BETA
Bureau
d'économie
théorique
et appliquée

Documents
de travail

# « Bridging the Wage Gap: The Fiscal and Economic Gains of Reducing Government Employment Inefficiencies »

Auteurs

**Oscar Valencia, Alfredo Villca, Carolina Ulloa-Suárez, Gustavo Sánchez**

Document de Travail n° 2025 – 49

*Novembre 2025*

**Bureau d'Économie**
**Théorique et Appliquée**
**BETA**

**https://www.beta-economics.fr/**

Contact :
jaoulgrammare@beta-cnrs.unistra.fr

Université de Strasbourg · cnrs · Université de Lorraine · INRAE · AgroParisTech · Université Haute-Alsace

# Bridging the Wage Gap: The Fiscal and Economic Gains of Reducing Government Employment Inefficiencies*

Oscar Valencia † Alfredo Villca ‡ Carolina Ulloa-Suárez § Gustavo Sánchez ¶

**Abstract**

This paper examines the macroeconomic and fiscal benefits of reducing inefficiencies in public sector wages, with a focus on the public–private wage premium. Using cross-country empirical evidence, along with a Dynamic Stochastic General Equilibrium (DSGE) model calibrated to Latin America and the Caribbean, we show that narrowing the wage gap yields substantial benefits. A one percentage point reduction in the premium improves the primary balance, lowers debt, and raises output and private employment, without generating inflationary pressures. Extensions show that the adjustment mechanism is key: gains are larger and faster when wage rigidities are limited and reforms are sustained, while employment cuts provide stronger fiscal relief at higher economic costs. These results underscore the importance of efficient and well-designed compensation policies in enhancing fiscal sustainability and promoting long-term macroeconomic stability.

**Keywords**: Fiscal policy; Wage premium; fiscal sustainability; DSGE models; Local Projections; Welfare.

**JEL Codes**: E62, H50, J31, J45

*The findings and interpretations in this paper are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank or the governments it represents.

†Inter-American Development Bank, Washington, DC, USA, oscarva@iadb.org

‡Inter-American Development Bank, Washington, DC, USA, alfredovillca569@gmail.com

§Inter-American Development Bank, Washington, DC, USA; and University of Strasbourg, BETA, Strasbourg, France, ulloasuarez@unistra.fr

¶Inter-American Development Bank, Washingon, DC, sanchezr.gustavo@hotmail.com

# 1 Introduction

In the context of persistently high debt levels and fiscal deficits following major economic shocks that have constrained fiscal space, together with rising social demands and ongoing geopolitical tensions, the creation of fiscal space has become a central concern of fiscal policy. Although the immediate response often involves fiscal consolidation and expenditure cuts, many economies cannot adopt such measures without undermining growth-enhancing spending. An alternative is to examine how public budgets are allocated and to identify strategies to achieve more with existing resources, or at least to maintain current outputs with unchanged spending. The gap between public expenditures and their outcomes reflects inefficiencies in spending, particularly in wages, transfers and subsidies, procurement, and investment. This paper investigates how reducing inefficiencies in the public sector wage bill can generate substantial macroeconomic gains, thereby restoring much-needed fiscal space.

Public sector wage bills absorb a substantial share of government expenditures, often constraining investment in critical areas such as infrastructure, education, and healthcare. Addressing inefficiencies in the wage bill provides an opportunity to strengthen fiscal sustainability without jeopardizing essential investments. Lowering the public–private wage premium can yield significant fiscal savings that may be redirected toward deficit reduction and more effective debt management. Moreover, aligning public sector compensation with productivity can foster greater efficiency, enhancing the government's capacity to address future economic challenges. Consistent with this view, Chang et al. (2021) show that public wage adjustments can contribute to fiscal consolidation with relatively moderate costs compared to other expenditure-based strategies. Their analysis highlights how the composition of consolidation matters, reinforcing the importance of wage bill reforms as a viable avenue for enhancing fiscal sustainability.

This paper quantifies the macro-fiscal gains that can be realized by reducing wage inefficiencies in the public sector, focusing on the public–private wage premium. Specifically, it addresses the research question of the macro-fiscal dividends from reducing wage inefficiencies. We show how narrowing the wage gap between public- and private-sector workers can generate fiscal savings, improve public sector efficiency, and contribute to a more equitable allocation of public resources. To this end, the paper employs a Dynamic Stochastic General Equilibrium (DSGE) model that incorporates public sector wages, simulating the effects of reducing wage disparities on key macroeconomic

variables such as economic growth, fiscal balance, debt sustainability, and employment. The results provide critical insights for policymakers seeking to enhance fiscal discipline, reduce deficits, and promote long-term macroeconomic stability through more efficient compensation policies.

Labor costs are a key area of public expenditure prone to inefficiency. In many economies, public sector wages exceed private sector wages for workers with comparable skills, qualifications, and job classifications. On average, public-sector workers earn about 10 percent more than comparable private-sector workers Abdallah et al. (2023). This wage discrepancy, known as the wage premium, represents an inefficiency in the allocation of fiscal resources. It is defined as the extent to which public sector wages exceed (or, in the case of a wage deficit, fall below) those in the private sector for similarly skilled workers.

The wage premium has significant macroeconomic implications. On the one hand, it raises public expenditure, as labor costs account for a large share of government budgets. On the other hand, it can distort labor allocation by incentivizing skilled workers to prefer public-sector employment over private-sector opportunities, potentially hampering productivity and innovation in the private sector. Reducing the wage premium could generate fiscal savings that may be redirected toward more productive or equitable uses, such as infrastructure, education, or social protection programs.

Understanding the wage premium is particularly relevant for fiscal policy. Public sector wage bills are often rigid expenditures that are difficult to adjust in the short term. Large wage premiums exacerbate fiscal pressures, reducing the government's ability to respond to external shocks or allocate resources efficiently. Reducing the premium, where feasible, offers an avenue to expand fiscal space and improve the overall efficiency of public spending.

Measuring the wage premium, the difference between public and private sector wages for comparable workers, is required for understanding its significance and implications. To estimate this gap, it is important to carefully consider counterfactual scenarios, which involve comparing a person's actual wage in one sector to the hypothetical wage they could earn in the other sector. The standard method uses individuals who stay in one sector as proxies for the counterfactual, while those who move between sectors serve as the treatment group.

A widely used method involves models with worker-fixed effects, which identify wage differences while controlling for time-invariant individual characteristics by analyzing individuals who switch between public and private employment. For example, Campos and Centeno (2012) employed fixed-effects estimates across ten European countries, providing a robust cross-country analysis of

the wage premium.

Alternative methodologies have emerged to address challenges such as selection bias and unobserved heterogeneity. Rattsø and Stokke (2019), for instance, propose an identification strategy to correct for bias arising from unobservable characteristics among workers transitioning between sectors. Bargain and Melly (2008) apply quantile regressions with panel data, shedding light on the distributional aspects of the premium. Rattsø and Stokke (2018) introduce a dynamic perspective by incorporating differences in returns to experience across sectors. Schanzenbach (2015) expand the analysis by integrating ability measures, such as IQ scores, as proxies for worker quality, offering an alternative to fixed effects for capturing unobserved heterogeneity.

Other approaches include bound analysis, as in Depalo (2018), which provides ranges for the wage gap under different assumptions about selection biases. Structural models, such as those in Postel-Vinay and Turon (2007) and Dickson et al. (2014), explicitly model the decision-making processes of workers and firms, accounting for the dynamic nature of labor market transitions.

These methodologies highlight the complexity of measuring wage inefficiencies. While fixed-effects models address selection based on time-invariant unobservables, they cannot fully capture time-varying characteristics or endogeneity in sectoral transitions. Each approach contributes valuable insights, but the need for robust and comprehensive estimation techniques remains central in the literature.

The wage premium varies significantly across countries and income groups, underscoring inefficiencies in public compensation policies. Recent estimates by Abdallah et al. (2023) illustrate these variations, showing how the public–private wage gap differs across advanced economies (AEs), emerging markets (EMs), and low-income developing countries (LIDCs).

In advanced economies, the public–private wage premium is generally modest or negative. Scandinavian countries, such as Denmark, Sweden, and Finland, consistently display negative wage premiums, where public sector wages are lower than private sector wages for comparable workers. This outcome reflects a public wage deficit, signaling more efficient wage-setting mechanisms and closer alignment with labor market dynamics. However, even among advanced economies, the pattern is not universal; countries such as Ireland and Luxembourg exhibit small positive premiums.

By contrast, EMs and LIDCs tend to exhibit higher positive wage premiums. This is particularly evident in Latin America and the Caribbean (LAC) and Sub-Saharan Africa (SSA), where public

sector wages substantially exceed those in the private sector for similarly qualified workers. Such large premiums indicate inefficiencies that distort labor allocation and impose fiscal burdens. These gaps may result from differences in skill levels, union bargaining power, monopolistic wage-setting, and political factors. For example, countries such as Barbados, Trinidad and Tobago, and Argentina display premiums above 15%, while others, including El Salvador, Guatemala, and Colombia, show premiums below 10% (Izquierdo et al., 2018; Cerda and Pessino, 2018a).

Globally, the average public wage premium has been about 10% over the past two decades, with substantial variation across income groups. In AEs, the average premium is 5.4%, reflecting closer alignment of public and private sector wages. In EMs, the average is 11.7%, while in LIDCs it rises to 12.8% (Abdallah et al., 2023). These figures remain consistent across median estimates, reinforcing the pattern of relatively small or negative premiums in AEs and significantly higher premiums in EMs and LIDCs.

The persistence of these disparities suggests structural differences in wage-setting practices across countries. While AEs have generally succeeded in aligning public wages more closely with private benchmarks, the large premiums observed in EMs and LIDCs point to significant inefficiencies. In LAC, for instance, the public wage bill represents 29% of total government spending, compared to 24.2% in OECD countries (Cerda and Pessino, 2018a). These inefficiencies create fiscal pressures and divert resources from productive investments.

Reducing these disparities could generate substantial fiscal dividends. By lowering wage premiums, particularly in EMs, governments could free resources, reduce inefficiencies, and expand fiscal space for priority investments such as infrastructure, education, and social services.

Once inefficiencies in public sector wage premiums are identified, it is essential to assess their macroeconomic implications. To quantify the fiscal dividends and broader macroeconomic impacts of reducing these inefficiencies, we employ DSGE models with public sector wages. These provide a robust framework for analyzing the dynamic interactions among key economic variables. The approach allows us to simulate the effects of wage adjustments on fiscal balances, growth, employment, and investment, capturing the transmission mechanisms through which reducing the wage premium translates into macro and fiscal gains.

Building on the framework of Pappa (2009), we extend the model in three ways. First, we introduce rigidity in the public labor market, assuming households face utility costs when allocating additional time to government employment. Second, we differentiate public and private sector

wages, generating a public–private premium. In this setup, private wages adjust endogenously to marginal productivity, while public wages are set exogenously. Third, following Ramey (2012) and Gomes (2015), we incorporate a public sector that produces consumption goods by combining public capital and labor. This extension enables a structured assessment of how changes in public wages affect both private sector dynamics and fiscal outcomes.

Through these mechanisms, reducing inefficiencies in public wages decreases public employment, which in turn increases private employment, raises productivity, and expands output. Wage bill adjustments also have direct fiscal effects, reducing recurrent expenditures and creating fiscal space for productive public investment. These extensions strengthen the model's capacity to capture the broader macroeconomic and fiscal consequences of wage policy reforms.

The remainder of the paper is organized as follows. Section 2 presents the empirical analysis, documenting the size and distribution of the public–private wage premium across countries and income groups, and providing econometric evidence of its macro-fiscal effects. Section 3 develops the DSGE model, highlighting how public wages are incorporated and the assumptions underlying the simulations. Section 4 reports the model results, quantifying the fiscal dividends and macroeconomic impacts of reducing wage premiums. Section 5 explores extensions, including the role of wage rigidities and employment adjustments. Section 6 analyzes the welfare implications of wage reforms. Section 7 integrates the empirical and structural approaches, offering a comprehensive interpretation of the findings. Finally, Section 8 concludes with policy recommendations to address inefficiencies in public sector wages and to promote sustainable fiscal policies.

## 2 Empirical Analysis

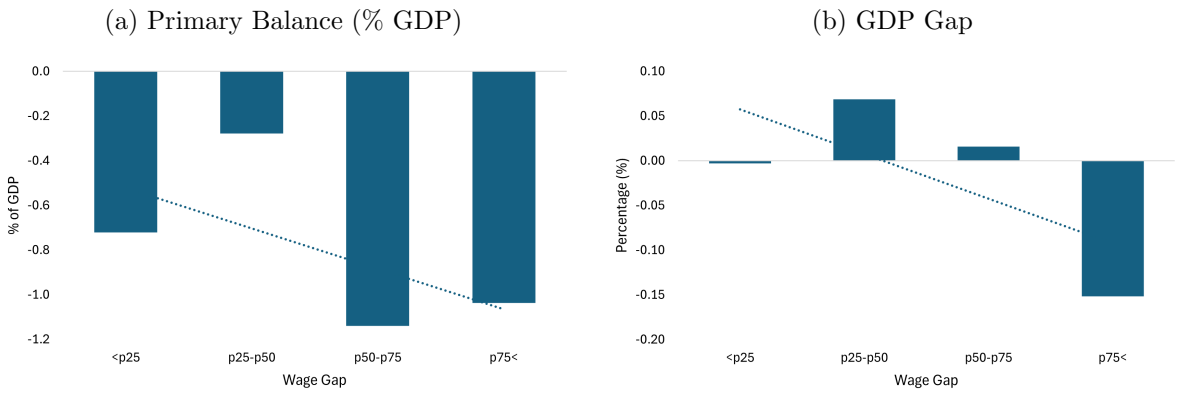
This section presents key stylized facts about the public–private wage premium using data from the World Development Indicators (World Bank, 2025) and the World Economic Outlook (International Monetary Fund, 2025). We also estimate its macro-fiscal effects through a Local Projection model. The analysis relies on an unbalanced panel covering 19 AEs, 29 EMs, and 16 LAC countries during 2000–2022. Detailed variable definitions, summary statistics, and data sources are provided in Appendix A.

