Stabilization Effect of Government Employment

Raphaël Jananji*

Preliminary and Incomplete†

March 20, 2026

Abstract

This paper studies the macroeconomic stabilization role of government employment using U.S. micro data and a two-asset Heterogeneous Agent New Keynesian model with sector-specific income and unemployment risk. Public-sector employment features persistently lower and less cyclical income risk than private employment. These differences generate higher marginal propensities to consume and greater illiquid asset holdings among public-sector households, consistent with PSID evidence. By embedding low-risk income in the labour market, government employment stabilizes aggregate demand and capital accumulation, and amplifies monetary policy through asset-return and labour-market spillovers. This mechanism is distinct from standard automatic stabilizers and highlights the macroeconomic importance of public sector employment security. An extension incorporating endogenous wages and search frictions will permit structural estimation using SIPP-based income risk and CPS employment transition data.

---

*University of Montreal, Department of Economics (raphael.jananji@umontreal.com). I would like to thank Nora Traum, Hyejin Park, and Cory Langlais for their invaluable support. I am also grateful for helpful comments and suggestions from Christian Bayer, Ralph Luetticke, and Benjamin Born, as well as for invitations to present at the Canadian Economic Association 59th conference and the Mount Allison University Department of Economics. Financial support from the Fonds de recherche du Québec – Société et culture (FRQSC) is gratefully acknowledged.

†A revised version including Bayesian estimation is expected in early April. Early results of random search can be found in Section 7. Click here for the latest version.

1 Introduction

Government employment represents a large and policy-dependent segment of the labour market with systematically different income and unemployment risk. In the United States, roughly 17% of workers are employed by government institutions, with government wage payments averaging about 6% of GDP. In comparison, automatic stabilizers accounted for an average of 1.35% of GDP between 1988 and 2007.[1] These magnitudes suggest that government employment constitutes a quantitatively important source of household income that is shaped directly by policy.[2]

From the perspective of non-insurable income risk, government employment has historically been characterized by relatively stable earnings and low unemployment risk. This stability differs markedly from private-sector employment and persists across the business cycle. As a result, public-sector households exhibit lower precautionary savings, higher marginal propensities to consume, and portfolio allocations tilted toward illiquid assets. Because these characteristics are persistent and policy-dependent rather than state-contingent, government employment provides a natural setting to study how stable, low-risk income affects aggregate consumption, investment, and macroeconomic stabilization. Moreover, because the size of this sector is directly shaped by policy, the framework clarifies the aggregate risk exposure and stabilization capacity at stake when public-sector employment is reduced.

This paper studies the stabilizing role of government employment by asking how persistent heterogeneity in income and unemployment risk affects the transmission of productivity and monetary shocks. I focus on the presence of a large group of low-risk, high-MPC public-sector households and analyze how their consumption and portfolio behavior shapes aggregate dynamics. To do so, I use a Heterogeneous Agent New

[1]Measures for total government salaries come from the Bureau of Labor Statistics (BLS) on Occupational Employment and Wage Statistics (OEWS), and excludes the military. Interestingly, government salaries, in terms of GDP, have seen its weight go down from 7.48% to 5.55% across the years. Figures of automatic stabilizers are from McKay and Reis (2016)

[2]A household is classified as public if at least one member is employed in the government sector.

Keynesian framework (HANK) with two employment states and two asset choices, explicitly modeling public- and private-sector households as distinct groups. This structure isolates a stabilization channel operating through household behavior and allows me to trace its general equilibrium effects on asset prices, capital accumulation, and spillovers to private-sector workers.

A large literature studies aggregate stabilization in HANK models through household consumption heterogeneity and marginal propensities to consume, while related work emphasizes portfolio choice and capital accumulation in two-asset environments. Separately, research on public-sector employment documents persistent differences in earnings stability and unemployment risk relative to the private sector, and recent contributions incorporate labour market frictions into HANK frameworks. Despite these advances, existing models abstract from persistent, policy-defined heterogeneity in unemployment risk across sectors, and from the interaction between public-sector and private-sector while incorporating income security, portfolio choice, and general equilibrium dynamics. As a result, the macroeconomic role of government employment as a stabilization mechanism remains underexplored.

As shown in McKay and Reis (2016, 2021), automatic stabilizers mitigate precautionary savings motives by insuring households against countercyclical increases in idiosyncratic income risk, thereby dampening the feedback loop between unemployment fears, savings, and aggregate demand. Importantly, stabilization arises even when policies are not explicitly state-contingent, because aggregate downturns raise the value of existing insurance. At the same time, this mechanism operates primarily through cyclical variation in effective insurance against rising risk, and its quantitative relevance depends on the interaction between aggregate risk, nominal rigidities, and the stance of monetary policy.

By contrast, government employment provides persistent, policy-defined income security by lowering unemployment risk and earnings volatility, independent of cyclical realizations. This form of insurance reshaped households' steady-state precautionary savings, portfolio composition, and marginal propensities to consume before shocks occur, rather than through countercyclical changes in insurance value. The paper therefore studies a stabilization channel that complements standard automatic stabilizers: while unemployment insurance stabilizes aggregate demand by dampening cyclical spikes in risk and precautionary savings, government employment stabilizes the economy by embedding low-risk income directly into the labour market, with implications for asset accumulation, MPC heterogeneity, and general-equilibrium spillovers.

This paper builds on the Heterogeneous Agent New Keynesian literature that emphasizes heterogeneity in marginal propensities to consume and portfolio composition as key drivers of aggregate shocks (Kaplan et al., 2018; Bayer et al., 2019; Luetticke, 2021; Bayer et al., 2024; Auclert et al., 2021, 2018). These models successfully capture amplification and redistribution through household balance sheets but typically abstract from unemployment risk or model income heterogeneity through transitory productivity shocks. As a result, heterogeneity in MPCs and portfolios arises endogenously from liquidity constraints rather than from persistent differences in income security tied to policy-defined employment environments.

Recent work incorporating labour market frictions and unemployment risk into HANK frameworks studies how job loss risk shapes consumption responses and business-cycle dynamics (Ravn and Sterk, 2017; Gornemann et al., 2022; Lee, 2026; Graves, 2025). Although they incorporate heterogeneity in unemployment risk across households, they do not distinguish between employment sectors with structurally different policy-driven unemployment risk. Consequently, this literature does not address how the coexistence of low-risk public employment and high-risk private employment reshapes aggregate stabilization through portfolio choice and general-equilibrium spillovers. Integrating public sector frictions further informs us of the policy dependent nature of the labour market, but also allows the identification of the low-risk, high-income profiles documented in Savoia (2024a,b).

Modeling labour market frictions is essential for understanding the macroeconomic role of government employment beyond its income-smoothing properties. Search-and-matching and on-the-job search frameworks document systematic cross-sectoral differences in job-finding rates, job destruction, and wage-setting, generating queues for public-sector jobs and wage compression relative to the private sector (Michaillat, 2014; Albrecht et al., 2018; Gomes, 2015). These frictions imply that expansions in public employment need not translate one-for-one into higher aggregate employment, but instead operate through composition effects and wage pressures, potentially crowding out private employment while raising equilibrium wages. Incorporating these frictions is therefore crucial to quantify the general-equilibrium trade-offs associated with government employment and to distinguish stabilization through income security from distortions in labour allocation.

A key empirical input to the framework is the measurement of sector-specific income risk. While existing work documents that government employment is associated with lower unemployment risk and more stable earnings than private-sector employment (Kopelman and Rosen, 2016), the evidence is largely descriptive and static. This paper provides new estimates of time-varying income risk by employment sector, showing that public-sector households face persistently lower variance in income risk over the business cycle. These risk profiles are consistent with micro evidence from the Panel Study of Income Dynamics and imply systematically different consumption and portfolio behavior across sectors. In particular, public-sector households exhibit muted consumption responses during the Great Recession, consistent with reduced precautionary motives rather than contemporaneous policy interventions.[3]

Methodologically, the paper introduces a Heterogeneous Agent New Keynesian

[3]See Appendix for difference-in-differences evidence using PSID consumption data.

framework that explicitly separates unemployment risk from earnings risk and allows both to differ persistently across public and private employment. This distinction is essential for identifying the stabilization effects of government employment independently of standard automatic stabilizers or transitory income shocks. By combining empirically disciplined sectoral risk profiles with a two-asset household problem, the framework isolates a novel stabilization channel operating through ex ante income security, portfolio composition, and marginal propensities to consume, and traces its general-equilibrium implications for asset prices, capital accumulation, and labour market spillovers.

Building on this structure, the paper aims towards a historical decomposition approach in the spirit of Bayer et al. (2024) to quantify how policy-defined employment security contributes to observed movements in the wealth distribution over time. By disciplining sector-specific income and unemployment risk, the framework distinguishes changes in wealth accumulation driven by aggregate shocks from those arising from persistent differences in income security embedded in the labour market. This allows the analysis to attribute part of the evolution of household balance sheets to the stabilizing role of government employment, rather than solely to monetary, productivity, or fiscal shocks. In this sense, the historical decomposition clarifies how policy-driven employment arrangements shape the distributional and aggregate dynamics of wealth through their effects on precautionary saving and portfolio composition.

The analysis further considers an extension with sector-specific search and wage frictions, allowing public and private employment to interact endogenously through job allocation, wage compression, and crowding-out effects. This extension clarifies the trade-offs between stabilization through income security and distortions in labour allocation, and highlights the policy-dependent nature of public-sector employment beyond its income-smoothing role.

The paper proceeds in five steps. First, it documents empirical facts on sectoral employment environments, highlighting persistent differences in income stability and unemployment risk between public and private employment. Second, it introduces a parsimonious HANK framework with exogenous government employment to isolate the stabilization effects of employment security in the absence of labour market frictions. Third, it studies the general-equilibrium responses of consumption, investment, and asset prices to monetary and productivity shocks within this benchmark framework. Fourth, it extends the model to incorporate random search and sector-specific wage frictions, allowing public and private employment to interact endogenously. Finally, the paper discusses estimation and validation, linking empirically measured sectoral risk to aggregate dynamics.

2 Income Risk and Unemployment Transitions

To characterize sectoral income dynamics and their role in macroeconomic stabilization, I separately identify income risk and unemployment risk for public- and private-sector households. Income risk captures time variation in earnings conditional on employment, while unemployment risk is governed by sector-specific employment transitions. Distinguishing these two dimensions is essential: the former disciplines the distribution and persistence of labour income, while the latter reflects the exposure of households to policy-driven employment risk.

Jointly measuring income and unemployment risk provides a higher-resolution characterization of household income processes. Income risk governs the dispersion and persistence of earnings conditional on employment, whereas unemployment risk captures the safety of employment itself. Since public-sector employment transitions are policy-determined, incorporating unemployment dynamics is crucial for assessing the fiscal stabilization channel emphasized in this paper.

This section describes the empirical identification of sector-specific income risk and employment transitions. The next section embeds these estimates into the model and clarifies how the documented empirical differences discipline the stabilization mechanism of government employment.

2.1 Income Risk

I follow the decomposition methodology of Bayer et al. (2019), estimating income risk separately for public- and private-sector households. A household is classified as public if at least one member is employed in the government sector. To isolate income risk from unemployment risk, I restrict attention to households that remain in the same sector across quarters. These households account for roughly 90% of observations, implying minimal loss of representativeness. Earnings fluctuations associated with sectoral transitions are captured separately through unemployment transitions. I use SIPP data aggregated to the household level at a quarterly frequency.[4]. I focus on household labour income after taxes and transfers.

Assuming the household income is composed of a transitory, a persistent, a household-fixed, and a deterministic component.[5] [6]

[4]My data specification allows for potential short term unemployment transitions, but only if households come back to their respective group. Given the low transition from unemployment to government, this should not be an issue in estimating income risk in government employees

[5]I abstain from specifying the employment state s, but each process is separately estimated for each groups.

[6]This procedure is mimicking Bayer et al. (2019), see their paper for the full explanations.

$$
\begin{aligned}
logy_{it} &= f(o_{it}) + \tau_{it} + e_{it} + \mu_i \\
e_{it} &= \sum_{s=c}^{t} \rho_e^{t-s} \epsilon_{is}^e, \\
\tau_{it} &= \epsilon_{it}^\tau + \rho_\tau \epsilon_{it-1}^\tau, \\
\epsilon_{it}^\tau &\sim \mathcal{N}(0, \sigma_\tau^2), \quad \epsilon_{it}^e \sim \mathcal{N}(0, \sigma_{\epsilon,t}^2), \quad \mu_i \sim \mathcal{N}(0, \sigma_\mu^2)
\end{aligned}
$$

where c defines a cohort by the quarter when a household head turns 30, $f(o_{it})$ measures the effect of observable household characteristics o_{it}, τ_{it} is a moving average (MA(1)) transitory shock, μ_i is a household fixed effect, and e_{it} is a persistent component.

