case where the monetary authority targets both price and output stabilization. Case II removes the output gap from the interest rate rule.

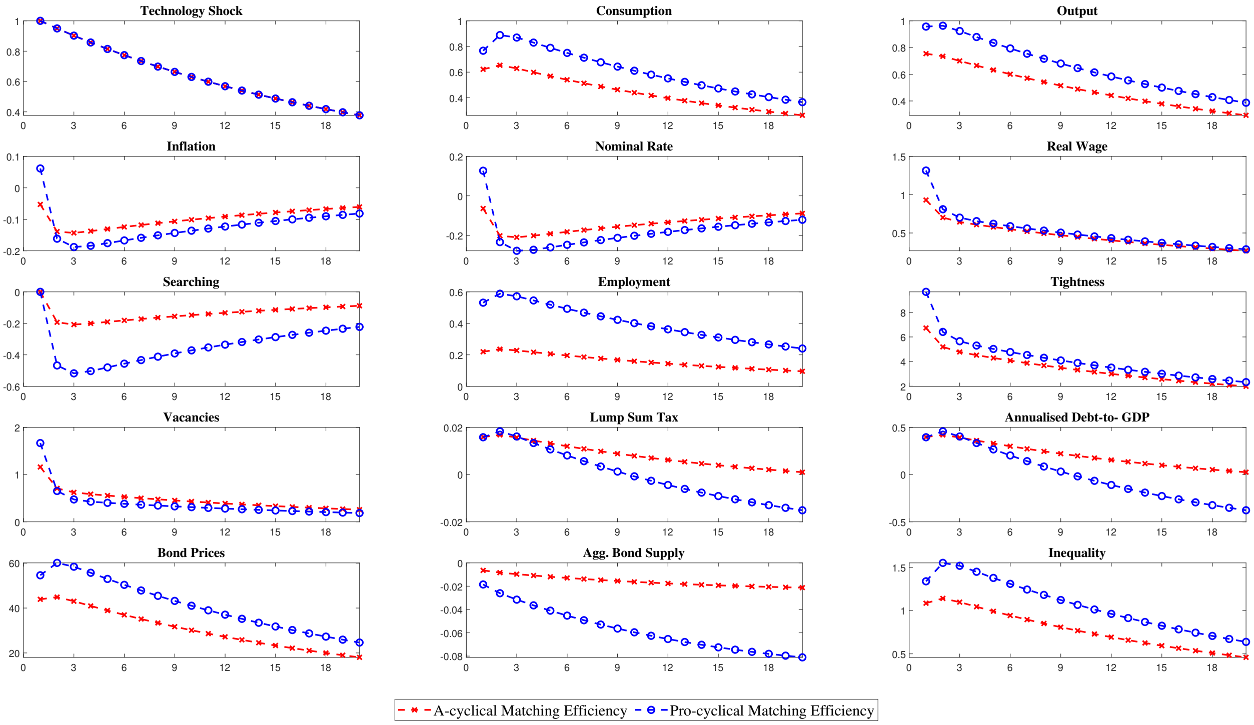

Figure 10: Policy response to an one-time unanticipated TFP shock. A-cyclical vs. Pro-cyclical matching efficiency.

state inequality is slow, and disparities among active households remain elevated over time.

Cyclicality of the Average Matching efficiency

In this section, the paper discusses the implications of allowing the (equilibrium) matching efficiency to be pro-cyclical instead of a-cyclical when the economy is experiencing an one-off autocorrelated aggregate shock. More specifically, the paper considers the dynamic responses to a one-off autocorrelated positive technology shock.

Figure 10 shows the effects of $+1\%$ unanticipated TFP shock. Under a pro-cyclical matching efficiency, the effects of the TFP shock on output and aggregate employment are amplified. Even for the same level of unemployed workers and/or vacancies, successful matching increases as output jumps above its equilibrium level.

Employment is experiencing more than double the increase in response to the positive TFP shock, compared to the benchmark FLANK model. As a result, aggregate output increases more than one- to- one with technology. Furthermore, the labour market itself becomes more resilient, which is evident from the fact that the tightness of the labour market initially jumps higher by more than 2%.

Furthermore, despite the fact that searching start from the same point in response to the aggregate shock, under pro-cyclical matching efficiency, searching drops further and remains below the equilibrium value for longer. This is hardly surprising since by definition searching is driven by the lagged value of employment, scaled by retention rate.

As anticipated, the positive technology shock leads to a more pronounced initial increase in output and aggregate consumption, driven by the pro-cyclical matching efficiency. This causes both inflation and the real interest rate to initially rise significantly higher compared to the benchmark case. As a result, inequality experiences a sharper initial surge and remains elevated compared to the benchmark scenario until the economy returns back to its steady-state.

Once again, searching and employment move in opposite directions. As the number of successful matches increase, in response to the positive technology shock, both the unemployment pool and the number of people searching decreases. As a result, the benefit of being employed, as measured by the real wage rate and aggregate consumption, increases by more compared to the baseline scenario. Finally, in line with the empirical evidence, vacancies are increasing in response to the unanticipated positive technology shock as firms increase their hiring intensity- since the economy is booming. Overall, the benefits from an unexpected positive aggregate shock show significantly higher gains under pro-cyclical matching efficiency, in terms of economic efficiency and labour market dynamics but, at the cost of higher cross-sectional lineality along the perfect foresight equilibrium path. This is a direct result of assuming the presence of a "Keynesian" population.