## 2.1 Stylized Facts

The wage premium remains a persistent feature of labor markets worldwide. Although gaps are relatively modest in AEs, they are substantially larger in EMs and especially in LAC. Between 2002 and 2018, the average premium was 1.1 in AEs, 1.17 in EMs, and 1.3 in LAC, implying that public employees in LAC earned on average 30% more than comparable private-sector workers.

Trends also show divergence across income groups. Over the same period, the premium in AEs declined by about 1.2%, suggesting gradual alignment between public and private wages. By contrast, it increased by more than 8% in both EMs and LAC. This widening gap points to rising inefficiencies in wage-setting, with potential consequences for fiscal discipline and labor market incentives.

Figure 1: Wage Premium Correlation




Note: Authors' calculations with data from the World Development Indicators (World Bank, 2025) and the World Economic Outlook (International Monetary Fund, 2025). The figure shows the average primary balance (left panel) and the GDP deviation from potential output (right panel) by wage premium levels. P25, P50, and P75 correspond to the $25^{th}$, $50^{th}$, and $75^{th}$ percentiles, respectively. P25 equals 1.02, P50 equals 1.16, and P75 equals 1.32.

The data reveal a clear negative correlation between high wage premiums and macro-fiscal performance. Figure 1a shows that countries with premiums above the 75th percentile (1.32) record primary balances about 0.3 percentage points lower than those below the 25th percentile (1.02). This suggests that excessive premiums contribute to persistent fiscal deficits, constraining investment in infrastructure and human capital.

Figure 1b further shows that high premiums are linked to weaker economic performance, as measured by the GDP gap. Economies with premiums below the 25th percentile maintain GDP gaps close to zero, while those above the 75th percentile exhibit an average gap of –0.15%. These

results indicate that elevated public wage premiums are associated with economies operating below potential output, likely reflecting distorted labor incentives and inefficient allocation of fiscal resources.

### 2.2 Effect of Wage Gap Reduction

To assess the dynamic relationship between the wage premium and macro-fiscal outcomes, we employ a Local Projections framework. This approach, proposed by Jordà (2005), offers flexibility in handling panel data and avoids imposing restrictions on the shape of the impulse response, reducing sensitivity to misspecification. The regression model is specified as follows:

$$Y_{i,t+h} - Y_{i,t} = \alpha_i^h + \beta_h WG_{i,t} + \Omega_h(L)x_{i,t-1} + \varepsilon_{i,t+h}, \qquad \forall h = 1,2,3,4,5 \tag{1}$$

where $Y$ denotes the primary balance as a percentage of GDP, the gross debt-to-GDP ratio, inflation, or the GDP gap. $WG_{i,t}$ is the wage gap, defined as the ratio of public to private wages plus one, multiplied by minus one hundred, so that $\beta_h$ captures the marginal effect at horizon $t+h$ of a one percentage point reduction in the premium at time $t$. $\alpha_i^h$ are country fixed effects, $\Omega_h(L)$ is the lag operator, and $x_{i,t-1}$ is a vector of control variables that differs by outcome.[1] The estimation horizon ($h$) is five periods, and all controls are lagged one year. Standard errors are computed using Driscoll–Kraay correction to account for heteroskedasticity, autocorrelation, and cross-sectional dependence.

Data on wage premiums include missing observations that could affect robustness. To mitigate this, we apply linear interpolation, which increases available observations from 691 to 996 while preserving the correlation structure with macro-fiscal variables of interest (see Appendix B).

The results in Figure 2 indicate that reductions in the wage premium are associated with modest but statistically significant improvements in macro-fiscal indicators. A one percentage point decline in the premium raises the primary balance by 0.044 percentage points over three years (Figure 2a). Public debt falls by about 0.26 percentage points over five years (Figure 2b). These effects suggest that narrowing the premium supports fiscal consolidation without adverse short-term growth costs.

Figure 2d shows that reducing the wage premium does not generate inflationary pressures.

[1] Controls for primary balance and debt include real GDP growth, inflation, depreciation, and governance indicators. Inflation regressions include the GDP gap, depreciation, governance indicators, Brent price, and debt change. GDP gap regressions include capital expenditure as a percentage of GDP, age dependency, and population growth.

Inflation remains statistically unaffected, implying that wage alignment policies are unlikely to trigger macroeconomic instability. At the same time, there is evidence of a temporary improvement in the GDP gap, with a one percentage point reduction in the premium associated with a short-run increase of 0.04 percentage points lasting about one year (Figure 2c). This short-lived growth effect may reflect improved labor market efficiency and greater private sector participation as wage distortions decline.

Figure 2: Effect of Wage Gap Reduction, Local Projection


Note: Figure shows the estimated accumulated effect of a one percentage point reduction in the wage premium. Shaded areas indicate the 90 percent confidence interval.

Overall, these findings support the view that reducing inefficiencies in public sector wages, particularly the wage premium, can yield measurable fiscal and macroeconomic gains. The evidence shows that narrowing the premium strengthens primary balances, lowers debt ratios, and avoids inflationary pressures, while temporarily boosting economic activity. These results underscore the importance of wage-setting reform as a policy tool for enhancing fiscal sustainability and economic performance.

The next section develops a structural framework to interpret these empirical patterns. We build a DSGE model that incorporates public sector wages and labor market dynamics, allowing us to analyze the mechanisms through which wage policies affect employment, output, fiscal balances, and debt trajectories. This framework provides a coherent theoretical foundation for the empirical evidence presented above and enables a quantitative assessment of the fiscal dividends from reducing wage premiums.

# 3 Model

The model incorporates two sectors: private and public. Specifically, the private sector produces consumption goods by combining private capital and labor, while the government (or public sector) also produces goods by combining public capital and labor. In this framework, households derive utility from both private and public goods, with a certain degree of complementarity or substitutability between them. Additionally, households have the choice to work in either the private or public sector. The wage received in the private sector is determined by the marginal productivity of labor, whereas the public sector wage is exogenously set by the government, rather than being endogenously determined by market forces. A key feature of the model is the presence of convex quadratic costs that households incur when choosing to work in the public sector. This real rigidity introduces a wage gap between the public and private sectors.

The wage gap, or wage premium, represents a form of inefficiency in the public sector, as public sector wages are not determined by any optimization problem. As a result, this inefficiency can be modeled as a distortion that drives the public wage away from its "efficient" level, that is, the wage that would prevail in a perfectly competitive labor market, where wages are determined by the marginal productivity of labor in the private sector. Consequently, a reduction in wage inefficiencies leads to a reallocation of labor from the public to the private sector, which in turn can generate macroeconomic effects by influencing key aggregate variables.

## 3.1 Households

The household optimizes its consumption and savings decisions while choosing how to allocate its labor supply across sectors. Specifically, it consumes private goods ($c_t^p$), demands domestic ($d_t$) and foreign assets ($d_t^*$), and accumulates private capital ($k_{t+1}^p$). Additionally, the household can

supply labor to both the private sector ($n_t^p$) and the public sector ($n_t^g$). The household's choices across these variables are guided by the objective of maximizing the discounted present value of lifetime utility, given by:

$$\max_{\{c_t^p, n_t^p, n_t^g, k_{t+1}^p, d_t\}_{t=0}^{\infty}} \mathbb{E}_t \sum_{t=0}^{\infty} \beta^t \left\{ \frac{(c_t^p + \alpha^g y_t^g)^{1-\sigma}}{1-\sigma} - \chi \frac{\left[ n_t^p + n_t^g + \frac{\gamma}{2} (n_t^g)^2 \right]^{1+\psi}}{1+\psi} \right\}.$$

In this framework, $y_t^g$ represents the public good provided by the government, and households derive utility from both private and public consumption goods. The degree of substitutability or complementarity between these goods is captured by the parameter $-1 < \alpha^g < 1$ (for a more detailed discussion, see, for example, Ganelli and Tervala (2009), Fève et al. (2013), and Dawood and Francois (2018)). The discount factor $\beta > 0$ reflects households' time preferences, while $\sigma > 0$ represents the coefficient of risk aversion.

On the other hand, following Vasilev (2017), when the household chooses to work in government, it incurs a convex quadratic cost, given by $\frac{\gamma}{2}(n_t^g)^2$, measured in terms of time, where $\gamma > 0$ is a parameter that captures the impact of job search costs in the public sector. This cost function reflects the idea that, beyond a certain point, working more in government generates "fatigue" or additional disincentives, as tasks may become less productive or more bureaucratic. The presence of this public labor cost function introduces real rigidities in the model and plays a crucial role in the determination of the public-private wage premium.

Moreover, public and private labor supply decisions, $n_t^g$ and $n_t^p$, are non-separable and embedded within a constant relative risk aversion (CRRA) utility function, implying the existence of a trade-off between public and private employment. The parameter $\chi$ regulates the control over labor supply, while $\psi > 0$ represents the inverse of the Frisch elasticity, determining the responsiveness of labor supply to changes in wages and employment conditions.

The household faces the following budget constraint

$$(1+\tau_t^c)c_t^p + x_t^p + d_t = (1-\tau_t^w)\left(w_t^p n_t^p + w_t^g n_t^g\right) + (1-\tau_t^k) r_t^k k_t^p + \left(\frac{1+i_{t-1}}{1+\pi_t}\right) d_{t-1} + Tr_t + \Pi_t. \quad (2)$$

The left-hand side of the equation represents the allocation of household income, which consists of: private consumption net of taxes, where $\tau_t^c$ is the consumption tax rate; private investment, $x_t^p$;

and domestic assets, $d_t$, which correspond to government debt holdings.

On the right-hand side, the constraint accounts for the household's sources of income. These include labor earnings from both the private sector, $w_t^p$, and the public sector, $w_t^g$, net of the wage tax, $\tau_t^w$. Capital income, $r_t^k k_t^p$, is also included, net of capital taxes, $\tau_t^k$. Additionally, the household receives income from the real return on assets, represented by $\left(\frac{1+i_{t-1}}{1+\pi_t}\right) d_{t-1}$, where $i_t$ is the nominal interest rate and $\pi_t$ is the inflation rate. Finally, household income includes government transfers, $Tr_t$, and net firm profits, $\Pi_t$ as well.

The household accumulates physical capital under the assumption that it owns the capital stock. Following Smets and Wouters (2003), the capital accumulation process incorporates investment adjustment costs, and is given by:

$$k_{t+1}^p = (1-\delta^p)k_t^p + x_t^p\left[1 - \frac{\kappa^p}{2}\left(\frac{x_t^p}{x_{t-1}^p} - 1\right)^2\right], \tag{3}$$

where $\delta^p > 0$ represents the depreciation rate of private capital, and $\kappa^p$ is the adjustment cost parameter. The inclusion of adjustment costs ensures that investment dynamics exhibit smooth responses to economic shocks, preventing unrealistic jumps in capital accumulation.

The solution to the inter-temporal problem is given by the following equilibrium conditions;

$$1 = \mathbb{E}\Lambda_{t,t+1}\left(\frac{1+i_t}{1+\pi_{t+1}}\right), \tag{4}$$

$$\lambda_t(1-\tau_t^w)w_t^p = \chi\left[n_t^p + n_t^g + \frac{\gamma}{2}(n_t^g)^2\right]^{\psi}, \tag{5}$$

$$\lambda_t(1-\tau_t^w)w_t^g = \chi\left[n_t^p + n_t^g + \frac{\gamma}{2}(n_t^g)^2\right]^{\psi}(1+\gamma n_t^g), \tag{6}$$

$$q_t = \mathbb{E}_t\Lambda_{t,t+1}\left[(1-\tau_{t+1}^k)r_{t+1}^k + (1-\delta^p)q_{t+1}\right], \tag{7}$$

and

$$1 = q_t\left[1 - \frac{\kappa^p}{2}\left(\frac{x_t^p}{x_{t-1}^p} - 1\right)^2 - \kappa^p\left(\frac{x_t^p}{x_{t-1}^p} - 1\right)\frac{x_t^p}{x_{t-1}^p}\right] + \kappa^p\mathbb{E}_t\Lambda_{t,t+1}q_{t+1}\left(\frac{x_{t+1}^p}{x_t^p} - 1\right)\left(\frac{x_{t+1}^p}{x_t^p}\right)^2. \tag{8}$$

Where $\Lambda_{t,t+1}$ is the stochastic discount factor that depends on the marginal utility of consumption, $\lambda_t$,

$$\Lambda_{t,t+1} = \beta\frac{\lambda_{t+1}}{\lambda_t} \quad , \quad \lambda_t = \frac{(c_t^p + \alpha^g y_t^g)^{-\sigma}}{1+\tau_t^c}. \tag{9}$$

The equilibrium conditions, given by the Euler Equation (4), Tobin's $q$ (7), and the private investment dynamics equation (8), are standard in the literature. The less conventional equations are those describing private (5) and public (6) labor supply, which are positively dependent on the wage. By combining both equations, we found that the private wage is different from the public wage, $w_t^p \neq w_t^g$, implying that the wage premium is positive and greater than one, $w_t^g/w_t^p > 1$. Thus, the labor supply to the public sector depends on this wage premium,

$$n_t^g = \frac{1}{\gamma}\left(\frac{w_t^g}{w_t^p} - 1\right), \tag{10}$$

this implies that as the wage premium increases, the labor supply to the public sector grows, i.e., $\frac{\partial n_t^g}{\partial(w_t^g/w_t^p)} > 0$, to the detriment of private employment, $\frac{\partial n_t^p}{\partial n_t^g} < 0$, as observed in the negative relationship between $n_t^p$ and $n_t^g$,

$$n_t^p = \left[\frac{1}{\chi}\left(\frac{1-\tau_t^w}{1+\tau_t^c}\right)\frac{w_t^p}{(c_t^p + \alpha^g y_t^g)^\sigma}\right]^{\frac{1}{\psi}} - \left[n_t^g + \frac{\gamma}{2}(n_t^g)^2\right]. \tag{11}$$

When public job search costs are absent ($\gamma = 0$), private and public sector wages converge ($w_t^p = w_t^g$), eliminating the wage gap, an outcome inconsistent with empirical evidence showing a public wage premium.