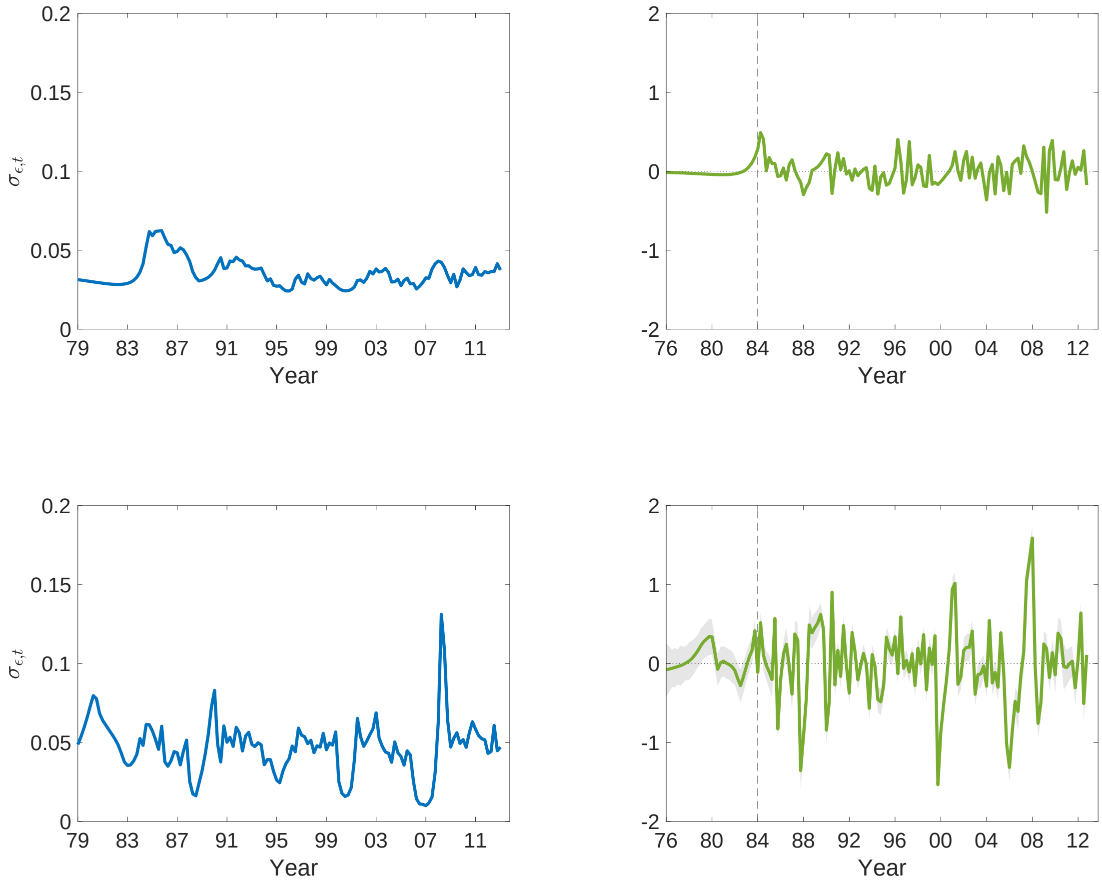
To define the permanent income risk, I assume that transitory shocks and fixed effects are homoscedastic, while the variance $\sigma_{\epsilon,t}^2$ of the shocks ϵ_{it}^e to the persistent component, e_{it}, evolves according to the following log AR(1) process, around a quadratic time trend:

$$
\begin{aligned}
\sigma_{\epsilon,t}^2 &= \bar{\sigma}_\epsilon^2 exp(s_t + t\theta_1 + t^2\theta_2), \\
s_t &= \rho_s s_{t-1} + \epsilon_{t-1}^s, \\
\epsilon_t^s &\sim \mathcal{N}\left(-\frac{\sigma_s^2}{2(1+\rho_s)}, \sigma_s^2\right).
\end{aligned}
$$

Estimating using Bayer et al. (2019) methodology, and reducing bootstraps levels, we can observe a significant difference between the income risk of government employees and private employees:[7]

[7] More robust estimates are being computed and will be integrated in a newer version.

Figure 1: Comparison of Sectors



(a) Level

(b) Shocks

Figure 1: Comparison between government and private sectors. The first row represents Government employment. Left panel: Estimated standard deviation of persistent income shocks for the period 1979-2013. Right panel: Shocks to income risk. Early Results, to be updated.

Shocks are drawn from a time-varying normal distribution and propagate over time through a persistent component. This identifies how households are exposed to income shocks across periods. For government households, shocks are slightly more persistent but exhibit substantially smaller dispersion, resulting in much lower and smoother income risk over time. Consequently, the implied standard deviation of the persistent income process is both lower and less cyclical. This lowers precautionary saving motives and implies a higher willingness to hold illiquid assets.

The estimates in Table 1 confirm that government employment is associated with both lower income risk and muted cyclical fluctuations. Relative to the private sector, the persistence of shocks to the variance process, ρ_s, is estimated with larger standard errors, reflecting reduced precision in earlier periods due to smaller samples. Nevertheless, the level and time variation of income risk remain well identified. The estimated persistence of income shocks, $\rho_e = 0.924$, is lower than benchmark values in the literature, while the volatility of income risk shocks, $\sigma_s = 0.162$, is quantitatively small. Compared to Bayer et al. (2019), this value is roughly three times lower. Consistent with these estimates, figure 1 shows a near absence of cyclical amplification in income risk during large aggregate shocks for government households.

Table 1: Income Process Estimates by Sector

	Government	Private	Bayer et al. (2019)
ρ_e	0.924 (0.18)	0.967 (0.00)	0.98 (0.06)
ρ_s	0.922 (0.21)	0.841 (0.01)	0.841 (0.06)
$\bar{\sigma}$	0.067 (0.01)	0.071 (0.00)	0.06 (0.03)
σ_s	0.162 (0.06)	0.458 (0.05)	0.54 (0.10)
ρ_τ	0.058 (0.06)	0.337 (0.01)	0.34 (0.01)
σ_τ	0.003 (0.02)	0.090 (0.00)	0.12 (0.00)
σ_μ	0.189 (0.03)	0.254 (0.01)	0.27 (0.01)

Notes: Quarterly frequency. Standard errors in parentheses (wild bootstrap for Government and Private). Bayer et al. (2019) values reported as in the original study.

2.2 Unemployment Transitions

Unemployment transitions are taken from the Current Population Survey over the period 1996–2018, using the estimates of Fontaine et al. (2020). The analysis focuses on transitions between private employment, government employment, and unemployment.[8] Averaging these transitions over time yields a stationary Markov transition matrix, which is used to discipline baseline differences in unemployment risk across employment sectors.

Table 2 highlights substantial asymmetries in unemployment dynamics across sectors. Private-sector workers face an unemployment transition probability of 1.5% per month, roughly twice that of government workers, whose corresponding probability is 0.7%. At the same time, job-finding rates out of unemployment are higher for private employment than for government employment, reflecting both greater cyclical sensitivity and higher turnover in the private sector. As a result, private employment is characterized by higher exposure to aggregate fluctuations, both in job destruction and job finding.

Table 2: Transition probabilities by employment status

	Private	**Unemployed**	**Government**
Private	0.983	0.015	0.003
Unemployed	0.289	0.685	0.026
Government	0.013	0.007	0.980

These asymmetries become particularly pronounced during downturns. During the Great Recession, elevated separations from private employment combined with depressed job-finding rates generated persistent increases in unemployment, with recovery taking several years.

The time variation in unemployment risk and job finding rate will be used to measure random search frictions. Building on the historical decomposition methodology of Bayer et al. (2024), this structure allows the analysis to trace how fluctuations in unemployment risk contribute to aggregate and distributional dynamics over time, while preserving the persistent cross-sectoral differences documented in the data. Fur-

[8]We abstract from from transitions into labour force inactivity due to the complexity of differentiating the state of inactivity.

thermore, it will inform us of the labour policies held by the government institutions.[9]

Collectively, these differences in income risk and unemployment transitions imply that government-sector households were substantially more insulated from the income disruptions of the Great Recession. The next subsection examines whether this insulation is reflected in household expenditure data.

Figure 2: Comparison of Unemployment Transitions

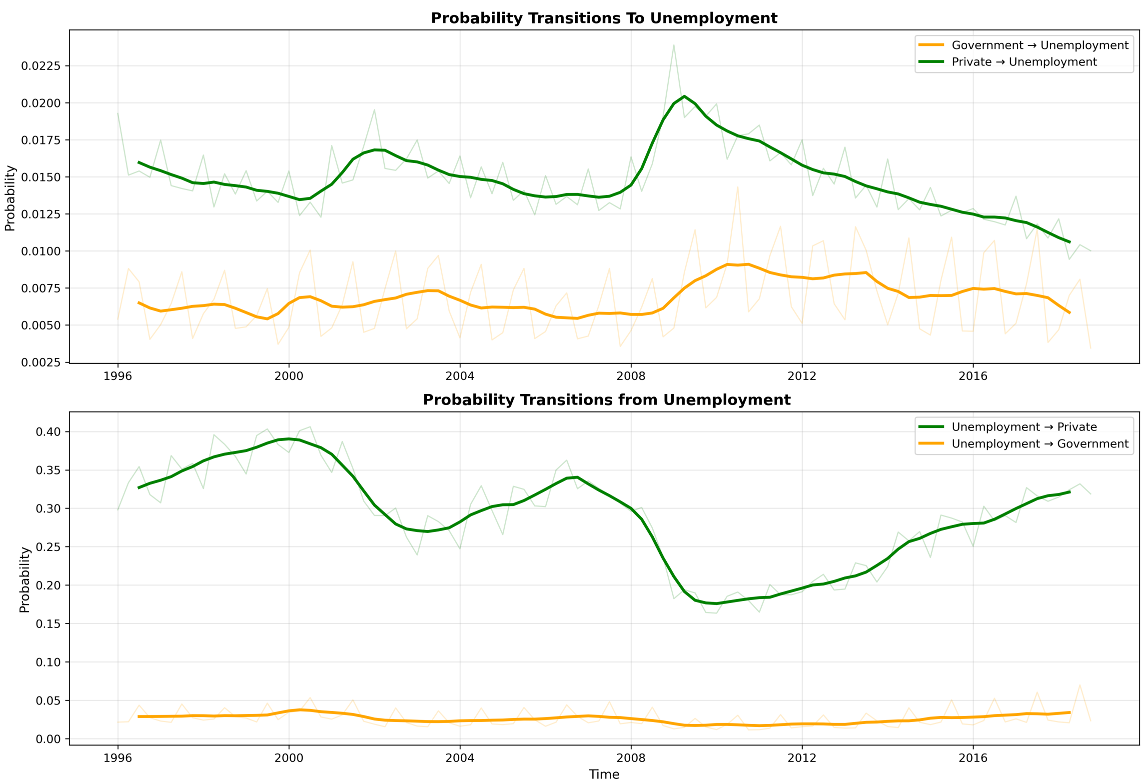


Figure 2: Probability transitions to and from unemployment for each sector. The first graph represents the transitions towards unemployment while the second graph represents the transitions from unemployment.

2.3 Consumption Responses to the Great Recession

The preceding subsections document two dimensions along which government and private employment differ sharply: persistent income shock volatility ($\hat{\sigma}_s = 0.162$ versus 0.458, Table 1) and monthly unemployment risk (0.7% versus 1.5%, Table 2).

[9]You may refer to the section on labour market frictions for further detail.

Together, these imply that during an aggregate contraction, private-sector households face both a higher probability of job loss and larger income shocks conditional on remaining employed. This subsection asks whether these differences produced a measurable divergence in household consumption during the Great Recession, using micro-level panel data from the *Panel Study of Income Dynamics (PSID)*.

The sample includes family-level observations with consistent composition across waves. I extract data on total family income and total household expenditures, recorded for the year prior to each interview. The study period spans from 1999 to 2017 at a bi-annual frequency, allowing us to observe consumption responses before, during, and after the Great Recession. I restrict the sample to households with at least one employed adult in the prior year and with at least two survey observations. Employment class (private, self-employed, local, state, or federal) is used to classify households into government and non-government sectors; a government household is one with at least one government employee.

To estimate the impact of government employment security on expenditure behavior, I employ a two-way fixed-effects model. I specify the log of the expenditure rate Y_{it} for household i at time t as follows:

$$Y_{it} = \alpha_i + \delta_t + \gamma(G_i \times \mathbb{1}_{\mathrm{rec},t}) + \beta X_{it} + \epsilon_{it} \tag{1}$$

The household fixed effects α_i absorb all time-invariant unobserved heterogeneity across households — such as permanent preferences, risk attitudes, or sorting into the public sector — so that identification of γ comes entirely from within-household variation over time. The time fixed effects δ_t control for aggregate macroeconomic conditions common to all households in each period, including business cycle fluctuations, monetary policy changes, and economy-wide price movements. The key coefficient of interest, γ, captures the differential change in log expenditure for government-employed households during the recession relative to their own pre-recession levels and relative to the contemporaneous change experienced by private-sector households. X_{it} includes controls for age (and its square), education, marital status, number of children, unemployment rate, and log permanent income.

Table 3: Fixed-Effects Estimates: Government Employment and Log Household Expenditure

	Dependent variable: Log Expenditure		
	(1)	(2)	(3)
Recession 2008	0.126***		
	(0.023)		
Govt × Recession 2008	0.056**	0.058**	0.055**
	(0.021)	(0.021)	(0.021)
Log Income	0.027***	0.026***	0.026***
	(0.007)	(0.007)	(0.007)
Govt × Recession 2001			−0.015
			(0.017)
Household FE	✓	✓	✓
Year FE		✓	✓
Controls	✓	✓	✓
Observations	30,482	30,482	30,482
R^2	0.853	0.854	0.854
R^2 Within	0.079	0.067	0.068

Standard errors in parentheses. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
Controls include age, age^2, education of head, education of spouse, number of children, and marital status.

Table 3 reports the regression results implying that, during the Great Recession, government-employed households sustained expenditure levels approximately 5.5–5.8% higher relative to their own pre-recession baseline and relative to the contemporaneous contraction experienced by private-sector households. This magnitude is consistent with the income risk differences documented in Table 1: the persistent shock volatility for government workers ($\hat{\sigma}_s = 0.162$) is less than half the private-sector estimate (0.458), and their transitory shock volatility is near zero ($\hat{\sigma}_\tau = 0.003$ versus 0.090), implying that government-employed households experienced markedly smaller income contractions during the downturn. The lower probability of job loss reported in Table 2 (0.7% versus 1.5% per month) further reinforced this capacity to maintain expenditure. In specification (1), the main effect of the 2008 recession indicator is also positive and highly significant (0.126), capturing aggregate variation in measured expenditure during the crisis period; this aggregate component is absorbed by the year fixed effects in specifications (2) and (3), leaving the interaction term as the cleanest estimate of the differential government-sector buffer.