Hawkish vs. Dovish Monetary Policy

This subsection investigates how alternative monetary policy stances affect the dynamic adjustment of the FLANK model following a one-time autocorrelated technology shock. As in previous analyses, the study is concerned with the perfect foresight equilibrium path following the unanticipated TFP shock. The shock is realized in period 0, after which households fully anticipate the path of the economy and policy.

While the choice of monetary policy reaction coefficients does not influence the long-run equilibrium allocation, it plays a critical role in shaping the transitional dynamics. Figure 11 compares the responses under a hawkish regime ($\phi_\pi = 1.5$) and a dovish regime ($\phi_\pi = 0.9$).

Under the dovish regime, the central bank allows inflation to fall more sharply and recover more slowly in response to the positive TFP shock. Despite assigning lower priority to price stability, real interest rates still track inflation movements but less than one-for-one. The resulting fall in nominal rates induces large revaluation effects on financial portfolios. While aggregate real purchasing power rises across all consumers, the capital gains experienced by older, asset-rich active households outweigh borrowing gains for younger agents. As a result, initial inequality increases more under the dovish policy.

In contrast, the real economy—particularly the labour market—benefits more visibly from monetary accommodation. The larger decline in nominal interest rates under the dovish stance leads to a stronger expansion in output, vacancies, and employment. Wage growth and labour market tightness respond more forcefully as well, driven by heightened hiring incentives and a higher marginal value of job creation.

These differences in real activity are short-lived. After several periods, labour market variables—such as employment and vacancies—converge to a common trajectory, regardless of the monetary policy stance. However, in the early phases of adjustment, a dovish policy clearly accelerates labour market recovery and amplifies the benefits of the positive supply shock.

In summary, while both regimes deliver similar long-run outcomes, the dovish stance provides mean-

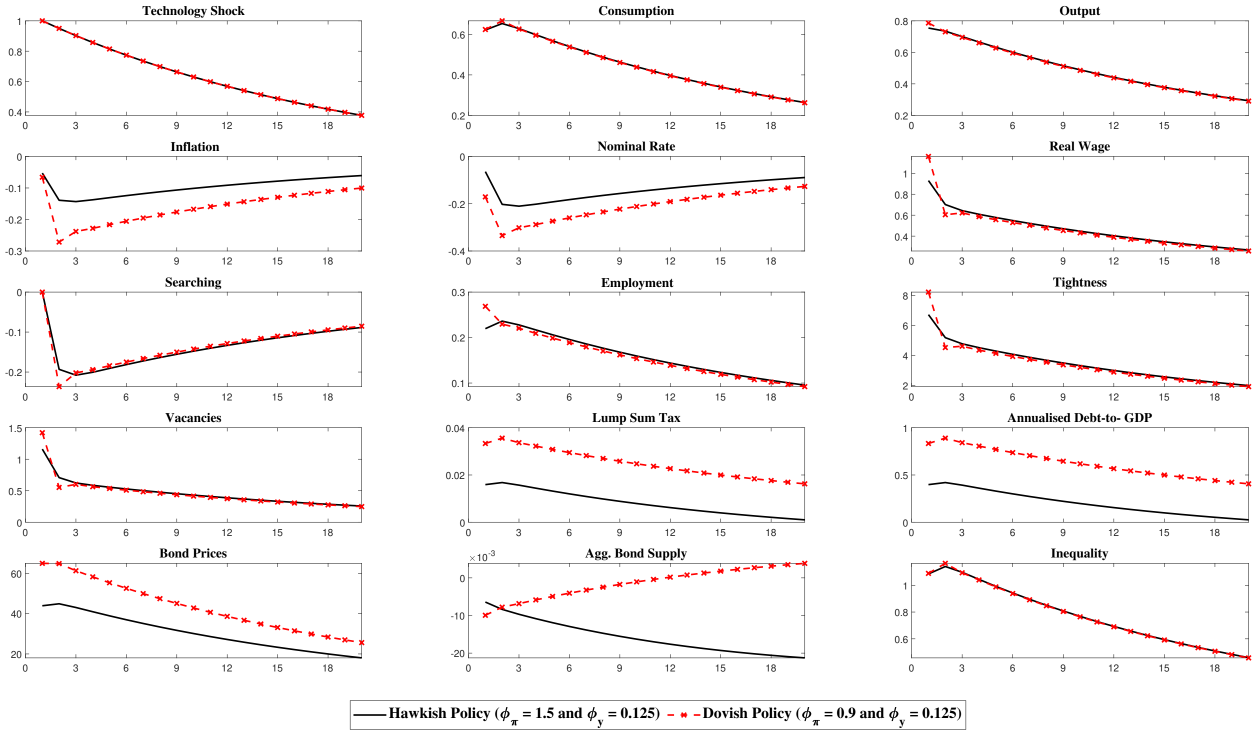

Figure 11: Dynamic responses to a one-off autocorrelated technology shock. Hawkish ($\phi_\pi = 1.5$) vs. Dovish ($\phi_\pi = 0.9$) monetary policy.

ingful short-term gains by boosting output and employment more rapidly. These findings reinforce the view that, although monetary policy does not affect steady-state allocations, it plays a decisive role in managing the transition to full employment and stabilizing macroeconomic dynamics in the presence of aggregate shocks.