### 3.2 Firms Producing Intermediate Goods

A continuum of firms produces differentiated intermediate goods using private capital ($k_t^p$), public capital ($k_t^g$), and private labor ($n_t^p$). These inputs are combined through a Cobb-Douglas production function:

$$y_t^p(i) = A_t \left[k_t^p(i)\right]^\alpha \left[n_t^p(i)\right]^{1-\alpha} \left[k_t^g(i)\right]^{\theta_1}, \tag{12}$$

where $\alpha > 0$ is the elasticity of output with respect to private capital, and $\theta_1 \in [0, 1)$ captures the output elasticity to public capital. Following Baxter and King (1993), Glomm and Ravikumar (1997), and Leeper et al. (2010), public capital is assumed to generate increasing returns, acting as a positive externality in production. Total Factor Productivity (TFP), $A_t$, evolves according to

$$\log A_t = (1-\rho^A)\log A_{ss} + \rho^A \log A_{t-1} + \varepsilon_t^A,$$

where $|\rho^A| < 1$ is the persistence parameter, $A_{ss}$ denotes the steady-state level of productivity, and $\varepsilon_t^A \sim \mathcal{N}(0, \sigma_A^2)$ is a mean-zero shock.

Each firm $i$ chooses $n_t^p(i)$, $k_t^p(i)$, and its price $p_t(i)$ to maximize expected after-tax profits:

$$\max_{\{n_t^p(i), k_t^p(i), y_t^p(i), p_t(i)\}_{t=0}^{\infty}} \mathbb{E}_t \sum_{j=0}^{\infty} \omega^j \Lambda_{t,t+j} (1 - \tau_{t+j}^{\Pi}) \Pi_{t+j}^e(i),$$

where $\tau_t^{\Pi}$ is the profit tax rate, common across firms; $\omega$ denotes the probability of maintaining the current price; and $\Lambda_{t,t+j}$ is the stochastic discount factor. The firm's profit function is given by:

$$\Pi_t^e(i) = \frac{p_t(i)}{p_t} y_t^p(i) - w_t^p n_t^p(i) - r_t^k k_t^p(i). \tag{13}$$

Firms face both the production constraint in (12) and an inverse demand function,

$$y_t(i)^p = \left( \frac{p_t(i)}{p_t} \right)^{-\theta} y_t^p \tag{14}$$

Assuming symmetric equilibrium, the optimal demand for capital and labor leads to the following first-order conditions:

$$r_t^k = \alpha \; mc_t \frac{y_t^p}{k_t^p}, \tag{15}$$

$$w_t^p = (1 - \alpha) \; mc_t \frac{y_t^p}{n_t^p}. \tag{16}$$

These expressions show how profit taxation distorts factor demands by lowering after-tax returns. A higher $\tau_t^{\Pi}$ reduces effective returns, thereby discouraging the use of both capital and labor.

Fiscal policy also influences firms' pricing behavior. Higher profit and sales taxes raise firms' marginal costs, prompting them to increase prices and shift part of the tax burden onto consumers. These effects are compounded by consumption taxes and variations in public spending, which affect the stochastic discount factor $\Lambda_{t,t+1}$.

The optimal reset price $p_t^*$ satisfies:

$$\frac{p_t^*}{p_t} = \frac{\theta}{\theta - 1} \frac{\mathbb{E}_t \left[ \sum_{j=0}^{\infty} \omega^j \Lambda_{t,t+j} (1 - \tau_{t+j}^{\Pi}) m c_{t+j} \left( \frac{p_{t+j}}{p_t} \right)^{\theta} y_{t+j}^p \right]}{\mathbb{E}_t \left[ \sum_{j=0}^{\infty} \omega^j \Lambda_{t,t+j} (1 - \tau_{t+j}^{\Pi}) \left( \frac{p_{t+j}}{p_t} \right)^{\theta-1} y_{t+j}^p \right]}. \tag{17}$$

Finally, the aggregate price level evolves as a CES aggregate of past and newly set prices:

$$p_t = \left[ \omega (p_{t-1})^{1-\theta} + (1 - \omega)(p_t^*)^{1-\theta} \right]^{\frac{1}{1-\theta}}. \tag{18}$$

### 3.3 Government

The government, acting as a goods-producing sector, combines labor and public capital to generate output according to the production function:

$$y_t^g = (k_t^g)^{\alpha_1} (n_t^g)^{1-\alpha_1}, \qquad 0 < \alpha_1 < 1, \tag{19}$$

where $\alpha_1$ denotes the elasticity of output with respect to public capital.

Public capital accumulates following:

$$k_{t+1}^g = (1 - \delta^g) k_t^g + x_t^g \left[ 1 - \frac{\kappa^g}{2} \left( \frac{x_t^g}{x_{t-1}^g} - 1 \right)^2 \right], \tag{20}$$

where $\delta^g > 0$ is the depreciation rate and $\kappa^g$ represents adjustment costs in public investment $x_t^g$.

The government's intertemporal budget constraint determines the evolution of gross public debt:

$$d_t = \left( \frac{1 + i_{t-1}}{1 + \pi_t} \right) d_{t-1} + (G_t - R_t) + Tr_t, \tag{21}$$

where $i_{t-1}$ is the nominal interest rate, $\pi_t$ inflation, $G_t$ total public spending, $R_t$ revenues, and $Tr_t$ lump-sum transfers.

Fiscal revenues are given by:

$$R_t = \tau_t^c c_t + \tau_t^w (w_t^p n_t^p + w_t^g n_t^g) + \tau_t^k r_t^k k_{t-1} + \tau_t^{\Pi} \Pi_t^e, \tag{22}$$

where taxation applies to private and public consumption, wages, capital income, and firm profits. Tax rates are exogenous policy instruments.

Each tax rate $\tau_t^j$, for $j \in \{c, w, k, \Pi^e\}$, evolves as:

$$\tau_t^j = \rho^j \tau_{t-1}^j + (1 - \rho^j)\tau_{ss}^j + \varepsilon_t^j, \tag{23}$$

where $|\rho^j| < 1$ captures persistence, $\tau_{ss}^j$ is the steady-state rate, and $\varepsilon_t^j \sim \mathcal{N}(0, \sigma_j^2)$ is a tax shock.

Primary spending is defined as:

$$G_t = c_t^g + x_t^g + w_t^g n_t^g, \tag{24}$$

with components for public consumption, investment, and wages.

Following Muscatelli and Tirelli (2005) and Chung and Leeper (2007), public consumption and investment follow autoregressive rules responsive to the output gap and debt:

$$\frac{c_t^g}{c_{ss}^g} = \left(\frac{c_{t-1}^g}{c_{ss}^g}\right)^{\rho^{cg}} \left(\frac{y_t^p}{y_{ss}^p}\right)^{\rho^{cy}} \left(\frac{d_{t-1}}{d_{ss}}\right)^{\gamma_1} \exp\{\varepsilon_t^{cg}\}, \tag{25}$$

$$\frac{x_t^g}{x_{ss}^g} = \left(\frac{x_{t-1}^g}{x_{ss}^g}\right)^{\rho^{xg}} \left(\frac{y_t^p}{y_{ss}^p}\right)^{\rho^{xy}} \left(\frac{d_{t-1}}{d_{ss}}\right)^{\gamma_2} \exp\{\varepsilon_t^{xg}\}, \tag{26}$$

where $\rho^{cg}$ and $\rho^{xg}$ capture persistence, $\rho^{cy}$ and $\rho^{xy}$ measure cyclical responses, and $\gamma_1, \gamma_2 \in (0, 1)$ capture debt feedback. The shocks $\varepsilon_t^{cg}, \varepsilon_t^{xg}$ represent unexpected spending deviations.

Public wage inefficiency is modeled as a distortion that drives a wedge between public and private wages. In a competitive market, efficiency implies $w_t^g = w_t^p$. Introducing a distortion factor $\mu_t^{inef} > 0$, the public wage becomes:

$$w_t^g = (1 + \mu_t^{inef}) w_t^p, \tag{27}$$

where inefficiency follows:

$$\mu_t^{inef} = \rho^{inef} \mu_{t-1}^{inef} + (1 - \rho^{inef})\mu_{ss}^{inef} + \varepsilon_t^{inef}, \tag{28}$$

with $|\rho^{inef}| < 1$ and $\varepsilon_t^{inef} \sim \mathcal{N}(0, \sigma_{inef}^2)$.

### 3.4 Monetary Policy

Monetary policy follows a standard Taylor rule:

$$\frac{1+i_t}{1+\bar{i}} = \left(\frac{1+i_{t-1}}{1+\bar{i}}\right)^{\rho^i} \left[\left(\frac{1+\pi_t}{1+\overline{\pi}}\right)^{\phi_\pi} \left(\frac{GDP_t}{\overline{GDP}}\right)^{\phi_y}\right]^{1-\rho^i}, \tag{29}$$

where $\rho^i$ captures the persistence of the policy rate, $\phi_\pi$ is the response to inflation, and $\phi_y$ is the response to the output gap. Consistent with the Taylor principle, it is assumed that $\phi_\pi > 1$, while $\phi_y > 0$.

### 3.5 Equilibrium

Market clearing requires that total private output, $y_t^p$, is absorbed by private and public consumption and investment:

$$y_t^p = c_t^p + x_t^p + c_t^g + x_t^g. \tag{30}$$

Let $q_t^g = \dfrac{p_t^g}{p_t}$ denote the relative price of public goods in terms of private goods. Aggregate output (GDP) is then defined as the value of private and public production:

$$GDP_t = y_t^p + q_t^g y_t^g. \tag{31}$$

Given the structural parameters, the initial conditions $\{q_0, x_0^z, k_0^z, p_0, c_0^g\}$, and the sequence of shocks $\{\varepsilon_t^A, \varepsilon_t^j, \varepsilon_t^{cg}, \varepsilon_t^{xg}, \varepsilon_t^{inef}, \xi_t^i\}_{t=0}^{\infty}$, the general equilibrium consists of sequences of quantities

$$\{n_t^z, x_t^z, c_t^z, y_t^z, k_t^z, d_t, G_t, R_t, GDP_t\}_{t=0}^{\infty},$$

and prices

$$\{i_t, \pi_t, r_t^k, w_t^z, q_t, p_t^*, p_t\}_{t=0}^{\infty},$$

for $z \in \{p, g\}$, where $p$ denotes the private sector and $g$ the public sector.

These sequences solve the optimization problems of households, firms, and the government, while satisfying all market-clearing conditions in goods, labor, and capital markets. The resulting dynamics are characterized by a system of rational expectations equations (see Appendix C).

# 4 Results

## 4.1 Calibration

The model is calibrated to replicate key stylized facts of LAC economies. Based on estimates of the public–private wage differential in Abdallah et al. (2023), wage inefficiency—proxied by $\frac{w^g}{w^p}$—is set at 1.34, implying that public sector wages are 34% higher than private sector wages. This value is consistent with Cerda and Pessino (2018b), who document a similar premium across the region.

The scale parameter of the transaction cost associated with public employment is set at $\gamma = 2.32$, following Vasilev (2017). Given this calibration and equation (10), the steady-state level of public employment $n^g_{ss}$ is determined.

Fiscal ratios guide the calibration of steady-state values. Primary spending is set at 25% of GDP $\left(\frac{G}{GDP} = 0.25\right)$, in line with regional averages.[2] Tax rates $\tau^c, \tau^w, \tau^k, \tau^\Pi$ are chosen so that the revenue-to-GDP ratio matches observed data, i.e., $\frac{R}{GDP} = 0.24$. Specifically, the consumption tax is calibrated to $\tau^c = 0.07$, the personal income tax to $\tau^w = 0.023$, the capital income tax to $\tau^k = 0.1$, and the corporate profit tax to $\tau^\Pi = 0.04$.[3]

Gross public debt is set at 58% of GDP $\left(\frac{d}{GDP} = 0.58\right)$.[4] The steady-state inflation rate corresponds to the regional inflation target, $\overline{\pi} = 0.03$.[5] The average nominal interest rate is calibrated to $\overline{i} = 0.04$, implying a real interest rate of 1%, with a discount factor $\beta = 0.99$.