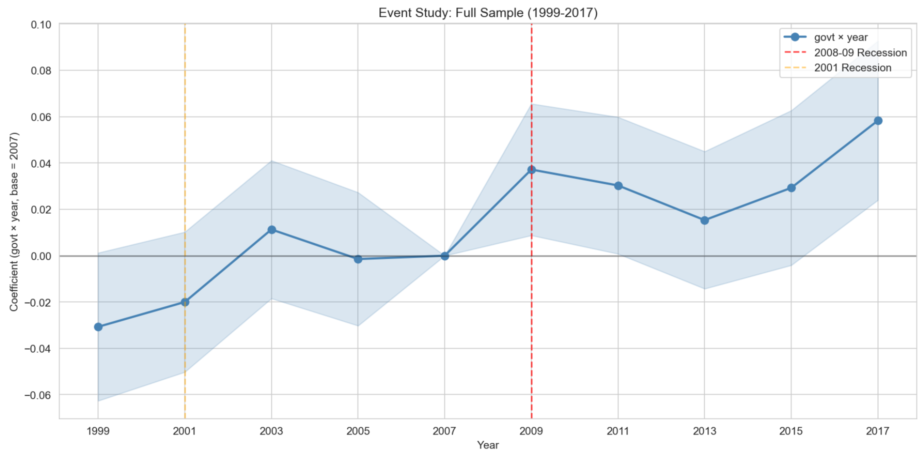
Specification (3) adds a placebo interaction for the 2001 recession. The estimated coefficient (-0.015) is small and statistically indistinguishable from zero, supporting the interpretation that the 2008 effect reflects a specific stabilizing role of public employment during that particular downturn rather than a mechanical pattern across all recessions. Intuitively, given the significance of the great recession, it would be expected to see the differences showing up from the PSID. The 2001 recession being of relatively shorter effects on unemployment, we don't see it being particularly important in differentiating from government. Taken together, these results are consistent with the hypothesis that public sector employment hold stable consumption patterns regardless of cycles.

These results are in turn solidified by an event study to explore temporal dynamics around the 2009 shock:

$$Y_{it} = \alpha + \sum_k \gamma_k (Govt_i \times D_{kt}) + \beta_2 Govt_i + X'_{it}\beta_x + \epsilon_{it} \tag{2}$$

Where D_{kt} are dummies for event time k relative to the base year 2007, γ_k captures the differential log expenditure for government-employed households in year k, X_{it} includes year dummies and standard controls.

The estimates show a clear divergence in 2009: government households exhibit a statistically significant increase in relative expenditure (approx. 6%). This supports the results of public employment holding stable expenditure regardless of downturns. The differential effect maintains a small significance up to 2011 with with little evi-



dence of persistent deviation in later years, except for a mild resurgence in 2017.

The pre-recession coefficients ($k \leq 2005$) are small and statistically insignificant, supporting the parallel trends assumption underlying the identification strategy. This is consistent with the stable, acyclical transition rates in Table 2: in normal times, the employment security gap between sectors is persistent but does not systematically widen, giving no reason to expect diverging consumption trends before a major aggregate shock.

Taken together, the PSID evidence provides direct micro-level support for the stabilization mechanism at the heart of this paper: the income and unemployment risk differentials documented in Tables 1 and 2 translate into measurable consumption differences during severe downturns. Section 3 embeds these empirical patterns into a heterogeneous-agent general equilibrium framework, and Section 5 quantifies the aggregate implications of these sectoral differences.

3 Model

I extend the household problem of Kaplan et al. (2018), by incorporating an employment state-dependent jump process, across the government,unemployment and private sector. This extension allows for an exogeneous consideration of government employment. In turn, expenditure toward government services are exogeneously determined by the labour weight of public sector.[10]

3.1 Household Problem

The economy is populated by a continuum of ex-ante identical households, indexed by $i \in [0,1]$. They are infinitely lived and have time-separable preferences with time-discount factor β. Household income differs on idiosyncratic labour productivity e^s_{it} and employment status $s \in G, P, U$, representing government, private and unemployment, respectively. They maximize utility by making decisions over their consumption c^s_{it}, leisure, and savings between liquid b^s_{it} and illiquid assets a^s_{it}. Where agents are faced with a borrowing constraint B, allowing for an exogenous debt limit, but cannot hold negative illiquid assets. Given the budget constraint and idiosyncratic environment, we can write down a state dependent bellman equation:

$$V^s_t(e_t, b_{t-1}, a_{t-1}) = \max_{c_t, b_t, a_t} \left\{ \frac{c_t^{1-\sigma}}{1-\sigma} - \varphi \frac{(N^s_t)^{1+v}}{1+v} + \beta\, \mathbb{E}^s_t V^s_{t+1}(e_{t+1}, b_t, a_t) \right\} \tag{3}$$

Subject to

$$c^s_{it} + a^s_{it} + b^s_{it} = y^s_{i,t}(e^s_{i,t}) + (1 + r^a_t) a^s_{i,t-1} + (1 + r^b_t) b^s_{i,t-1} - \Psi(a^s_{it}, a^s_{i,t-1}),$$
$$b^s_{it} \geq \underline{B}, \quad a^s_{it} \geq 0,$$

I assume that each households can supply all varieties of labour, but only the private sector is endogenously supplying to a labour union. The government households are treated as exogenous in their labour supply decisions. Hours worked N^p_t, for private households, are determined by the firm's labour demand in accordance to a labour packer aggregation of supplied labour unions. To simplify, government em-

[10]Given recent developments, you will find the discrete time version of the model, following Auclert et al. (2021). For the continous time approach, I refer to the appendix.

ployees provide an exogenous hours of work, but do not supply to the labour unions. The private wage w_t^p, are thus only bargained for private employees, by the labour unions. The government wage w_t^g is set exogeneously to fix an empirical average ratio. All households can provide all types, but their labour supply depends on their current labour position. Unemployed households receive unemployment benefits u_b matched with their prior state position on the productivity grid.

$$\mathbf{y}_{i,t}^s(e_{i,t}^s) \equiv \begin{bmatrix} (1-\tau_t)\, w_t^P\, N_t^P\, e_{i,t}^P & \text{for private } (s=1) \\ (1-\tau_t)\, w_t^G\, e_{i,t}^G & \text{for public } (s=2) \\ ub & \text{for unemployed } (s=3) \end{bmatrix}$$

I use the adjustment cost function from Auclert et al. (2021), with $\chi_0, \chi_1 > 0$ and $\chi_2 > 1$, as

$$\psi(a, a_{t-1}) = \frac{\chi_1}{\chi_2} \left| \frac{a_{it} - (1+r_t^a)a_{it-1}}{(1+r_t^a)a_{it-1} + \chi_0} \right|^{\chi_2} [(1+r_t^a)a_{it-1} + \chi_0] \tag{4}$$

In its most basic form, the income process can be discretized into a log AR(1) process:

$$loge_{it}^s = \rho^s loge_{it-1}^s + \sigma^s \epsilon_{it} \tag{5}$$

With normal innovations $\epsilon_{it} \sim \mathcal{N}(0,1)$. Intuitively, ρ^s is the persistence of income, or the speed of reverting back to the mean. σ^s represents the persistent income risk. Notice that employment types will influence the income process of households. Table 1 shows a significantly lower variance of risk in government employment than private, with relatively lower persistence. I further include the exogenous transition probability of moving across sectors.

3.2 Labour Market

Labour packer. The private-sector labour market is organized around unions indexed by $k \in [0,1]$. Each union represents a continuum of private-sector households and sets a uniform labour supply rule, $N^p_{kt} = n^p_{ikt}$, which implies the normalization $\int_i e_{it}\, di = 1$, where e_{it} denotes individual labour efficiency. Aggregate effective labour supplied by union k is given by

$$N^p_{kt} N_p = \int_0^p \int_i e^p_{it} n^p_{ikt}\, di\, dp, \tag{6}$$

with N_p denoting the mass of private households. This formulation isolates variation at the extensive margin of labour supply.

A competitive labour packer aggregates the continuum of differentiated labour inputs into a composite labour input used by private firms. The aggregation technology is CES with elasticity of substitution $\varepsilon_w > 1$:

$$N^p_t N_p = \left(\int_0^1 \left(N_p N^p_t(k) \right)^{\frac{\varepsilon_w - 1}{\varepsilon_w}} dk \right)^{\frac{\varepsilon_w}{\varepsilon_w - 1}}. \tag{7}$$

Wage setting. Cost minimization by the labour packer yields labour demand for each type k,

$$N^p_t(k) = \left(\frac{W_t(k)}{W_t} \right)^{-\varepsilon_w} N^p_t, \tag{8}$$

where the aggregate wage index is defined as

$$W_t = \left(\int_0^1 W_t(k)^{1-\varepsilon_w}\, dk \right)^{\frac{1}{1-\varepsilon_w}}. \tag{9}$$

The associated steady-state gross wage markup is

$$\mu_w = \frac{\varepsilon_w}{\varepsilon_w - 1} > 1. \tag{10}$$

Wage dynamics. Under the symmetry assumption that each household supplies every labour type, marginal disutility of labour and consumption are identical across k. Unions represent private households and therefore internalize only aggregate private marginal utility when setting wages.

Nominal wage rigidities give rise to a New Keynesian wage Phillips curve,

$$\log(1+\pi_t^w) = \kappa_w N_p \left(\varphi N_t^{1+\nu} - \frac{(1-\tau_t) w_t^p N_t}{\mu_w} \int e_{it}^p c_{it}^{p-\sigma}\, di \right) + \beta \log(1+\pi_{t+1}^w). \tag{11}$$

The extensive margin N_p scales wage adjustment and reflects the role of labour composition across states, while the marginal utility term depends exclusively on private households.

3.3 Private Firms

Final output is produced by a representative competitive firm that aggregates a continuum of differentiated intermediate goods indexed by $j \in [0,1]$. The aggregation technology is of the Dixit–Stiglitz form,

$$Y_t = \left(\int_0^1 y_{j,t}^{\frac{\epsilon-1}{\epsilon}}\, dj \right)^{\frac{\epsilon}{\epsilon-1}}, \qquad \epsilon > 1, \tag{12}$$

where ϵ denotes the elasticity of substitution across intermediate inputs. Cost minimization implies the standard demand function for each variety,

$$y_{j,t} = \left(\frac{p_{j,t}}{P_t} \right)^{-\epsilon} Y_t, \tag{13}$$

with the aggregate price index given by

$$P_t = \left(\int_0^1 p_{j,t}^{1-\epsilon}\, dj \right)^{\frac{1}{1-\epsilon}}. \tag{14}$$

Each intermediate good is produced by a monopolistically competitive firm using capital and private-sector effective labour. Aggregation across firms and labour types implies an economy-wide production function of the form

$$Y_t = Z_t K_{t-1}^{\alpha} \big(N_t^p \cdot N_p \big)^{1-\alpha}, \tag{15}$$

where Z_t denotes aggregate productivity, K_{t-1} is predetermined capital, N_t^p captures the intensive margin of private labour, and N_p represents the private-sector extensive margin.

Firms rent capital and hire private labour in perfectly competitive factor markets. Given the Cobb–Douglas technology, real marginal cost is identical across firms and is given by

$$mc_t = \frac{1}{Z_t}\left(\frac{r_t^k}{\alpha}\right)^{\alpha}\left(\frac{w_t^p}{1-\alpha}\right)^{1-\alpha}, \tag{16}$$

where r_t^k denotes the rental rate of capital and w_t^p the real private wage.

Intermediate firms face Rotemberg-style quadratic costs of price adjustment. Optimal price setting yields a New Keynesian price Phillips curve,

$$\log(1+\pi_t) = \kappa_p\left(mc_t - \frac{1}{\mu_p}\right) + \frac{Y_{t+1}}{(1+r_{t+1})Y_t}\log(1+\pi_{t+1}), \tag{17}$$

where π_t denotes price inflation, $\mu_p = \epsilon/(\epsilon-1)$ is the desired gross price markup, κ_p is the slope of the Phillips curve, and r_t is the real interest rate.

Capital accumulation is subject to quadratic adjustment costs and is governed by a Tobin's Q formulation. The investment condition implies

$$Q_t = 1 + \frac{1}{\delta\epsilon_I}\left(\frac{K_t - K_{t-1}}{K_{t-1}}\right), \tag{18}$$

where δ denotes the depreciation rate and ϵ_I controls the magnitude of adjustment costs. Firm valuation satisfies the no-arbitrage condition

$$\begin{aligned}(1+r_t)Q_t = \alpha Z_{t+1}\left(\frac{N_{t+1}^p N_p}{K_t}\right)^{1-\alpha} & mc_{t+1} \\ - \left[\frac{K_{t+1}}{K_t} - (1-\delta) + \frac{1}{2\delta\epsilon_I}\left(\frac{K_{t+1}-K_t}{K_t}\right)^2\right] & + \frac{K_{t+1}}{K_t}Q_{t+1}.\end{aligned} \tag{19}$$

3.4 Government

The government faces exogenous expenditures G_t and provides public services S_t. It raises revenues through a progressive tax system with rate τ_t, and provides lump-sum transfers T_t. The intertemporal government budget constraint is:

$$\dot{B}_t^g + G_t + S_t + T_t = \tau_t \sum_{s\in\{G,P\}} \int w_t^s z^s l_t^s(a,b,z)\, d\mu_t + r_t^b B_t^g, \tag{20}$$

where total service expenditure is:

$$S_t = w_t^g N_t^g. \tag{21}$$

3.5 Financial Intermediation and Monetary Policy

I follow the financial intermediary framework of Auclert et al. (2021). A representative competitive financial intermediary collects liquid and illiquid deposits from households and invests them in nominal government bonds B_t^g and firm equity p_t. The intermediary performs liquidity transformation at a proportional cost $\omega \int b_{it}\, di$, where b_{it} denotes household liquid asset holdings.

The monetary authority supplies nominal government bonds and sets the short-term nominal interest rate i_t. Monetary policy therefore affects the economy through the returns on nominal assets and the induced path of inflation.

No-arbitrage implies that the economy-wide ex-ante real return $E_t[1+r_{t+1}]$ is equalized across all assets held by the intermediary. In equilibrium,

$$E_t[1+r_{t+1}] = \frac{1+i_t}{E_t[1+\pi_{t+1}]} = \frac{E_t[d_{t+1}+p_{t+1}]}{p_t} = E_t[1+r_{t+1}^a] = E_t[1+r_{t+1}^b] + \omega, \tag{22}$$

where r_{t+1}^a denotes the return on illiquid assets, r_{t+1}^b the return on liquid assets net of intermediation costs, d_{t+1} firm dividends, and π_{t+1} inflation.

Ex-post realized returns differ due to surprise inflation and capital gains. Since liquid assets are nominal, their realized real return satisfies

$$1+r_t = \frac{1+i_{t-1}}{1+\pi_t} = 1+r_t^b+\omega. \tag{23}$$

Capital gains are assumed to accrue entirely to the illiquid portfolio. The realized return on illiquid assets is therefore given by

$$1+r_t^a = \Theta_p \left(\frac{d_t+p_t}{p_{t-1}}\right) + (1-\Theta_p)(1+r_t), \tag{24}$$

where Θ_p denotes the share of equity in the illiquid portfolio.

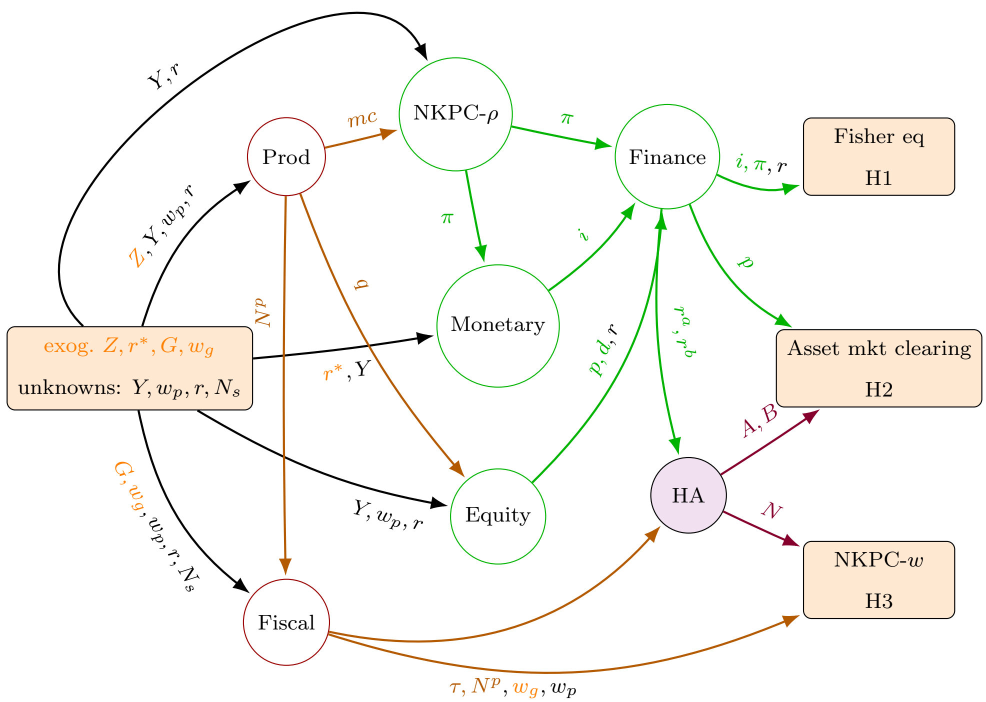
The monetary authority sets the nominal interest rate according to a policy rule,

$$i_t = \bar{i} + \phi_\pi \pi_t + \phi_y \big(Y_t - \bar{Y}\big). \tag{25}$$

and adjusts the supply of nominal government bonds to satisfy market clearing. Through its effect on expected and realized real returns, monetary policy generates state-contingent redistribution across households via the intermediary.

3.6 Directed Acyclical Graph

The general equilibrium dynamics can be represented by a Directed Acyclcical Graph (DAG) following (Auclert and Rognlie, 2018):



Parameter	**Symbol**	**Value**	**Description / target**
Preferences			
Discount factor	β	0.976	Set to clear the asset market in steady state
EIS parameter	σ	0.5	Intertemporal elasticity of substitution is $1/\sigma$
Inverse Frisch	ν	1.0	Frisch elasticity is $1/\nu$
Technology			
Capital share	α	–	Calibrated to match $K = 10Y$
Depreciation	δ	0.02	Quarterly depreciation rate
TFP level	Z	–	Calibrated to normalize $Y = 1$
Investment adj. cost	ϵ_I	4.0	Governs Tobin's-Q investment elasticity
Nominal rigidities and markups			
Price Phillips slope	κ_p	0.1	Rotemberg/Calvo-implied price adjustment slope
Wage Phillips slope	κ_w	0.1	Wage adjustment slope
Price markup	μ_p	–	Calibrated to match total wealth $p + B_g = 14Y$
Wage markup	μ_w	1.1	Target steady-state wage markup
Portfolio adjustment costs			
Scale	χ_0	0.25	Adjustment cost scale
Level	χ_1	6.5	Calibrated to match liquid wealth $B_h = 1.04Y$
Curvature	χ_2	2.0	Adjustment cost curvature
Liquidity wedge	ω	0.005	Intermediation wedge between liquid/illiquid returns
Monetary and fiscal policy			
Inflation target	π^*	0.0	Zero-inflation steady state
Steady real rate	r^*	0.0125	Quarterly (5% annual)
Taylor coefficient	ϕ_π	1.5	Response of i_t to inflation; baseline sets $\phi_y = 0.21$
Government debt	B_g	2.8	Steady-state debt level
Government spending	G	0.2	Steady-state government purchases/services
Gov wage premium	w_g/w_p	1.1	Public wage set relative to private wage
Unemployment benefit	b_u	0.1	Replacement rate

Notes: Parameters reported as "–" are calibrated endogenously to match the stated steady-state targets. Scenario variation in the public-sector job-finding rate is reported separately in Table 5.

Table 4: Calibration parameters (quarterly)

4 Calibration

Table 4 reports the baseline quarterly calibration. Preference, technology, and nominal-rigidity parameters take standard values from the HANK literature. The capital share and productivity are calibrated to match a capital–output ratio of 10 and normalized output. Portfolio adjustment costs and the liquidity wedge follow the financial intermediation structure in Auclert et al. (2021), implying a small spread between liquid and illiquid returns. Monetary policy follows a standard Taylor rule responding only to inflation, while fiscal parameters—including government debt, spending, and unemployment benefits—are set conservatively to match steady-state aggregates.

Baseline government employment transitions are taken from Table 2 and calibrated using the estimates of Fontaine et al. (2020). These transitions imply an average government employment share of 17% of the labour force, consistent with U.S. averages over the period 1996–2018.

Table 5 summarizes the resulting steady-state moments and parameter values across counterfactual economies. I consider three alternative values for the public-to-private transition rate, g_p—*Low*, *Baseline*, and *High*—which govern the relative size of the government and private sectors. These specifications are compared to the benchmark HANK economy of Auclert et al. (2021), which abstracts from employment transitions and sectoral differentiation. Increasing g_p reduces the effective "safety" of government employment by raising the probability of transitioning into a higher-risk private-sector environment. The *Baseline* specification corresponds to the U.S. calibration based on Fontaine et al. (2020).

The model targets an aggregate illiquid-to-liquid asset ratio of 12.46, consistent with the data. Government employment exerts significant upward pressure on illiquid asset holdings, reflecting lower income and unemployment risk. Moreover, comparing the labour force share of government employment to its share of aggregate consumption reveals that public-sector households consume more per capita on average. The combination of high illiquid asset holdings and elevated consumption is consistent with a "rich hand-to-mouth" characterization. Importantly, the model captures this behavior not only through high marginal propensities to consume, but through persistently lower income risk and reduced precautionary saving motives.

5 General Equilibrium Dynamics

This section studies the dynamic general equilibrium effects of aggregate shocks and contrasts them with the standard HANK framework used in Auclert et al. (2021). I focus on two disturbances: an expansionary monetary policy shock and a recessionary total factor productivity (TFP) shock. The comparison highlights how government employment and portfolio heterogeneity reshape aggregate dynamics, asset reallocation, and consumption

Metric	Low ($g_p = 0.0065$)	Baseline ($g_p = 0.0125$)	High ($g_p = 0.06$)	Standard HANK	Target
1. Labour market outcomes					
Unemployment rate (%)	3.95	4.09	4.36	0.00	Transition parameters
Private employment (%)	74.14	79.85	90.49	100.00	—
Government employment (%)	21.91	16.06	5.16	0.00	—
Private wage	0.890	0.827	0.729	0.660	Zero inflation (NKPC-w)
Wage ratio (gov/private)	1.10	1.10	1.10	N/A	Fixed relative wage
2. Asset and consumption shares					
Consumption share – Private (%)	72.65	78.83	90.64	N/A	—
Consumption share – Government (%)	24.04	17.67	5.49	N/A	—
Illiquid asset share – Private (%)	75.41	80.11	90.54	N/A	—
Illiquid asset share – Government (%)	20.86	16.02	5.29	N/A	—
Liquid asset share – Private (%)	88.72	90.21	93.39	N/A	—
Liquid asset share – Government (%)	9.02	7.42	4.04	N/A	—
Illiquid/liquid ratio	12.46	12.46	12.46	12.46	Implied by calibration
Illiquid/liquid ratio (private)	10.59	11.07	12.08	12.46	Implied by calibration
Illiquid/liquid ratio (government)	28.84	26.91	16.33	N/A	—
3. Structural parameters					
TFP	0.572	0.544	0.500	0.468	$Y = 1$
Discount factor (β)	0.973	0.973	0.975	0.973	Asset market clearing
Adjustment cost (χ_1)	3.28	3.67	4.47	4.88	$B = B_h = 1.04Y$
Capital share (α)	0.330	0.330	0.330	0.330	$K = 10Y$
Markup (μ_p)	1.015	1.015	1.015	1.015	Total wealth $= 14Y$
4. Fiscal policy					
Government services	0.215	0.146	0.041	0.200	Government employment
Unemployment benefits	0.0040	0.0041	0.0044	0.000	Fixed: $b_u = 0.1$
Labour tax rate (%)	26.87	29.16	33.51	35.61	Balanced budget

Table 5: Calibration targets, steady-state outcomes, and parameter values.

responses.

5.1 Expansionary Monetary Policy Shock

I first analyze an expansionary monetary policy shock and compare aggregate, and distributional responses across models. The discussion proceeds along three dimensions: aggregate dynamics, decomposition of the consumption responses into direct and indirect effect, and the portfolio reallocation between liquid and illiquid assets.

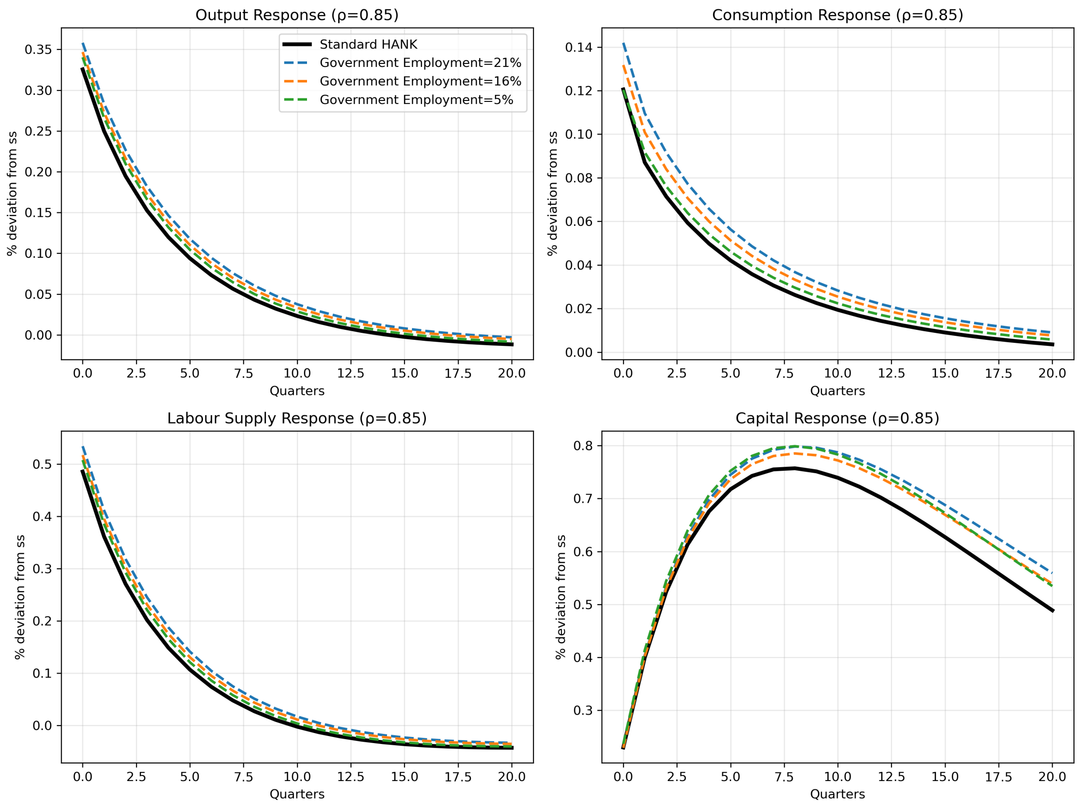


Figure 3: Monetary shock: aggregate responses.