Other parameters follow standard values in the RBC and NK literature (see Walsh (2017), Schmitt-Grohé and Uribe (2003), Baxter and King (1993), Ganelli and Tervala (2009)). Risk aversion is set at $\sigma = 2$, and the inverse Frisch elasticity of labor supply at $\psi = 10$. The adjustment cost parameter for private investment is $\kappa^p = 0.2$, with depreciation rates $\delta^p = 0.1$ for private capital and $\delta^g = 0.025$ for public capital.

Nominal rigidities are captured by the Calvo parameter $\omega = 0.75$, implying that firms keep prices unchanged with a 75% probability each period. The elasticity of output with respect to private capital is set at $\alpha = 0.33$, while for public production it is $\alpha_1 = 0.2$.

[2] The ratio of primary expenditure to GDP is obtained from IMF WEO (April 2023).
[3] The tax values are consistent with OECD data for Latin American economies.
[4] The debt-to-GDP ratio is obtained from IMF WEO (April 2023).
[5] Inflation targets in LAC vary across countries, but the largest economies, such as Brazil, Mexico, Colombia, and Peru, target 3.0%.

A summary of parameter values is presented in Table 1.

Table 1: Parameter calibration

| **Simbol** | **Definition** | **Value** |
|---|---|---|
| $\beta$ | Discount factor | 0.99 |
| $\alpha^g$ | Degree of comp./subs. between public spending and private consumption | -0.8 |
| $\sigma$ | Risk aversion coefficient | 2 |
| $\psi$ | Inverse Frisch elasticity | 10 |
| $\chi$ | Labor supply scale parameter | 0.93 |
| $\gamma$ | transaction cost associated with government work is set at | 2.32 |
| $\delta^p$ | Private capital depreciation rate | 0.1 |
| $\kappa^p$ | Scale parameter for private capital adjustment costs | 0.2 |
| $\theta$ | Elasticity of substitution of differentiated goods | 5 |
| $\alpha$ | Private capital-product elasticity | 0.33 |
| $\omega$ | Probability of changing Calvo's prices | 0.75 |
| $\delta^g$ | Public capital depreciation rate | 0.025 |
| $\theta_1$ | Public-Private capital-product elasticity | 0.05 |
| $\alpha_1$ | Public capital-product elasticity | 0.2 |
| $\kappa^g$ | Scale parameter for public capital adjustment costs | 2 |

### 4.2 Comparative Statics Analysis

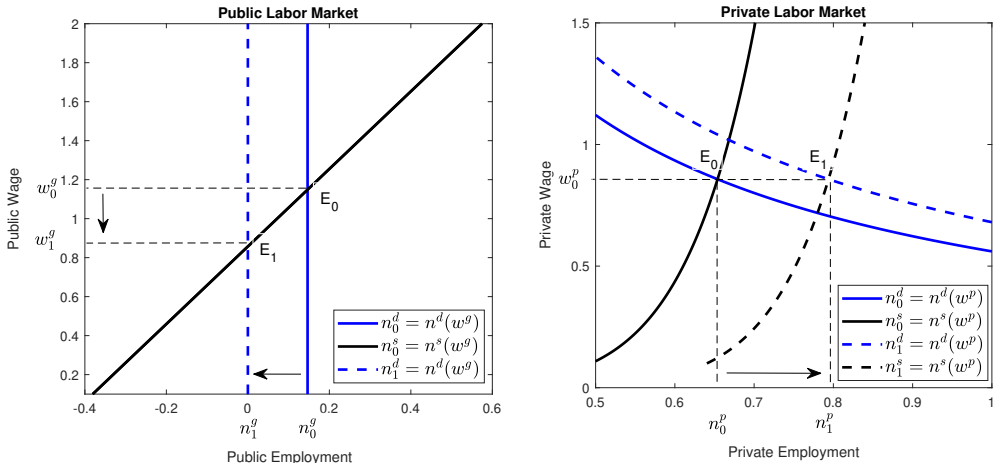
We now examine how reducing inefficiencies in public employment affects labor market outcomes. To illustrate, we construct labor supply and demand curves for both public and private sectors. In the initial steady state, public labor demand, $n_0^g$, is perfectly inelastic, implying that the government hires workers regardless of the wage level. In contrast, the public labor supply curve, $n_0^g = n^s(w^g, \gamma)$, has a positive slope and is derived from condition (10). On the private side, the labor supply curve, $n_0^s = n^s(w^p, \Phi)$, follows from equation (11), where $\Phi$ denotes a set of structural parameters. Private labor demand, $n_0^d = n^d(w^p, \Phi)$, is obtained from equation (16).

Figure 3 presents the public and private labor market equilibria. The initial equilibrium, $E_0$, corresponds to a calibrated wage premium of $\frac{w^g}{w^p} = 1.34$. Reducing this premium to $\frac{w^g}{w^p} = 1$ lowers the public wage from $w_0^g$ to $w_1^g$, shifting public labor demand from $n_0^g$ to $n_1^g$.

This adjustment has notable spillovers for the private labor market. Lower public wages re-

duce incentives for government employment, inducing households to reallocate labor toward the private sector. As a result, the private labor supply shifts rightward, and firms' labor demand rises. The new equilibrium, $E_1$, entails higher private employment $n_1^p$, while private wages remain constant. This outcome follows from constant returns to scale in production, whereby output expands proportionally with employment.

Figure 3: Public and Private Labor Market

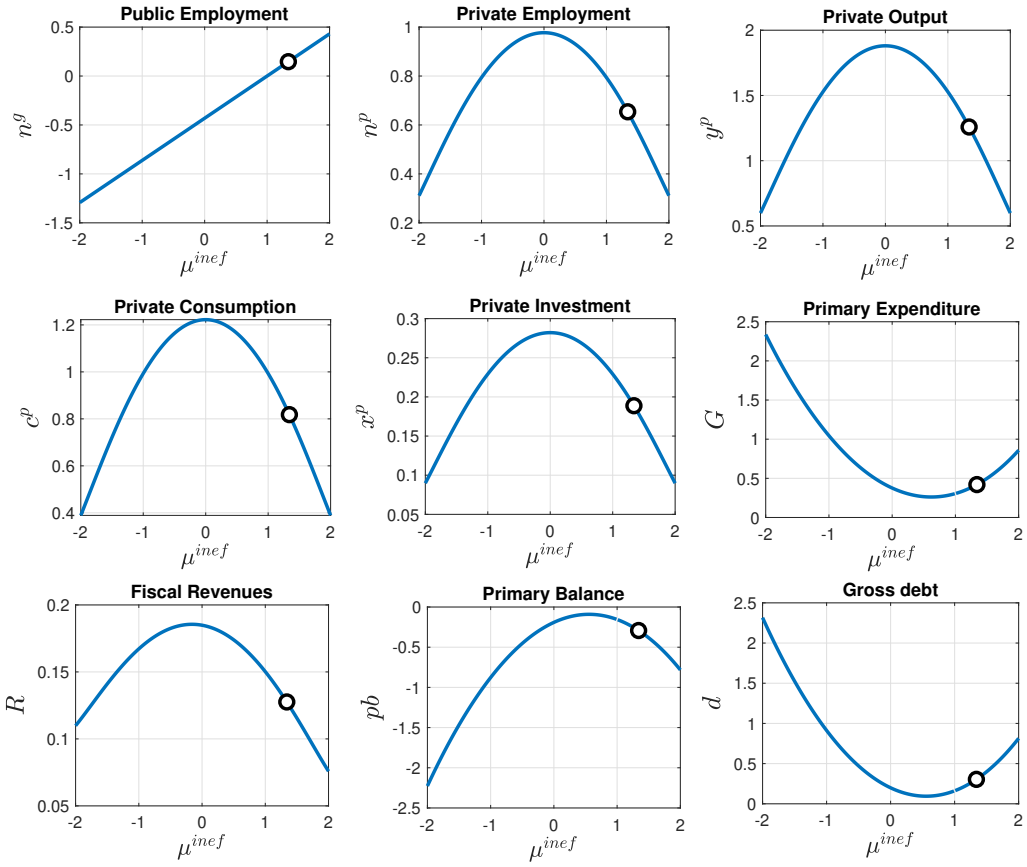



We next explore steady-state responses to alternative values of inefficiency. A vector for $\mu^{inef}$, equivalent to a vector of wage premia $\frac{w^g}{w^p}$, includes the initial calibration of 1.34. The lower bound is set at $\frac{w^g}{w^p} = 1$, implying wage parity across sectors ($\mu^{inef} = 0$, see equation 27), consistent with observed cases in LAC such as the Dominican Republic. The upper bound is set at $\frac{w^g}{w^p} = 1.6$, consistent with estimates for Colombia.

Figure 4 reports steady-state outcomes for different values of $\mu^{inef}$, with the white circle denoting the initial calibration. A reduction in inefficiency—values below the circle—decreases public employment and increases private employment, reflecting the inverse relationship between $n^g$ and $n^p$.

The reallocation of labor raises private output, which, in turn, stimulates aggregate demand through higher consumption and investment. Lower inefficiency also yields substantial fiscal benefits: reduced public wages lower primary expenditure, while stronger private activity boosts revenues. The combined effect improves the primary balance and reduces public debt.

Figure 4: Long-term impacts of a reduction in inefficiency

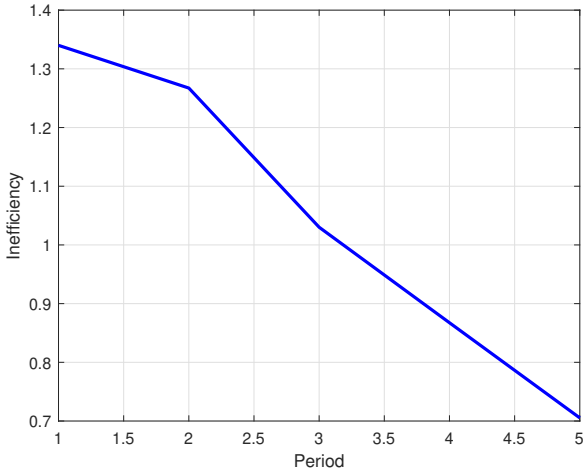



Note: The white circle indicates the initial calibration of the wage premium (1.34).

## 4.3 Numerical Simulations

Figure 5 illustrates the trajectory of public wage inefficiency following a policy of wage adjustment, implemented through a gradual reduction in relative public wages. This path reflects gains in spending efficiency and reduced fiscal pressures. Historical experiences in Latin America, including Peru and Brazil in the 1990s and more recently Argentina, suggest that containing public wage growth can strengthen fiscal sustainability without necessarily compromising service quality, particularly when combined with management reforms. In the simulation, inefficiency falls from 1.34 to 0.7 over five periods, corresponding to the average duration of a government term. This adjustment may result from either lower average wages or a more efficient allocation of public employment. By reducing inefficiency, resources are freed for public investment or debt reduction, consistent with practices in countries where fiscal rules cap current expenditure growth.

Figure 5: Reduction of Public Inefficiency




The macroeconomic and fiscal implications are substantial. Figure 6 presents the model outcomes. Lower inefficiency reduces both public wages and public employment, while private employment rises. Private wages remain constant at their long-run level, consistent with constant returns to scale in production. At the same time, private capital accumulates as investment expands. Public capital also increases, reflecting a shift in expenditure: lower wage spending allows for higher public investment, enhancing the capital stock available to final goods producers. These supply-side dynamics translate into a 0.3 percentage point increase in output growth at the time of the shock.

On the demand side, the policy acts as a contraction in government consumption, triggering a reallocation of aggregate demand. Private consumption and investment both rise, reflecting the crowding-in effect from greater fiscal space. Inflation declines through two channels. First, lower government wage costs reduce financing needs, easing inflationary pressures often linked to public debt. Second, higher public capital lowers marginal costs for private producers. With private wages stable, these factors jointly contribute to disinflation. As a result, the policy rate also falls, before both inflation and the nominal interest rate converge to their steady-state levels.

The fiscal effects are equally significant. The decline in wage inefficiency reduces primary expenditure by about 0.1 percentage points of GDP on impact. At the same time, revenues rise as broader tax bases in consumption, labor, and capital expand, even without changes in tax rates. The primary balance improves, generating a direct reduction in gross public debt. This stronger fiscal position lowers financing needs and improves debt sustainability by easing future

fiscal burdens and supporting a more stable long-run trajectory.

Figure 6: Transition Dynamics in the Face of Reduced Inefficiency

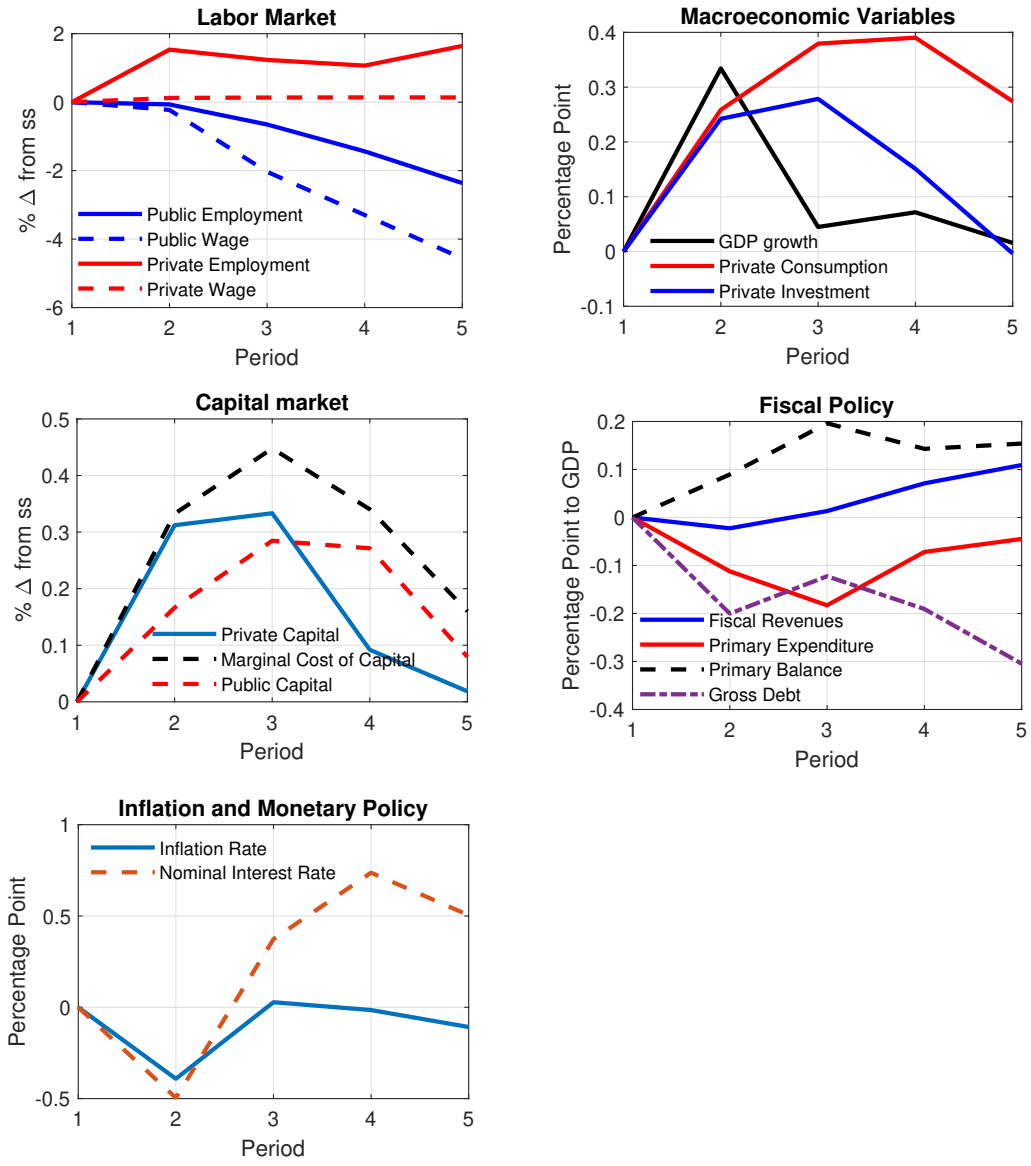



Table 2 summarizes the cumulative effects over the first five periods after the reform. In the labor market, public wages fall by 2.8 percent and public employment by 2.2 percent, while private employment rises by 1.3 percent and private wages remain constant.

In fiscal terms, primary expenditure declines by 0.4 percentage points of GDP, improving the primary balance by the same amount. The overall fiscal balance improves by 0.3 percentage points, and gross public debt falls by 0.8 percentage points, strengthening fiscal sustainability.

The decomposition of GDP growth shows a reallocation toward the private sector. Output growth rises by 0.5 percentage points, driven by a 3.4 percentage point increase in private consumption and a 1 percentage point increase in private investment, while public expenditure falls by 3.9 percentage points of GDP.

Overall, these simulations highlight that improving the efficiency of public employment not only strengthens fiscal sustainability and private labor market outcomes but also fosters higher economic growth, underscoring the role of efficient resource allocation in macroeconomic performance.

Table 2: Cumulative Impact of Reducing Inefficiency

| **Variables** | **Unit of Measurement** | **Cumulative Impact** |
|---|---|---|
| **Labor Market** | | |
| Public Wage | Percent | -2.8 |
| Public Employment | Percent | -2.2 |
| Private Wage | Percent | 0.0 |
| Private Employment | Percent | 1.3 |
| **Fiscal Sector** | | |
| Fiscal Revenues | p.p. of GDP | 0.0 |
| Primary Expenditure | p.p. of GDP | -0.4 |
| Primary Balance | p.p. of GDP | 0.4 |
| Total Balance | p.p. of GDP | 0.3 |
| Gross Debt | p.p. of GDP | -0.8 |
| Interest Payment | p.p. of GDP | 0.0 |
| **GDP Growth Decomposition** | | |
| GDP Growth | p.p. | 0.5 |
| Private Consumption | p.p. of GDP | 3.4 |
| Private Investment | p.p. of GDP | 1.0 |
| Public Expenditure | p.p. of GDP | -3.9 |

# 5 Extensions: The Role of Wage Rigidities and Adjustments in Public Employment

## 5.1 The Impact of Downward Wage Rigidity and the Role of Inflation

The previous section treated inefficiency as an exogenous factor. We now develop a simplified framework in which inefficiency arises endogenously, shaped by macroeconomic fundamentals and institutional rigidities. Four channels are considered. First, institutional rigidities limit the government's ability to reduce public wages in response to changes in private wages. Second, wage indexation to inflation links public wage premia mechanically to past and current inflation. Third, wage taxation increases the fiscal cost of public employment, particularly when employment levels are high. Fourth, structural parameters such as wage smoothing preferences, the household discount factor, and the degree of indexation further influence the dynamics of inefficiency.

To formalize these channels, we introduce a central planner minimizing a loss function that trades off narrowing the gap between public and private wages against avoiding abrupt changes in public wages over time.

We assume $j \in [0, 1]$ government units, each representing a sector or entity with distinct wage-setting behavior.[6]

The planner considers the fiscal sustainability of public wage costs. Using the government budget constraint (21), the nominal wage bill for unit $j$ is:

$$\Omega_1(W_t^g(j)) = (1 - \tau_t^w) W_t^g(j) n_t^g(j). \tag{32}$$

Respecting the household labor supply condition (10), this becomes:

$$\Omega_1(W_t^g(j)) = \frac{1 - \tau_t^w}{\gamma} \left( \frac{W_t^g(j)}{W_t^p} - 1 \right) W_t^g(j). \tag{33}$$

The planner also minimizes fluctuations in wages across periods. Following Rotemberg (1982),

[6] Heterogeneity across government units reflects differences in professions or institutional settings. For example, wages for public hospital doctors may differ from those of administrative staff in central ministries.

wage adjustment costs are:

$$\Omega_2(W_t^g(j)) = \frac{\lambda}{2}\left(\frac{W_t^g(j)}{W_{t-1}^g(j)} - 1\right)^2 W_t^g n_t^g, \tag{34}$$

where $\lambda > 0$ captures wage smoothing preferences.

The planner's objective is to minimize:

$$C(W_t^g(j)) = \Omega_1(W_t^g(j)) + \Omega_2(W_t^g(j)).$$

Because public wages often exceed private wages, sharp real wage declines could reduce public employment and impair service delivery. To address this, we introduce an indexation rule linking public wages to past inflation, consistent with nominal rigidity models (e.g., Christiano et al. (2005), Carrillo et al. (2022)):

$$W_{t+i}^g(j) = \prod_{s=1}^{i}(1 + \phi\pi_{t+s-1})W_t^g(j), \quad i \geq 1,$$

with $W_{t+i}^g(j) = W_t^g(j)$ when $i = 0$. Inflation is defined as $\pi_t = P_t/P_{t-1} - 1$, where $P_t$ is the price level. The parameter $\phi \in (0, 1)$ reflects partial indexation: $\phi = 1$ implies full indexation, while $\phi = 0$ implies none. Defining $\Pi_{t,i} = \prod_{s=1}^{i}(1 + \phi\pi_{t+s-1})$ as gross indexed inflation,[7] we have $W_{t+i}^g(j) = \Pi_{t,i}W_t^g(j)$.

Substituting into the cost function gives:

$$\min_{\{W_t^g(j)\}} \sum_{i=0}^{\infty} \beta^i \left[\frac{1-\tau_t^w}{\gamma}\left(\frac{\Pi_{t,i}W_t^g(j)}{W_t^p} - 1\right)\Pi_{t,i}W_t^g(j) + \frac{\lambda}{2}\left(\frac{\Pi_{t,i}W_t^g(j)}{\Pi_{t,i-1}W_{t-1}^g(j)} - 1\right)^2 W_t^g n_t^g\right],$$

subject to a downward wage rigidity constraint:

$$\gamma_t^w \Pi_{t,i} W_t^g(j) \geq W_t^p, \tag{35}$$

ensuring public wages remain above a fraction of private wages. Here $\gamma_t^w = 1 + \mu_t^w$ introduces shocks to the wage premium, such as political pressures.[8] A positive $\mu_t^w$ reflects rising inefficiencies, while a negative value signals efficiency gains.

[7] $\Pi_{t,i}$ captures compounded indexed inflation.

[8] Unlike Schmitt-Grohé and Uribe (2022), who impose $W_t^g \geq W_{t-1}^g$, we impose a relative constraint to private wages, aligning with the planner's objective of minimizing wage inefficiencies.

This formulation highlights how wage rigidities and inflation dynamics jointly shape the persistence of inefficiencies. Empirical evidence supports this mechanism: Mineyama (2023) show that downward nominal wage rigidity amplifies inflation persistence during disinflation episodes, underscoring the role of wage-setting frictions in macroeconomic adjustment. From a theoretical perspective, such rigidities also affect equilibrium stability. Mineyama (2024) demonstrate that nominal wage rigidity alters the determinacy conditions in New Keynesian models, reinforcing the view that wage frictions are central to both the speed of adjustment and the overall stability of the economy.

The solution yields a wage-setting rule equivalent to equation (27) in Appendix D, but with inefficiency now partly endogenous:

$$\mu_t^{inef} = \underbrace{f(\pi_t, n_t^g, \tau_t^w, \pi_{g,t}^w) + \gamma \left( \frac{1+\phi\pi_t}{1-\tau_t^w} \right) \mu_t}_{\text{Endogenous}} + \underbrace{\kappa_t^{inef}}_{\text{Exogenous}}, \tag{36}$$

where

$$f = \phi\pi_t - \lambda\gamma \left( \frac{\pi_{g,t}^w + \phi\pi_t - \phi\pi_{t-1}}{1-\tau_t^w + 2\phi\pi_{t-1}} \right) n_t^g + \lambda\beta\gamma\mathbb{E}_t \left[ \left( \frac{\pi_{g,t+1}^w + \phi\pi_{t+1} - \phi\pi_t}{1-\tau_t^w + 2\phi\pi_t} \right) n_{t+1}^g \right].$$

Two cases arise: if the constraint binds, then $W_t^g = W_t^p$ and $\mu_t > 0$; otherwise $W_t^g > W_t^p$ and $\mu_t = 0$.

Equation (36) identifies two sources of wage inefficiency. The endogenous component reflects nonlinear and intertemporal macro-fiscal conditions. Higher inflation $\pi_t$ increases the wage premium directly through indexation, and this effect is amplified when expected inflation enters the forward-looking wage path. Empirical work also suggests that downward nominal wage rigidity amplifies this persistence, as documented by Mineyama (2023), who show that wage stickiness flattens the Phillips curve and prolongs disinflation dynamics. A higher labor income tax $\tau_t^w$ raises the gross fiscal cost of public employment, since the government must offer higher gross wages to match private-sector net wages. The indexation parameter $\phi$ governs both the current and future persistence of wage pressures: highly indexed systems reduce the government's capacity to adjust real wages. Finally, the size of public employment $n_t^g$ magnifies these effects, as a larger payroll increases the aggregate fiscal impact. These pressures are exacerbated when the downward wage rigidity constraint binds

($\mu_t > 0$), reflecting institutional or political limits that prevent efficient adjustment.

$$\gamma \left( \frac{1 + \phi \pi_t}{1 - \tau_t^w} \right) \mu_t^w \mu_t \approx \kappa_t^{inef},$$

which follows:

$$\kappa_t^{inef} = \rho^{\kappa} \kappa_{t-1}^{inef} + \varepsilon_t^{\kappa}.$$

For simulations, parameters are calibrated from the literature: $\phi = 0.17$ (Hofmann et al., 2012; Carrillo et al., 2022), $\lambda = 0.5$ (Born and Pfeifer, 2020), and the model is solved with nonlinear methods from Guerrieri and Iacoviello (2015).