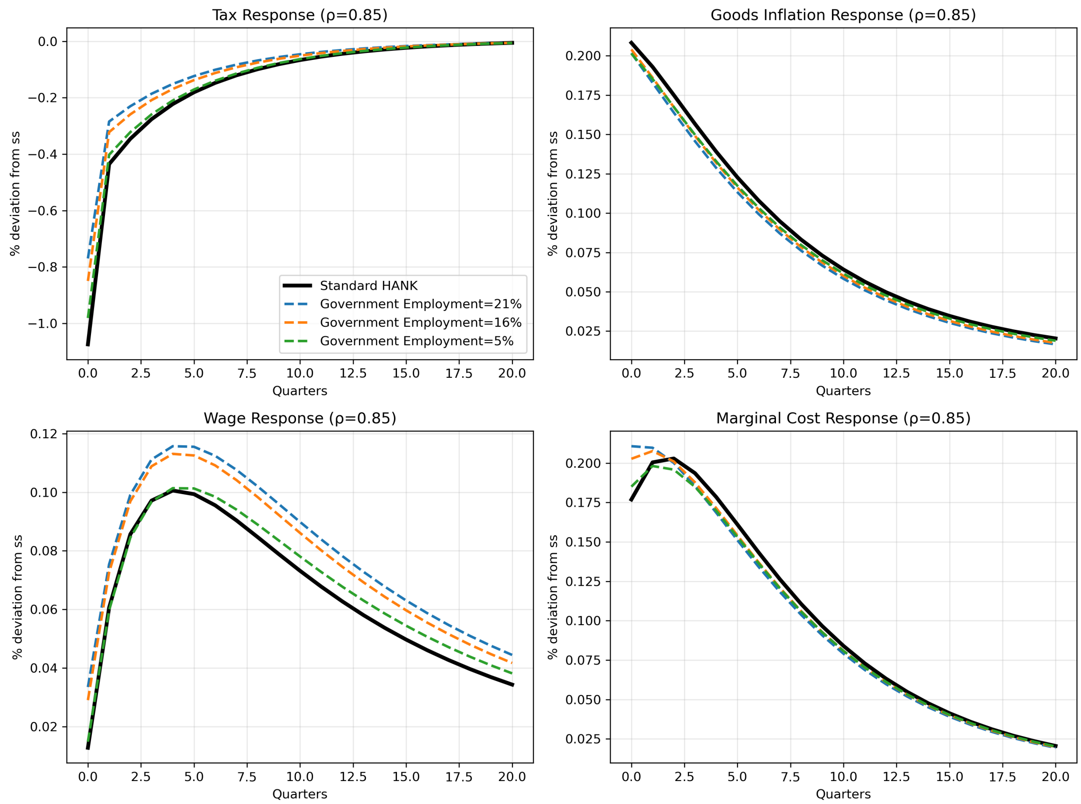


Figure 4: Monetary shock: price and wage dynamics.

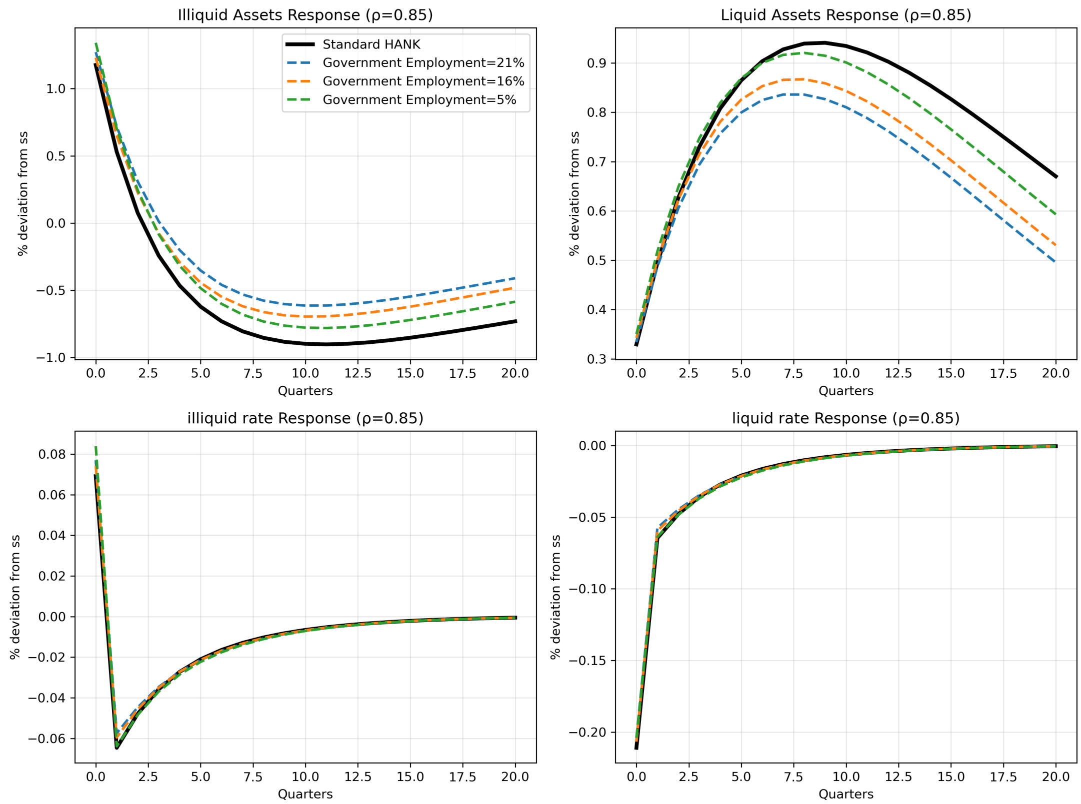


Figure 5: Monetary shock: asset market responses.

A decline in the nominal interest rate raises output, consumption, and investment on impact. Relative to a standard HANK economy, the baseline economy, with government employment, exhibits amplification of output responses, which is explained by a stronger aggregate consumption response and a similar short-run capital response. Over the medium horizons capital accumulation remains persistently higher in the baseline, reflecting differences in portfolio adjustment and income risk exposure across households.

In comparison to the standard HANK, the baseline model holds a dual interaction between private and government households. Both employment hold different stochastic environments, which differentiates their marginal utilities and portfolio allocations. Thus, it generates a different competition for assets. Although the returns on the illiquid and liquid assets remain the same in comparison to the Standard HANK, the response within the asset market differs. The private households hold larger amounts of constrained individuals. Being in a more risky environment, they will see larger gains in consuming today due to lower demand for the liquid assets by government households. As "Rich Hand-to-Mouth", government households are non constrained, and thus smooth adequately their consumption. Changes in the nominal rates impacts them to a lower extent due to their higher illiquidity and their ability to finance their consumption through income. This reduction in the liquidity need is reflected in 5 and 9 thus, they won't require large changes in liquidity.

To clarify the transmission mechanisms, let's first decompose the consumption response into direct and indirect effects:

$$dC_0 = \underbrace{\int_0^\infty \frac{\partial C_0}{\partial r_t^b}\, dr_t^b\, dt}_{\text{direct effect}} + \underbrace{\int_0^\infty \left(\frac{\partial C_0}{\partial w_t}\, dw_t + \frac{\partial C_0}{\partial r_t^a}\, dr_t^a + \frac{\partial C_0}{\partial \tau_t}\, d\tau_t \right) dt}_{\text{indirect effects}} . \tag{26}$$

The direct effect through liquid interest rates is present but muted for government-employed households, reflecting their limited exposure to liquid asset positions. The dominant channel operates through indirect effects, in particular via changes in illiquid asset returns. Expansionary policy raises the return on illiquid capital, strengthening investment incentives for households with sizable illiquid holdings.

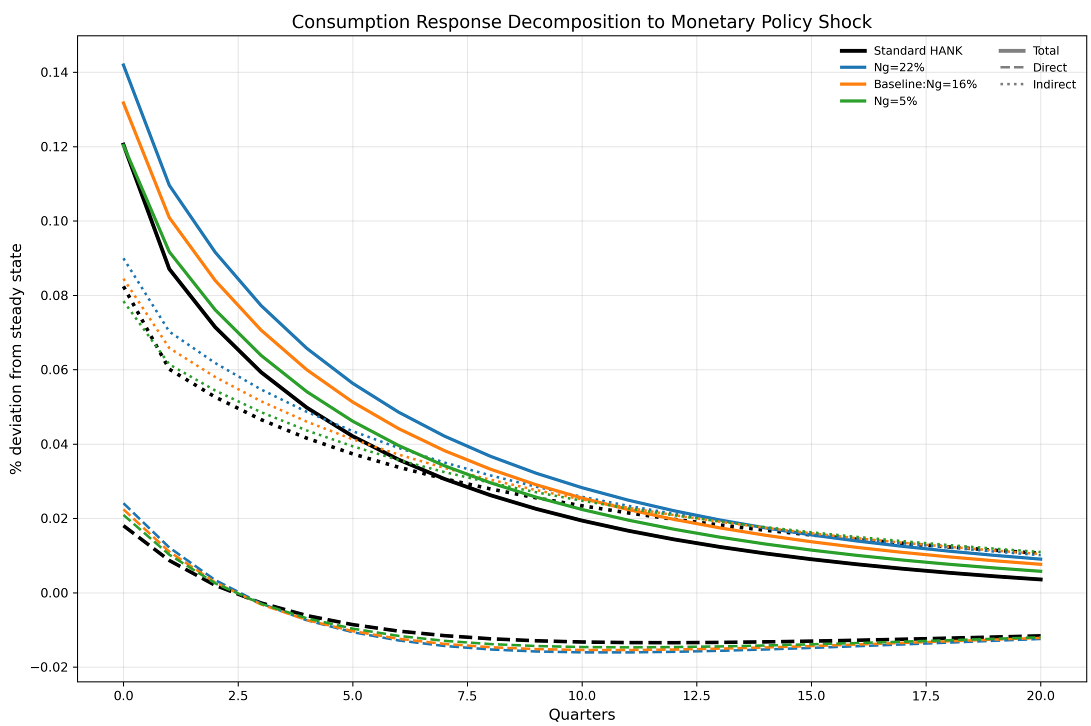


Figure 6: Monetary shock: consumption decomposition.

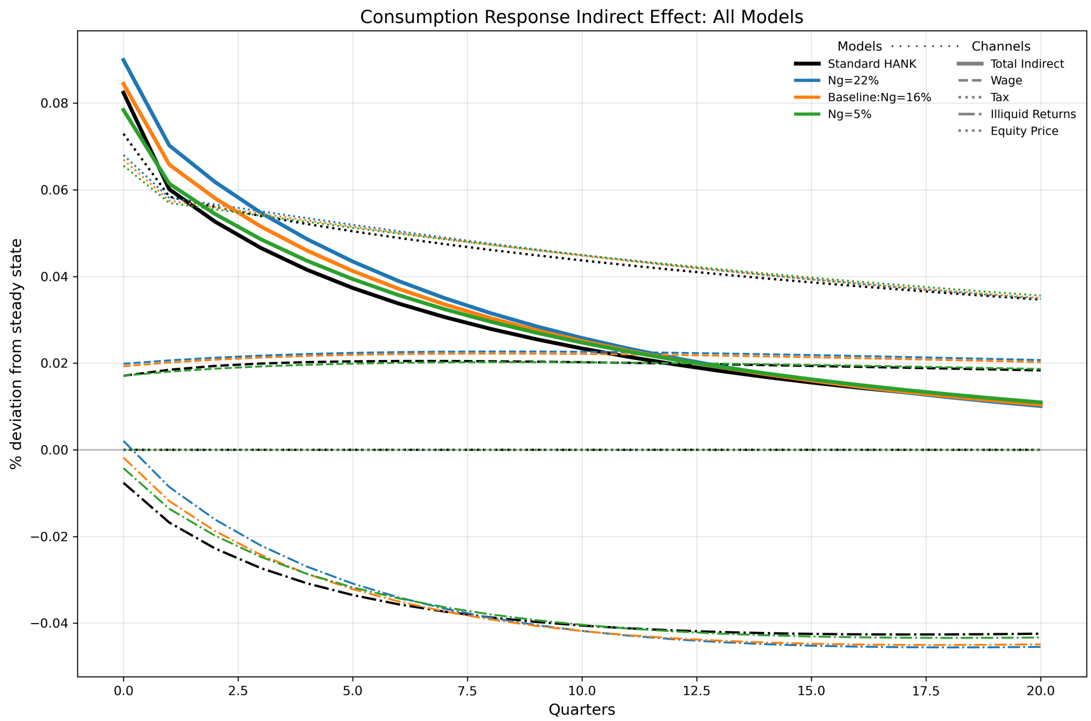


Figure 7: Monetary shock: indirect consumption channels.

On impact, fiscal and labour-income channels partially offset each other. Lower nominal interest rates stimulate labour demand and attenuate unemployment risk, increasing private-sector labour income through bargaining and employment margins. However, tax reductions are smaller in the economy with higher government employment, as a fixed component of public spending and debt service constrains fiscal adjustment. As a result, the disposable-income channel is muted relative to the standard HANK benchmark. In the medium term, stronger aggregate income and capital accumulation reduce the need for distortionary taxation, reinforcing the consumption response.

Consumption differences on impact arise primarily through the illiquid return revaluation channel. A decline in nominal rates increases the present value of future profits and raises returns on illiquid assets. Because government-employed households hold a larger share of illiquid wealth and face lower income risk, their balance sheets improve more strongly. This generates two reinforcing effects: a wealth effect and an MPC amplification effect. Given their higher marginal propensities to consume, government households translate capital gains into larger consumption responses.

As Figure 8 and Figure 9 shows, portfolio reallocation plays a central role in capital dynamics. Lower interest rates increase the valuation of capital, but households face a trade-off between liquidating illiquid assets to finance consumption and retaining them to benefit from higher future returns. Government-employed households, due to income stability, do not need to liquidate capital holdings to smooth consumption. Consequently, aggregate demand for illiquid assets remains elevated, limiting capital contraction and supporting investment persistence. In contrast, in the benchmark HANK economy, stronger precautionary motives induce larger capital sales, dampening the persistence of capital accumulation.

Wage dynamics reflect both labour supply responses and firms' capital adjustment. Although wages are sticky, the stronger labour supply response of private-sector households—driven by income losses—combined with smoother capital dynamics dampens short-run wage pressure. Over time, the more stable capital path reduces marginal cost volatility, leading to a more gradual wage adjustment relative to the benchmark economy.

Inflation dynamics remain largely unchanged across specifications. Identical price and wage Phillips curves generate similar inflation responses, implying that differences in real outcomes arise from household balance-sheet composition and asset market segmentation rather than from differences in nominal rigidities.

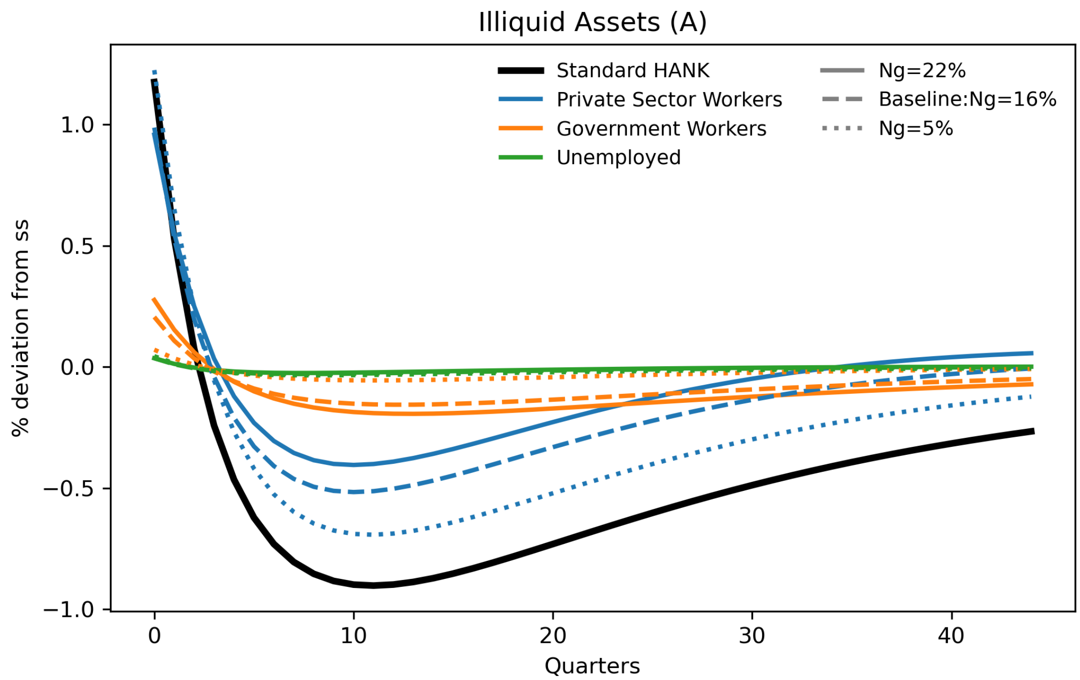


Figure 8: Monetary Shock: Asset Responses by Employment State, Channel I.

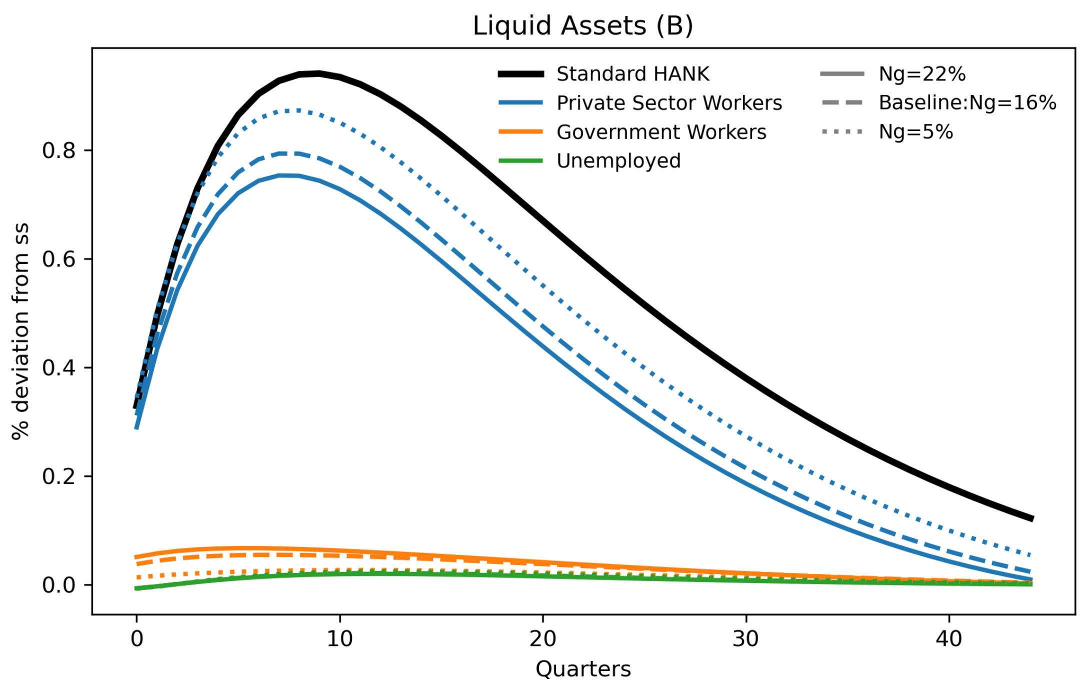


Figure 9: Monetary Shock: Asset Responses by Employment State, Channel II.

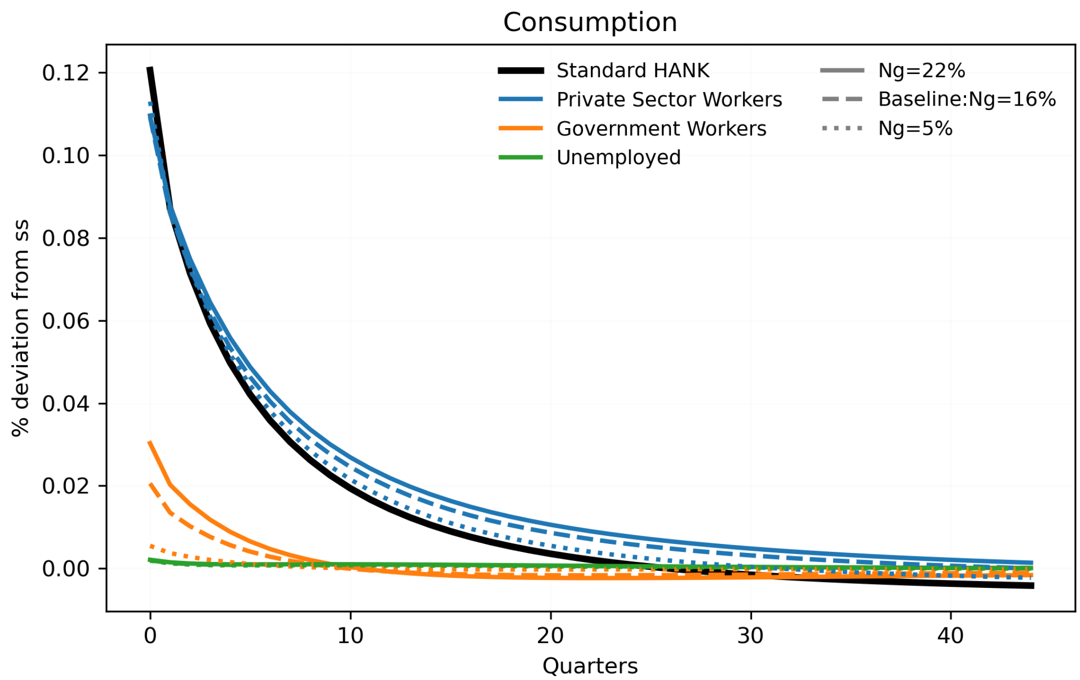


Figure 10: Monetary Shock: Consumption Responses by Employment State.

5.2 Negative Total Factor Productivity Shock

I consider a 1% negative TFP shock. Relative to a standard HANK economy, aggregate responses exhibit substantially stronger smoothing. Output contracts by less on impact and along the transition path, reflecting the stabilizing role of government employment through more stable labour income dynamics.

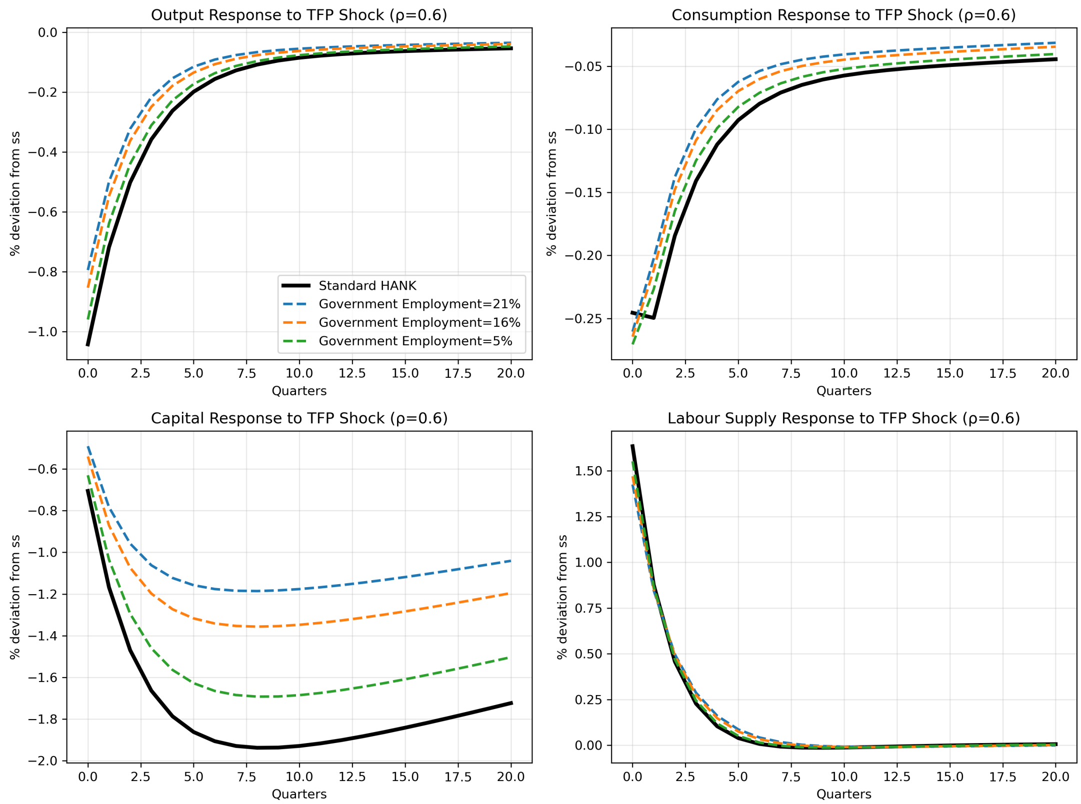


Figure 11: Negative TFP shock: aggregate responses.

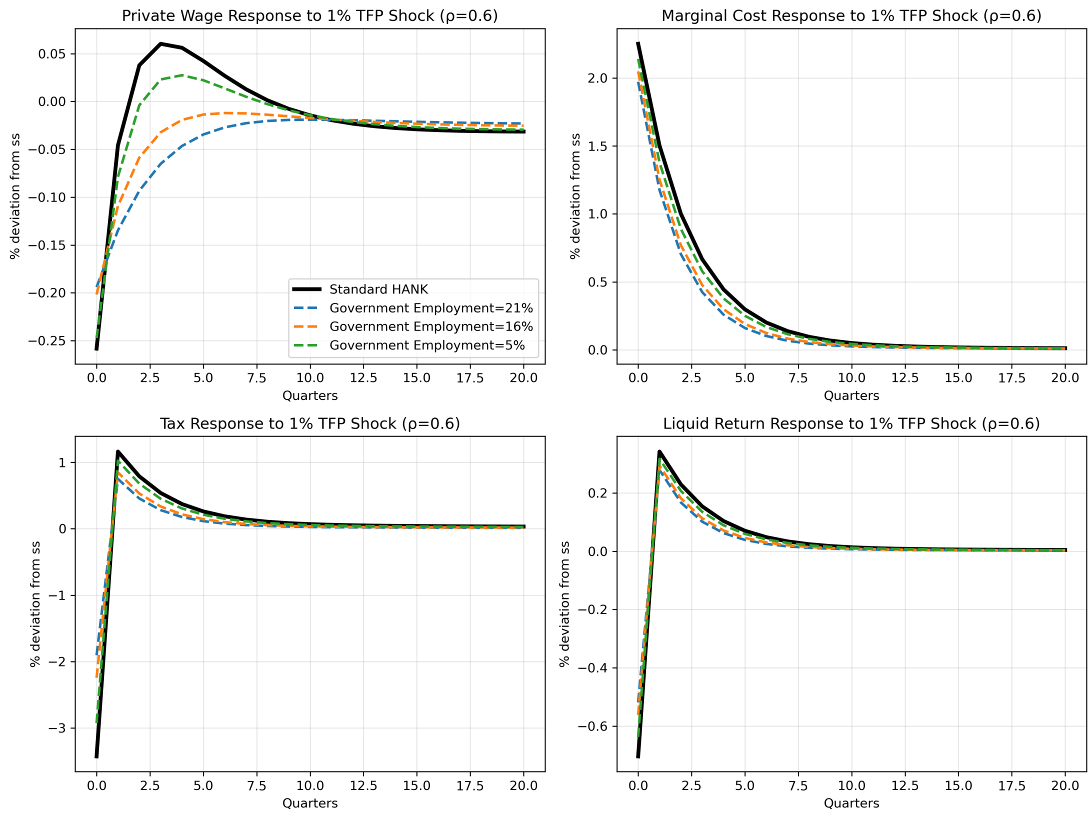


Figure 12: Negative TFP shock: price and wage dynamics.