Figure 7: Macro-fiscal Impacts in the Presence of Wage Rigidities

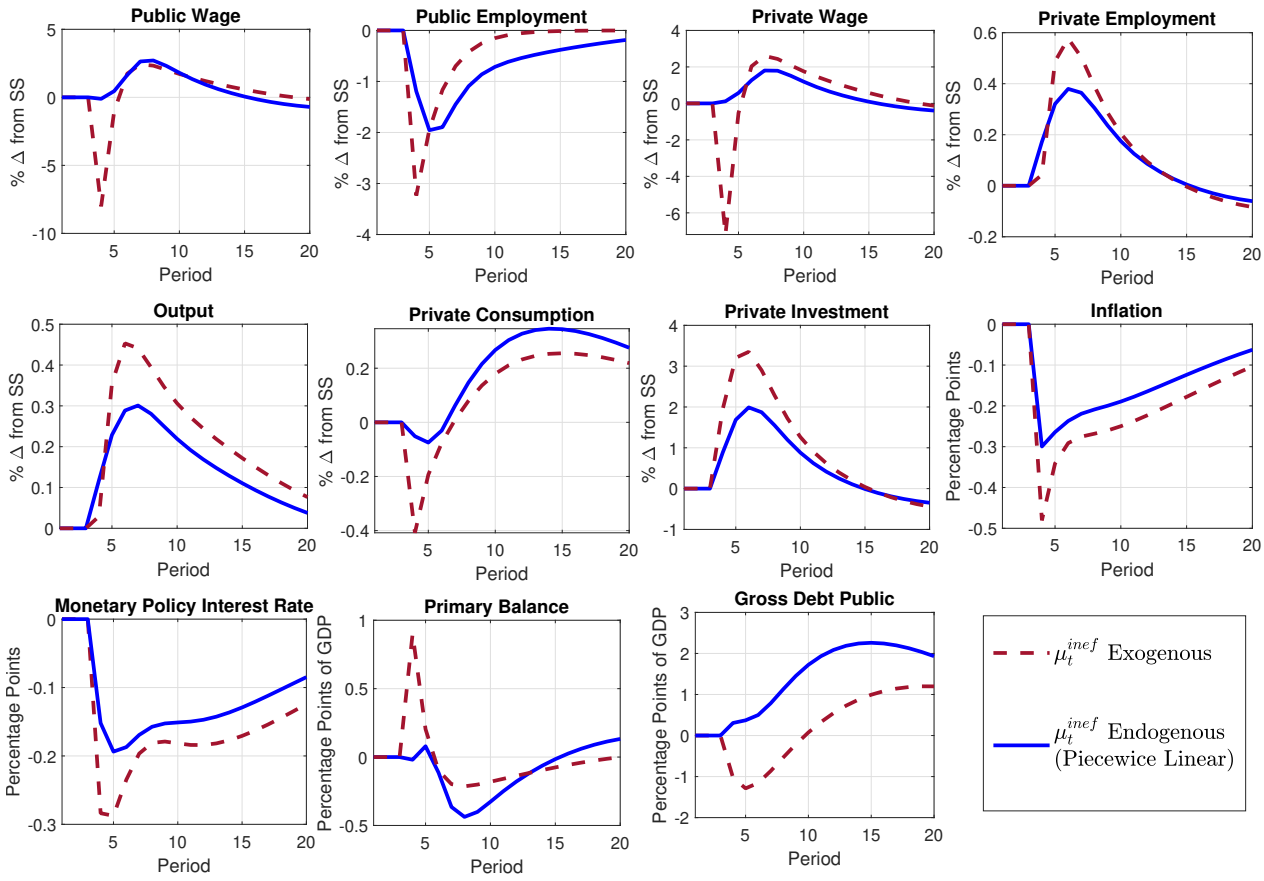



Figure 7 reports macro-fiscal dynamics under reduced inefficiency, comparing the benchmark case of exogenous inefficiency with the endogenous model. When inefficiency is exogenous, adjustment is sharp: public wages fall quickly, with large declines in consumption, inflation, and debt.

When inefficiency is endogenous, rigidities slow the adjustment, producing more gradual and persistent effects. Fiscal balances improve more slowly, and debt accumulates more significantly. These results illustrate how nominal and institutional rigidities, notably downward wage stickiness and indexation, constrain the speed and effectiveness of fiscal consolidation, reducing its macroeconomic and debt-sustainability gains.

### 5.2 Public Employment Cuts

In the baseline model (Section 3), households freely choose between public and private employment. In practice, this assumption is often too strong: workers face frictions, and employment levels are also shaped by government policies. To incorporate these features, we extend the model with a law of motion for public employment, inspired by search-and-matching models,[9]

$$n_t^g = (1 - \sigma_t^g) n_{t-1}^g + \varepsilon_t^g, \quad \varepsilon_t^g \sim \mathcal{N}(0, \sigma_n^2), \tag{37}$$

where $\sigma_t^g$ is the dismissal rate, representing the fraction of workers separated from the public sector. To capture institutional rigidities and endogenous persistence, we model $\sigma_t^g$ as a fiscal rule that reacts to deviations in the primary balance:

$$\sigma_t^g = \overline{\sigma^g} + \rho^\sigma \sigma_{t-1}^g + \phi_\sigma (pb_t - \overline{pb}) + \varepsilon_t^\sigma, \quad \varepsilon_t^\sigma \sim \mathcal{N}(0, \sigma_\sigma^2).$$

Here, $\overline{\sigma^g} \in (0, 1)$ is the historical average dismissal rate, $\rho^\sigma$ captures persistence, and $\phi_\sigma$ measures the sensitivity of employment decisions to fiscal conditions.

This formulation reflects the idea that changes in public employment are partly endogenous to fiscal performance. When $pb_t < \overline{pb}$, i.e., the primary balance falls short of the target, the government reduces employment. This adjustment entails severance costs: we assume that a share $\theta^g$ of primary spending compensates dismissed workers, so $\theta^g G_t$ enters the budget as an additional expenditure and household income.

In addition to dismissals, the government may impose an institutional cap on public employ-

[9] See Andolfatto (1996) and Merz (1995). Here, however, the matching function is treated as exogenous, and an endogenous firing rule is introduced.

ment, reflecting administrative or political limits. This upper bound is modeled as:

$$n_t^g \leq \overline{n^g}. \tag{38}$$

Equations (37) and (38) become additional constraints in the household's optimization problem. The equilibrium conditions remain those of Section 3.1, except for employment choice. The modified version of condition (10) is:

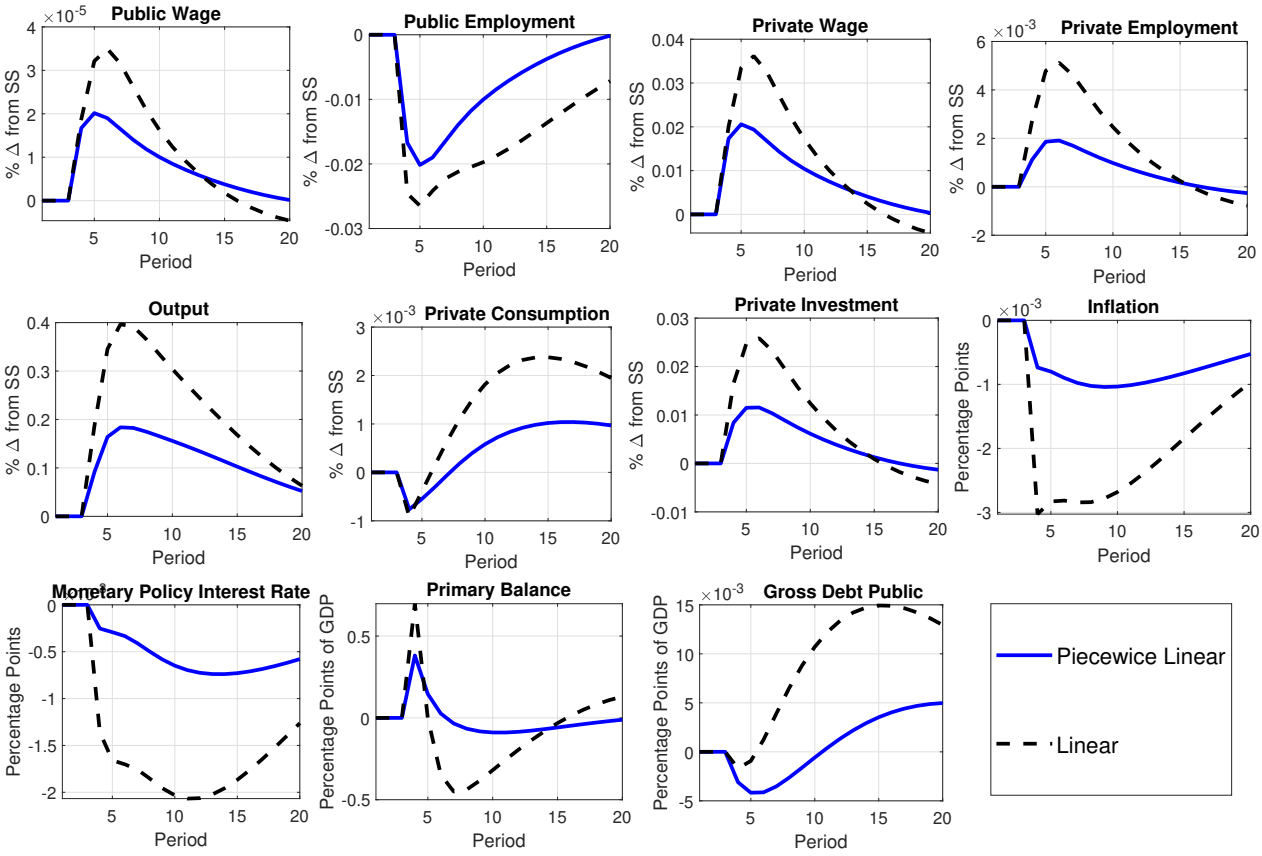
$$n_t^g = \frac{1}{\gamma}\mathbb{E}_t\left[\beta\left(\frac{w_{t+1}^g}{w_{t+1}^p} - 1\right)\right],$$

implying that public employment depends not on current wage differentials but on expectations about the relative attractiveness of public wages. Thus, when governments announce employment reduction policies, their fiscal impact hinges on credibility and intertemporal consistency.

For simulations, we calibrate $\overline{\sigma^g}$ to 1.4%, consistent with destruction rates reported by Gomes (2015). Higher values, such as 4%, are sometimes used to match private-sector benchmarks (Bandeira et al., 2017). The responsiveness parameter is set at $\phi_\sigma = -0.06$, based on the observed correlation between primary balance gaps and wage premia.

Figure 8 compares macro-fiscal dynamics under two scenarios. The first (dashed black line) follows a linear adjustment rule. The second (blue line) introduces the employment cap through a piecewise-linear policy. Under the linear rule, the adjustment is sharper: public employment, wages, and output fall more quickly, while the primary balance improves faster. By contrast, the cap produces a more gradual consolidation. Employment and wages decline slowly, cushioning the fall in output and private consumption. This smoother path reduces volatility in inflation and interest rates but also slows debt reduction, as gross public debt remains elevated for longer. Overall, employment caps allow for less disruptive adjustment at the cost of a more protracted fiscal consolidation.

Figure 8: Macro-fiscal impacts in the presence of employment cuts



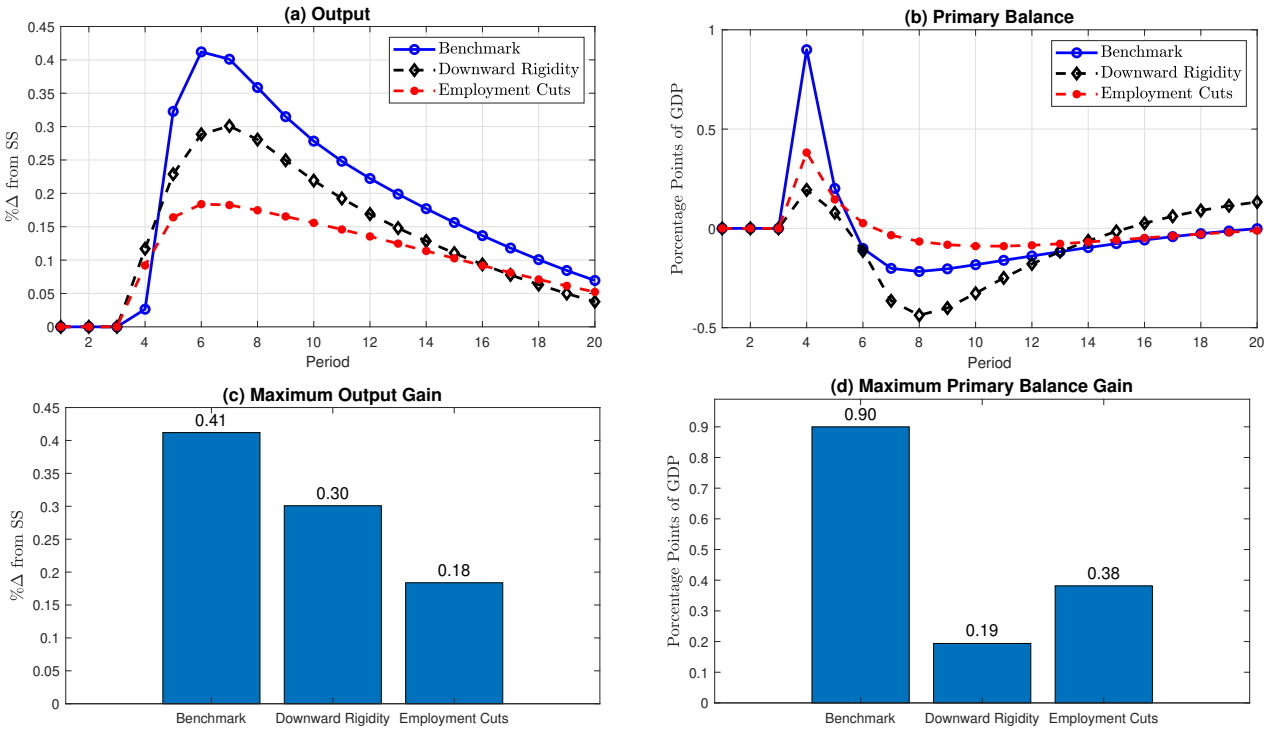

## 5.3 Fiscal and Economic Gains of Reducing Inefficiencies

Figure 9 compares macroeconomic and fiscal outcomes across alternative strategies to reduce inefficiencies in the public sector. In the benchmark case, where wage inefficiency declines exogenously, both GDP growth (panel a) and the primary balance (panel b) record the strongest improvements. When adjustment instead occurs through downward wage rigidity or public employment cuts, the gains become more modest. Wage rigidity generates moderate output gains with limited fiscal improvement (panels c and d), while employment cuts yield stronger fiscal outcomes but at the cost of weaker growth.

A comparison of the two policy instruments reveals a clear trade-off. Employment cuts improve the primary balance more than downward wage rigidity (0.38 vs. 0.19 percentage points of GDP), but they deliver smaller output gains (0.18% vs. 0.30% relative to steady state). Reducing employment provides stronger fiscal relief but depresses aggregate demand and raises unemployment. By contrast, preserving jobs while lowering wages mitigates economic costs but yields smaller fiscal

benefits. These results underscore the need to balance fiscal sustainability objectives with the social and macroeconomic implications of adjustment policies.

Figure 9: Macro-fiscal gains




## 6 Welfare Analysis

We now examine the welfare implications of reducing inefficiencies in the public sector. Following Faia and Monacelli (2007) and Schmitt-Grohé and Uribe (2007), welfare is measured as the fraction of private consumption households would be willing to forgo in a frictionless economy (without policy intervention) to attain the same utility level $W_{j,t}$ achieved under a policy that reduces inefficiency.[10] Formally, household utility satisfies:

$$W_{j,p} = \mathbb{E}_0 \sum_{j=0}^{\infty} \beta^j U\left((1+\varepsilon)c^p_{t+j}, y^g_{t+j}, n^p_{t+j}, n^g_{t+j}\right) = W_0,$$

where $\varepsilon$ represents the equivalent variation in private consumption.

We compute unconditional welfare to capture long-run effects, abstracting from short-term dynamics. In general terms, welfare depends on private and public employment ($n^j$), the provision

[10] $W_0$ denotes utility in the baseline (no policy) and $W_p$ the utility level under the policy.

of public goods $y^g$, and a vector of structural parameters $\Phi = \Phi(\gamma, \alpha^g, \psi, \chi)$, with $j \in \{p, g\}$. From equation (10), public employment is a function of the wage premium, itself determined by the inefficiency parameter $\mu^{inef}$ via equation (27). Accordingly, welfare can be expressed as $W = W(\mu^{inef}, \Phi)$.

Figure 10: Welfare and Public Inefficiency

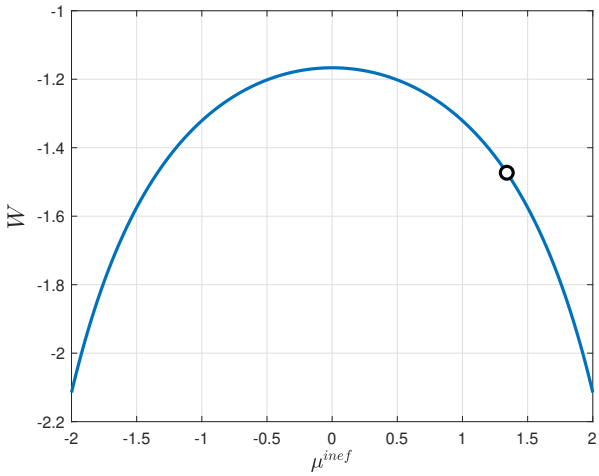



Figure 10 shows the social welfare curve across values of $\mu^{inef}$, which measures the distortion between public and private wages. Plausible values range from $-2$ to 2, yielding an inverted U-shape. Welfare peaks at $\mu^{inef} = 0$, corresponding to the case of no wage inefficiency in the public sector. For $\mu^{inef} > 0$, rising inefficiency generates a monotonic welfare decline. The benchmark calibration, marked by the black dot, lies in this range, indicating that the economy operates in a suboptimal region where wage premia reduce welfare. Welfare also falls when $\mu^{inef} < 0$, as persistently lower public wages relative to private wages are inefficient. Thus, large wage gaps in either direction—favoring public or private workers—are welfare-reducing. Optimal welfare is attained when public compensation aligns with the marginal productivity of private labor, underscoring the importance of balanced wage structures for efficient resource allocation.

We next assess how welfare responds to joint changes in wage inefficiency and key structural parameters: $\gamma$, which governs the disutility from public employment, and $\alpha^g$, which measures the substitutability or complementarity between private and public goods in consumption. Both parameters are policy-relevant. For example, $\gamma$ may be affected by government interventions such as changes in wages, working hours, or benefits that alter the attractiveness of public employment. Similarly, $\alpha^g$ may shift depending on whether public goods provision complements or substitutes for private consumption.

Figure 11: Welfare in response to changes in $\mu^{inef}$, $\gamma$, and $\alpha^g$

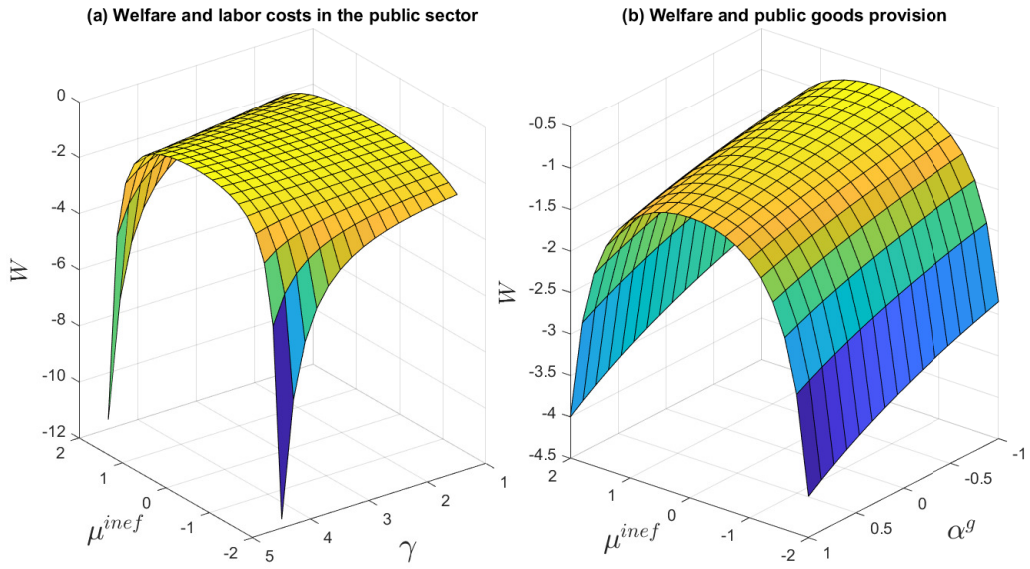



Figure 11 illustrates these interactions. Panel (a) plots $W = W(\mu^{inef}, \gamma)$. At low values of $\gamma$, the disutility from public employment is limited, making public jobs relatively attractive. In such cases, efficiency improvements in public wages directly raise welfare. Conversely, at high values of $\gamma$, particularly when inefficiencies persist, the utility cost of public employment rises sharply. This discourages participation in the public sector and lowers welfare, even when wage distortions decline, due to adverse effects on household consumption and labor allocation.

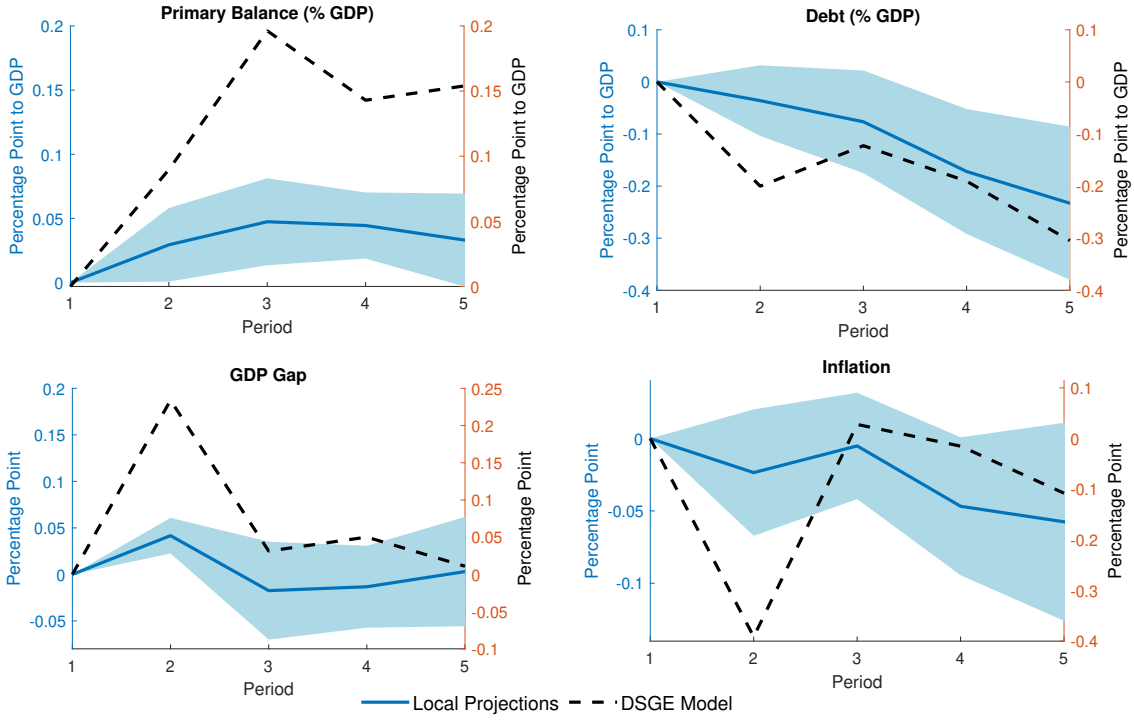
Panel (b) presents $W = W(\mu^{inef}, \alpha^g)$. When public goods complement private consumption ($\alpha^g < 0$), efficiency gains in public wages enhance welfare, as households derive higher joint utility. By contrast, when public and private goods are substitutes ($\alpha^g > 0$), improvements in public provision may crowd out private consumption. In this case, welfare gains are weaker or even negative, as households anticipate higher future taxes or debt-financed spending that reduce private consumption opportunities.

Overall, these results highlight that the welfare implications of reducing inefficiencies depend not only on labor market frictions but also on household preferences over public and private goods. Policies aimed at reducing inefficiencies must therefore account for both dimensions to maximize social welfare.

# 7 Empirical vs. Structural: Local Projections and DSGE Model

Building on the impulse responses presented in Section 4.3, this section compares outcomes from the structural DSGE model with those from the empirical Local Projections framework introduced in Section 2.2. Unlike approaches such as Uribe and Yue (2006), where DSGE parameters are calibrated to match empirical responses, the two exercises here are kept entirely independent. This unconditional strategy ensures a cleaner comparison between empirical and theoretical frameworks, avoiding potential biases from parameter tuning.

Figure 12: Impacts of inefficiency reduction: Local Projections vs. DSGE model




Note: The figure shows cumulative responses of macroeconomic variables in both models. DSGE responses are plotted on the right axis, while LP estimates appear on the left axis with confidence intervals.

Figure 12 contrasts the dynamic responses from both models. In qualitative terms, the DSGE model replicates the empirical patterns: reductions in public sector inefficiency improve fiscal balances and support output with limited inflationary effects. Quantitatively, however, the DSGE model produces larger responses. These stronger effects arise from endogenous amplification through rational expectations and general equilibrium interactions. For example, the improve-

ment in the primary balance reaches about 0.2 percentage points of GDP in the DSGE model, compared to 0.05 percentage points in the LP estimates, implying a gap of roughly 0.15 percentage points of GDP.

Table 3 reports correlations between the cumulative responses across models. All variables display positive correlations, indicating that the DSGE framework captures the directional patterns documented empirically. Correlations are moderate to high, reaching 0.60 for the output gap. These findings suggest that, despite quantitative differences, the structural model reproduces the essential macroeconomic dynamics observed in the data, strengthening the credibility of the theoretical analysis developed in this paper.

Table 3: Correlation between DSGE and Local Projection model responses

| **Variable** | **Correlation** |
|---|---|
| Primary Balance (% GDP) | 0.33 |
| Public Debt (% GDP) | 0.58 |
| Output Gap (p.p.) | 0.60 |
| Inflation (p.p.) | 0.30 |

# 8 Conclusions and Policy Implications

This paper has examined the macro-fiscal consequences of reducing inefficiencies in public-sector wages, with particular attention to the wage premium between public and private employment. Using both an empirical framework based on Local Projections and a structural DSGE model, the analysis shows that narrowing this gap generates fiscal savings, improves macroeconomic outcomes, and enhances welfare.