Aggregate consumption also declines by less than in the benchmark HANK model, though the attenuation is more modest than for output. While private-sector households experience lower productivity and wages, government-employed households face insulated earnings and unemployment risk. This limits precautionary savings responses among public-sector workers and dampens the aggregate contraction in consumption.

The primary adjustment margin operates through capital and asset accumulation. Owing to income stability and weaker liquidity constraints, government-employed households maintain their illiquid asset positions following the shock. This stabilizes aggregate capital dynamics and mitigates the amplification mechanisms typically arising from precautionary savings and balance-sheet adjustments in incomplete-markets models.

Private-sector wage dynamics reflect both labour market institutions and firms' capital adjustment. Higher government employment weakens private-sector bargaining power, leading to a smaller initial wage response to the productivity shock. At the same time, the lowered contraction in capital reduces firms' incentives to substitute away from labour, further dampening wage adjustments. On the household side, income losses induce private-sector workers to increase labour supply, slowing wage bargaining dynamics. Together, these channels generate a smoother wage path relative to the benchmark economy.

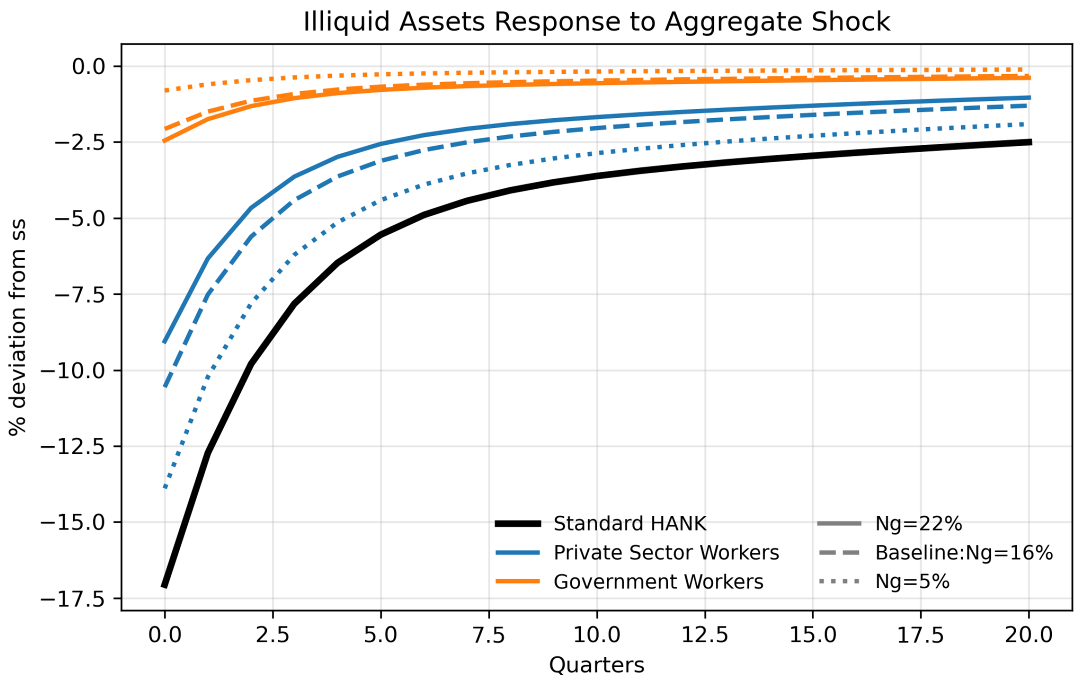


Figure 13: Negative TFP shock: illiquid asset dynamics.

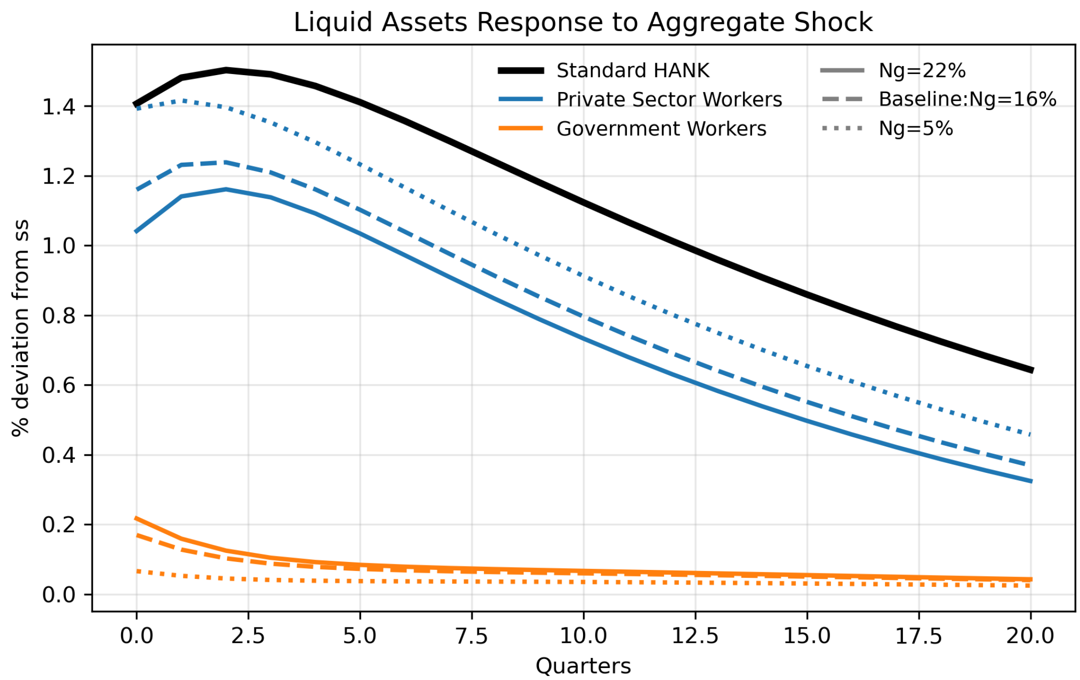


Figure 14: Negative TFP shock: liquid asset dynamics.

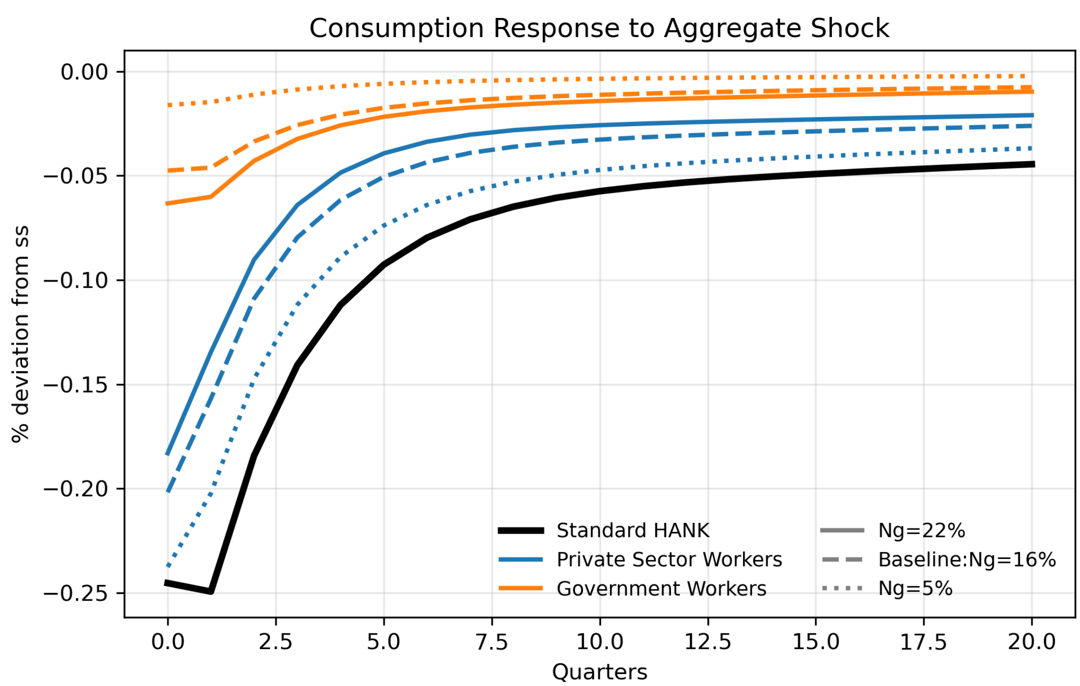


Figure 15: Negative TFP shock: consumption dynamics.

6 Conclusion

This paper studies the macroeconomic role of government employment as a source of aggregate stabilization. Using U.S. micro evidence and a two-asset HANK model with sector-specific income and unemployment risk, I document three central facts: (i) public-sector unemployment risk is substantially lower and acyclical, (ii) persistent income risk is significantly smaller in the public sector, and (iii) government households hold systematically higher illiquid asset shares and display lower precautionary savings.

Embedding these features into a general equilibrium environment delivers a stabilization mechanism distinct from traditional automatic stabilizers. Because government employment insulates households from cyclical income risk, it sustains consumption and preserves illiquid asset positions during downturns. The resulting capital and valuation effects attenuate output contractions following negative TFP shocks. Under monetary expansions, we see amplification that operates largely through indirect income effects, especially changes in illiquid returns, taxes and wage rather than through direct interest-rate channels.

Quantitatively, the presence and size of the public sector alter both the magnitude and the composition of aggregate responses. The stabilization operates through balance-sheet structure and sectoral risk heterogeneity. In this sense, historically policy-dependent employment stability shapes household portfolios and amplifies general equilibrium feedbacks.

From a policy perspective, government employment should be understood not only as service provision but also as a structural component of macroeconomic risk-sharing. Large shifts in public-sector employment may therefore modify precautionary behavior, capital accumulation, and the distributional transmission of shocks.

Ongoing extensions incorporating search frictions, and state-space estimation will allow a full quantitative assessment of optimal public employment and its interaction with fiscal and monetary policy.

7 Random Search Frictions

At the beginning of period t, workers are distributed across three states $s \in \{P, G, U\}$ denoting private employment, public employment, and unemployment. Let N_t^P, N_t^G, and U_t denote the corresponding labour shares of each sectors. The labour force is normalized to one $1 = N_t^P + N_t^G + U_t$.

Each households holds the probability of being in state s' the next period, denoted as $\lambda_{ss'}$, $\forall\ s\ \&\ s' \in \{P, G, U\}\}$. Let $\sum_{s'} \lambda_{ss'} = 1$, $\forall\ s \in \{P, G, U\}$, which ensures a stationnary markov transition matrix.

$$\Pi = \begin{pmatrix} \lambda_{PP} & \lambda_{PU} & \lambda_{PG} \\ \lambda_{UP} & \lambda_{UU} & \lambda_{UG} \\ \lambda_{GP} & \lambda_{GU} & \lambda_{GG} \end{pmatrix}$$

This structure nests exogenous job destruction ($P \to U$, $G \to U$), exogenous cross-sector mobility ($P \leftrightarrow G$), exogenous exits from unemployment ($U \to P$, $U \to G$), and continued employment within each sector. I refer to table 2 for the steady state calibrated transitions. In addition to exogenous mobility, unemployed workers form matches via a random search process. Let vacancies in sector $s \in \{P, G\}$ be denoted V_t^s. Following Gomes (2015), the Cobb-Douglas constant-returns matching function, the probability of filling vacancies, and the job finding rate follows[11]:

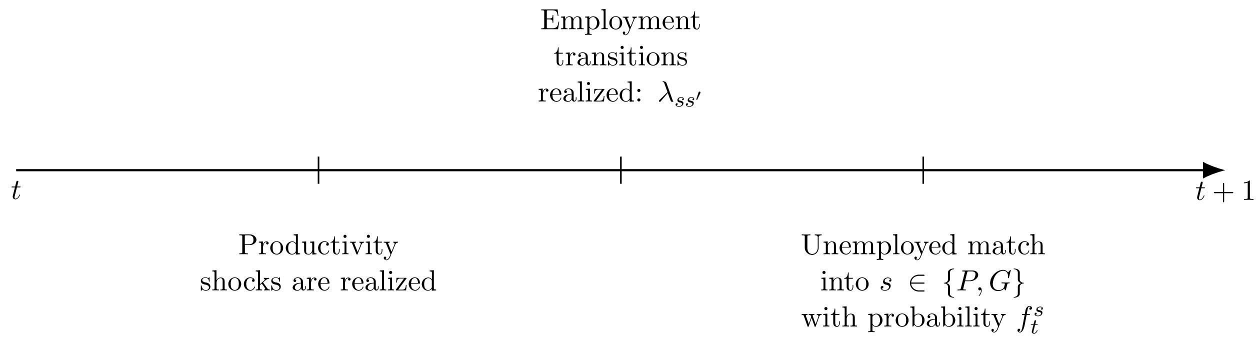
$$M_t = \chi U_t^{\eta} \left(V_t^P + V_t^G \right)^{1-\eta}, \tag{27}$$

$$q_t^s = \frac{m_t^s}{V_t^s} \tag{28}$$

[11] Alternatively, we may use Den Haan et al. (2000) to ensure "the function guarantees matching probabilities between zero and one for all unemployment and vacancies":

$$M_t = \frac{U_t(V_t^P + V_t^G)}{(U_t^l + (V_t^P + V_t^G)^l)^{\frac{1}{l}}}$$

Figure 16: Labour market timeline



$$f_t^s = \frac{m_t^s}{U_t} \tag{29}$$

where $\chi > 0$ is the matching efficiency and $\eta \in (0,1)$ is the matching elasticity. $M_t = m_t^p + m_t^g$ forms the entire matching function out of the sectoral matchings. We assume the same probability of filling vacancies for each employment sector:

$$\frac{V_t^g}{V_t^p} = \frac{m_t^g}{m_t^p} \tag{30}$$

We may further define labour market tightness as $\theta_t^s = \frac{V_t^s}{U_t}$. Using 29, we may rewrite the transition matrix:

$$\Pi = \begin{pmatrix} \lambda_{PP} & \lambda_{PU} & \lambda_{PG} \\ f_t^P & \lambda_{UU} & f_t^G \\ \lambda_{GP} & \lambda_{GU} & \lambda_{GG} \end{pmatrix}$$

The labour market follows the timing in Figure 16.[12]

[12] As noted by Bardóczy, modeling search and matching in continuous time improves the interpretation of transition rates, since unemployment–employment flows can occur instantaneously and be calibrated directly to hazards, whereas a discrete-time formulation allows at most one transition per period. To approximate this in discrete time, I assume within-period matching after job destruction.

7.1 Household Valuations

$$\mathbb{E}_0^s \max_{\{cc_{it}, n_{it}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \beta^t \left\{ u(cc_{it} - G(e_{it}^s, n_{it})) - \xi_{it} \mathbf{1}_{\{a_{it+1} \neq a_{it}\}} \right\} \quad \text{s.t.}$$

$$cc_{i,t} + b_{i,t+1} + q_t^a a_{i,t+1} = b_{i,t} \frac{R_t}{\Pi_t} + (r_t + \delta) a_{i,t} + y_{i,t} - T_t \tag{31}$$

where the felicity function exhibits constant relative risk aversion,

$$u(x_{it}) = \frac{x_{it}^{1-\xi} - 1}{1-\xi}, \qquad x_{it} = cc_{it} - G(e_{it}^s, n_{it}). \tag{32}$$

Composite consumption is defined as

$$cc_{it} = \left[\alpha_1 (c_{it})^{\alpha_2} + (1-\alpha_1)(g_t^c)^{\alpha_2} \right]^{\frac{1}{\alpha_2}}, \tag{33}$$

with c_{it} denoting private consumption and g_t^c publicly provided complementary goods[13]. While n_{it} denotes household i's labor supply, e_{it}^s represents sector-specific labor productivity.[14] There's liquid assets $b_{i,t}$ held in bonds, illiquid assets $a_{i,t}$ rented for capital, R_t the gross nominal interest rate, Π_t inflation, r_t the rental rate of capital, δ the depreciation rate, τ_t a proportional tax rate, and T_t lump-sum transfers. The terms Π_t^u and Π_t^E denote union (labor-market) and entrepreneurial profits, respectively, and $\xi_{it}\mathbf{1}_{\{a_{it+1}\neq a_{it}\}}$ represents a stochastic disutility incurred whenever the household changes its illiquid asset position.[15]

This formulation embeds employment status directly into both income and labor disutility, ensuring consistency with the value functions defined in the labor market block.

Expectations are taken over e' conditional on time-t information. Then, for both employed sectors, the valuation is dependent on transitions towards the other sector $\lambda_{ss'}$, the probability of staying in your sector λ_{ss} and the probability of transitioning towards unemployment.

[13] In Jananji (2026), I explore the heterogeneity in complementarity by assuming substitution increases over income $\alpha_2(e_i)$

[14] Allowing productivity to differ across sectors implies that income and continuation values are sector dependent.

[15] As noted by Bayer et al. (2019); Lee (2026) this helps preserves the global concavity which improves computation.

$$V_t^s(b,a,e) = \max_{b',a'} \Big\{ u\big(x(b,b',a,a',e)\big) + \beta \mathbb{E}_t \Big[\lambda_{ss} V_{t+1}^s(b',a',e') + \lambda_{ss'} V_{t+1}^{s'}(b',a',e') + \lambda_{su} V_{t+1}^u(b',a',e') \Big] \Big\} \tag{34}$$

$$V_t^u(b,a,e) = \max_{b',a'} \Big\{ u\big(x(b,b',a,a',e)\big) + \beta \mathbb{E}_t \Big[\lambda_{uu} V_{t+1}^u(b',a',e') + f_t^P V_{t+1}^P(b',a',e') + f_t^G V_{t+1}^G(b',a',e') \Big] \Big\}. \tag{35}$$

The key mechanism of the model is the unemployment risk faced by both sectors, and the idiosyncratic risk within sectors, which differs and thus generate different asset holdings. The unemployment risk drives precautionary savings, while income risk should drive illiquid/liquid ratio[16].

7.2 Labour Services

Formal intermediate labor services are contracted through a representative private labor agency that posts vacancies in a frictional labor market. The agency is owned by risk–neutral entrepreneurs. Its revenues depend on the effective units of private labor supplied (ℓ_t^P), and the private extensive margins (N_t^P)

$$\ell_t^P = \int e_{it}\, n_{it}^P \, d\mu_t(b_i, a_i, e_i), \tag{36}$$

where e_{it} denotes the efficiency units of labor, n_{it}^P individual labor supply in the private sector, and $\mu_t(\cdot)$ the cross-sectional distribution of households over assets, productivity, and employment states.

The recursive problem of the private labor agency is

[16] see Graves (2025)

$$J_t(N_t^P, \ell_t^P) = \max_{V_t^P} \left\{ \left(\Omega_t^P - w_t^P\right) N_t^P \, \ell_t^P - c \, V_t^P + \beta J_{t+1}(N_{t+1}^P, \ell_t^p) \right\}, \tag{37}$$

subject to the law of motion for private employment,

$$N_{t+1}^P = (1 - \lambda_{PU,t} - \lambda_{PG}) N_t^P + q_t^P V_t^P \tag{38}$$

Here, J_t denotes the value of the private labor agency, c is the per-vacancy posting cost, Ω_t^P the marginal product of private labor, w_t^P the sectoral wage, $\lambda_{PU,t}$ the separation rate from private employment into unemployment, and f_t^P the job-finding rate into private employment.

Private wages respond to sectoral productivity according to

$$w_t^P = \bar{w}^P \left(\frac{\Omega_t^P}{\bar{\Omega}^P} \right)^{\varepsilon_w}, \tag{39}$$

where ε_w governs the elasticity of private wages to productivity, and $\bar{w}^P$ and $\bar{\Omega}^P$ denote steady-state wages and productivity.

Public wages are partially indexed to lagged private wages,

$$w_t^G = (1 - \rho_w)\bar{w}^G + \rho_w w_{t-1}^P, \tag{40}$$

where $\rho_w \in [0, 1]$ captures the degree of wage indexation and $\bar{w}^G$ denotes the steady-state public wage.

Government vacancy posting follows an exogenous AR(1) process,

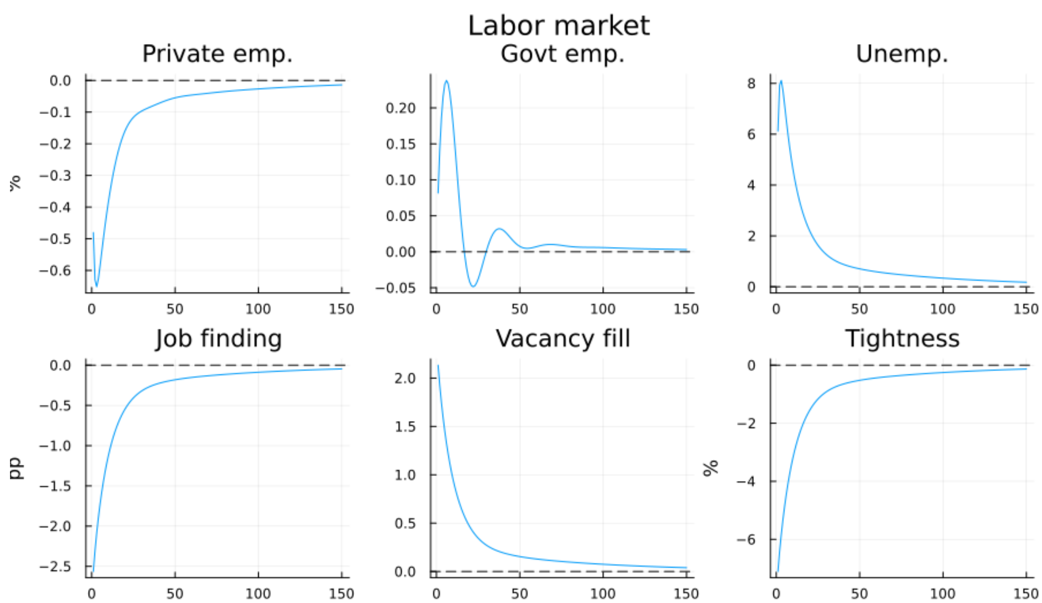
$$V_t^G = (1 - \rho_V)\bar{V}^G + \rho_V V_{t-1}^G + \varepsilon_t^V, \qquad \varepsilon_t^V \sim \mathcal{N}(0, \sigma_V^2), \tag{41}$$

where $\rho_V \in [0, 1)$ governs the persistence of public vacancy shocks, $\bar{V}^G$ denotes steady-state public vacancies, and σ_V^2 the variance of the innovation.[17]

[17] In Jananji (2026) I introduce the role of a social planner that governs government vacancies and wages as in Gomes (2015).

7.3 Preliminary Results

For preliminary results, I will focus on the random search mechanism effects following a 1% negative TFP shock.[18] Specifically, I want to orient our focus on the labour frictions that we may now capture and that has been documented in Gomes (2015). Specifically, a period of unemployment increases causes a crowding out effect due to the vacancy policies. Following a negative TFP shock, private vacancies contract while government vacancies follow their exogenous trend. Since both sectors draw from the same matching pool, the government's rigid vacancy path captures a growing share of unemployed workers, slowing the recovery of private employment.



These effects are important to differentiate between aggregate security from government employment, studied in previous sections, and the frictions influencing recoveries of the private sectors. The tradeoff is further studied in Jananji (2026) once I consider the government vacancy choice for social a optimum of government employment.

[18]The current results are done over a one asset model with complementarity of goods. The two asset model with labour friction is coming shortly.

References

Albrecht, J., Robayo-Abril, M., and Vroman, S. (2018). Public-sector employment in an equilibrium search and matching model. *The Economic Journal*.

Auclert, A., Bardóczy, B., Rognlie, M., and Straub, L. (2021). Using the Sequence-Space Jacobian to Solve and Estimate Heterogeneous-Agent Models.

Auclert, A. and Rognlie, M. (2018). Inequality and Aggregate Demand.

Auclert, A., Rognlie, M., and Straub, L. (2018). The Intertemporal Keynesian Cross.

Bayer, C., Born, B., and Luetticke, R. (2024). Shocks, Frictions, and Inequality in US Business Cycles. *American Economic Review*, 114(5):1211–1247.

Bayer, C., Luetticke, R., Pham-Dao, L., and Tjaden, V. (2019). Precautionary Savings, Illiquid Assets, and the Aggregate Consequences of Shocks to Household Income Risk. *Econometrica*, 87(1):255–290. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA13601.

Den Haan, W. J., Ramey, G., and Watson, J. (2000). Job Destruction and Propagation of Shocks. *American Economic Review*, 90(3):482–498.

Fontaine, I., Galvez-Iniesta, I., Gomes, P., and Vila-Martin, D. (2020). Labour market flows: Accounting for the public sector. *Labour Economics*.

Gomes, P. (2015). Optimal Public Sector Wages. *The Economic Journal*, 125(587):1425–1451.

Gornemann, N., Kuester, K., and Nakajima, M. (2022). Doves for the Rich, Hawks for the Poor? Distributional Consequences of Monetary Policy.

Graves, S. (2025). Does Unemployment Risk Affect Business Cycle Dynamics? *American Economic Journal: Macroeconomics*, 17(2):65–100.

Jananji, R. (2026). Social Optima of Government Employment. *Working Paper*.

Kaplan, G., Moll, B., and Violante, G. L. (2018). Monetary Policy According to HANK. *American Economic Review*, 108(3):697–743.

Kopelman, J. L. and Rosen, H. S. (2016). Are Public Sector Jobs Recession-proof? Were They Ever?

Lee, D. (2026). Unconventional Monetary Policies and Inequality.

Luetticke, R. (2021). Transmission of Monetary Policy with Heterogeneity in Household Portfolios. *American Economic Journal: Macroeconomics*, 13(2):1–25.

McKay, A. and Reis, R. (2016). The Role of Automatic Stabilizers in the U.S. Business Cycle. *Econometrica*, 84(1):141–194. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA11574.

McKay, A. and Reis, R. (2021). Optimal Automatic Stabilizers | The Review of Economic Studies | Oxford Academic.

Michaillat, P. (2014). A Theory of Countercyclical Government Multiplier. *American Economic Journal: Macroeconomics*, 6(1):190–217.

Ravn, M. O. and Sterk, V. (2017). Job uncertainty and deep recessions. *Journal of Monetary Economics*, 90:125–141.

Savoia, E. (2024a). Labor Income Risk and Monetary Policy: The Within-Wealth MPC Channel. *Manuscript under review.*

Savoia, E. (2024b). The Safe Non-Hand-to-Mouth. *Manuscript under review.*