The empirical results indicate that reductions in the public wage premium are associated with modest but statistically significant improvements in fiscal balances and debt sustainability, without generating inflationary pressures. A one percentage point decline in the premium raises the primary balance and reduces public debt, while also delivering a short-lived increase in output. The DSGE model corroborates these findings and highlights the transmission channels: lower wage premia shift labor toward the private sector, increase employment and capital accumulation, and crowd in private consumption and investment. The resulting expansion in output strengthens revenues

and reduces debt, amplifying the fiscal gains. Welfare analysis further reveals that both excessively high and excessively low wage premia reduce social welfare, underscoring the importance of aligning public compensation with private-sector productivity.

Extensions to the baseline model highlight the role of institutional rigidities. Downward wage stickiness and wage indexation slow the adjustment process and limit the fiscal dividends of reform, while employment caps smooth short-term disruptions at the cost of more gradual consolidation. These results suggest that the effectiveness of efficiency gains depends critically on institutional settings and the instruments chosen to achieve them. Moreover, the comparison between empirical and structural results shows that both approaches are qualitatively consistent, with the DSGE framework generating larger responses due to general equilibrium amplification, reinforcing the credibility of the structural analysis.

The findings suggest three main policy implications. First, reducing wage premiums in the public sector can be an effective tool for fiscal consolidation. This approach can create opportunities for reducing debt or for making investments that enhance growth. Second, the strategy chosen for adjustments is important. Wage moderation helps preserve employment but results in smaller fiscal benefits. In contrast, cutting jobs can provide greater fiscal relief, although it comes with a higher social cost. Third, implementing institutional reforms is essential. These could include limiting wage indexation, strengthening employment management practices, and establishing credible fiscal rules regarding wage budgets. Such reforms can help sustain efficiency gains. Finally, aligning public sector wages more closely with productivity is therefore a crucial part of a strategy to improve fiscal sustainability, optimize labor allocation, and support long-term economic growth.

## References


Abdallah, C., Coady, D., and Jirasavetakul, L.-B. F. (2023). *Public-private wage differentials and interactions across countries and time*. International Monetary Fund.

Andolfatto, D. (1996). Business cycles and labor-market search. *The American Economic Eeview*, pages 112–132.

Bandeira, G., Pappa, E., Sajedi, R., and Vella, E. (2017). Fiscal consolidations in a low inflation environment: Pay cuts versus lost jobs. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3042620.

Bargain, O. and Melly, B. (2008). Public sector pay gap in france: new evidence using panel data. https://www.econstor.eu/handle/10419/34942.

Baxter, M. and King, R. G. (1993). Fiscal policy in general equilibrium. *The American Economic Review*, pages 315–334.

Born, B. and Pfeifer, J. (2020). The new keynesian wage phillips curve: Calvo vs. rotemberg. *Macroeconomic Dynamics*, 24(5):1017–1041.

Campos, M. M. and Centeno, M. (2012). Public-private wage gaps in the period prior to the adoption of the euro: an application based on longitudinal data. *Banco de Portugal, WP*, 1:2012.

Carrillo, J. A., Peersman, G., and Wauters, J. (2022). Endogenous wage indexation and aggregate shocks. *Journal of Macroeconomics*, 72:103417.

Cerda, R. and Pessino, C. (2018a). How large are fiscal wage gaps in latin america? how can they be corrected? *Inter-American Development Bank, Washington, DC. Unpublished*.

Cerda, R. and Pessino, C. (2018b). How large are fiscal wage gaps in latin america? how can they be corrected? *Inter-American Development Bank, Washington, DC. Unpublished*.

Chang, J.-J., Lin, H.-Y., Traum, N., and Yang, S.-C. S. (2021). Fiscal consolidation and public wages. *Journal of Money, Credit and Banking*, 53(2-3):503–533.

Christiano, L. J., Eichenbaum, M., and Evans, C. L. (2005). Nominal rigidities and the dynamic effects of a shock to monetary policy. *Journal of Political Economy*, 113(1):1–45.

Chung, H. and Leeper, E. M. (2007). What has financed government debt?

Dawood, T. C. and Francois, J. N. (2018). Substitution between private and government consumption in african economies. *Economic Modelling*, 73:129–139.

Depalo, D. (2018). Identification issues in the public/private wage gap, with an application to italy. *Journal of Applied Econometrics*, 33(3):435–456.

Dickson, M., Postel-Vinay, F., and Turon, H. (2014). The lifetime earnings premium in the public sector: The view from europe. *Labour Economics*, 31:141–161.

Faia, E. and Monacelli, T. (2007). Optimal interest rate rules, asset prices, and credit frictions. *Journal of Economic Dynamics and control*, 31(10):3228–3254.

Federal Reserve Bank of St. Louis (2025). Federal reserve economic data (fred). https://fred.stlouisfed.org/.

Fève, P., Matheron, J., and Sahuc, J.-G. (2013). A pitfall with estimated dsge-based government spending multipliers. *American Economic Journal: Macroeconomics*, 5(4):141–78.

Ganelli, G. and Tervala, J. (2009). Can government spending increase private consumption? the role of complementarity. *Economics Letters*, 103(1):5–7.

Glomm, G. and Ravikumar, B. (1997). Productive government expenditures and long-run growth. *Journal of Economic Dynamics and control*, 21(1):183–204.

Gomes, P. (2015). Optimal public sector wages. *The Economic Journal*, 125(587):1425–1451.

Guerrieri, L. and Iacoviello, M. (2015). Occbin: A toolkit for solving dynamic models with occasionally binding constraints easily. *Journal of Monetary Economics*, 70:22–38.

Hofmann, B., Peersman, G., and Straub, R. (2012). Time variation in us wage dynamics. *Journal of Monetary Economics*, 59(8):769–783.

International Monetary Fund (2025). World economic outlook, april 2025.

Izquierdo, A., Pessino, C., Vuletin, G., et al. (2018). *Better spending for better lives: how Latin America and the Caribbean can do more with less*, volume 10. Inter-American Development Bank.

Jordà, (2005). Estimaition adn inference of impulse responses by local projections. *American Economic Review*, 95(1):161–182.

Leeper, E. M., Walker, T. B., and Yang, S.-C. S. (2010). Government investment and fiscal stimulus. *Journal of monetary Economics*, 57(8):1000–1012.

Merz, M. (1995). Search in the labor market and the real business cycle. *Journal of Monetary Economics*, 36(2):269–300.

Mineyama, T. (2023). Downward nominal wage rigidity and inflation dynamics during and after the great recession. *Journal of Money, Credit and Banking*, 55(5):1213–1244.

Mineyama, T. (2024). Downward nominal wage rigidity and determinacy of equilibrium. *Journal of Money, Credit and Banking*, 56(1):305–316.

Muscatelli, V. A. and Tirelli, P. (2005). Analyzing the interaction of monetary and fiscal policy: Does fiscal policy play a valuable role in stabilisation? *CESifo Economic Studies*, 51(4):549–585.

Pappa, E. (2009). The effects of fiscal shocks on employment and the real wage. *International Economic Review*, 50(1):217–244.

Postel-Vinay, F. and Turon, H. (2007). The public pay gap in britain: small differences that (don't?) matter. *The Economic Journal*, 117(523):1460–1503.

Ramey, V. A. (2012). Government spending and private activity. Technical report, National Bureau of Economic Research.

Rattsø, J. and Stokke, H. E. (2018). Dynamic private-public wage gap: Return to experience, education level and city effect. Technical report.

Rattsø, J. and Stokke, H. E. (2019). Identification of the private-public wage gap. *Labour Economics*, 59:153–163.

Rotemberg, J. J. (1982). Monopolistic price adjustment and aggregate output. *The Review of Economic Studies*, 49(4):517–531.

Schanzenbach, M. (2015). Explaining the public-sector pay gap: The role of skill and college major. *Journal of Human Capital*, 9(1):1–44.

Schmitt-Grohé, S. and Uribe, M. (2003). Closing small open economy models. *Journal of International Economics*, 61(1):163–185.

Schmitt-Grohé, S. and Uribe, M. (2007). Optimal simple and implementable monetary and fiscal rules. *Journal of Monetary Economics*, 54(6):1702–1725.

Schmitt-Grohé, S. and Uribe, M. (2022). Heterogeneous downward nominal wage rigidity: Foundations of a nonlinear phillips curve. Technical report, National Bureau of Economic Research.

Smets, F. and Wouters, R. (2003). An estimated dynamic stochastic general equilibrium model of the euro area. *Journal of the European Economic Association*, 1(5):1123–1175.

Uribe, M. and Yue, V. Z. (2006). Country spreads and emerging countries: Who drives whom? *Journal of International Economics*, 69(1):6–36.

Vasilev, A. (2017). On the cost of opportunistic behavior in the public sector: A general-equilibrium approach. *Journal of Public Economic Theory*, 19(2):565–582.

Walsh, C. E. (2017). *Monetary Theory and Policy*. MIT Press, 4th edition.

World Bank (2025). World development indicators.

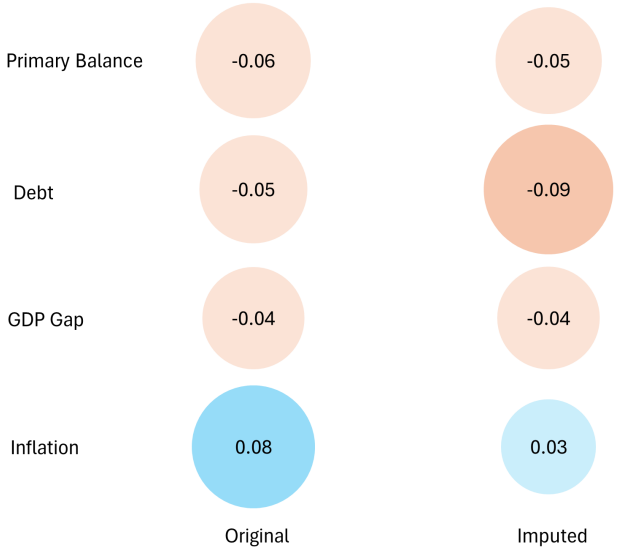
# Appendices

## A Summary statistics

| | Description | Observations | Mean | Std. Dev. | Min | Max | Source |
|---|---|---|---|---|---|---|---|
| **A. Wage Premium** | | | | | | | |
| Original | 1+(Public/ Private) | 691 | 1.2 | 0.2 | 0.7 | 2.2 | World Bank (2025) |
| Imputed | Linear imputation | 996 | 1.2 | 0.2 | 0.7 | 2.2 | |
| **B. Dependent Variables** | | | | | | | |
| Primary balance | As percentage of GDP | 987 | -0.9 | 3.0 | -29.9 | 8.3 | |
| Debt | As percentage of GDP | 986 | 50.1 | 28.8 | 3.9 | 189.6 | International Monetary Fund (2025) |
| Inflation | IPC variation (%) | 988 | 5.0 | 5.6 | -11.9 | 91.0 | |
| GDP Gap | Deviation from potential output | 996 | -0.1 | 3.7 | -23.2 | 22.0 | |
| **C. Control Variables** | | | | | | | |
| GDP growth | Real GDP growth | 996 | 3.7 | 4.3 | -17.7 | 33.6 | |
| Depreciation | Change of nominal exchange rate (Local/USD) | 996 | 2.7 | 11.3 | -28.8 | 104.1 | |
| Change Debt | Debt(t) - Debt(t-1) | 977 | 0.5 | 7.0 | -42.1 | 50.7 | International Monetary Fund (2025) |
| Capital expenditure | As percentage of GDP | 903 | 3.8 | 2.6 | -1.2 | 15.5 | |
| Population growth | Percentage change | 996 | 1.2 | 1.3 | -3.1 | 12.5 | |
| Brent | Price of oil Brent (USD/Bar) | 996 | 70.4 | 27.6 | 24.5 | 111.6 | Federal Reserve Bank of St. Louis (2025) |
| WGI average | Average of world governance indicators | 996 | 0.1 | 0.8 | -1.6 | 1.9 | World Bank (2025) |
| Ratio Old | (Population +65 / Population 15-65)*100 | 996 | 14.0 | 8.6 | 3.9 | 35.6 | World Bank (2025) |

Note: Table shows variables, definitions, summary statistics, and data sources for indicators used in the Local Projection estimation.

## B Correlations of original and imputed wage premium data




Note: Figure shows the correlation between original and imputed wage premium data with macro-fiscal indicators.

# C Equations governing the model economy

The equations governing the model economy are given by the following system;

$$
\begin{aligned}
1 &= \mathbb{E}\Lambda_{t,t+1}\left(\frac{1+i_t}{1+\pi_{t+1}}\right),\\
\lambda_t(1-\tau_t^w)w_t^p &= \chi\left[n_t^p+n_t^g+\frac{\gamma}{2}\left(n_t^g\right)^2\right]^{\psi},\\
\lambda_t(1-\tau_t^w)w_t^g &= \chi\left[n_t^p+n_t^g+\frac{\gamma}{2}\left(n_t^g\right)^2\right]^{\psi}(1+\gamma n_t^g),\\
q_t &= \mathbb{E}_t\Lambda_{t,t+1}\left[(1-\tau_{t+1}^k)r_{t+1}^k+(1-\delta^p)q_{t+1}\right],\\
1 &= q_t\left[1-\frac{\kappa^p}{2}\left(\frac{x_t^p}{x_{t-1}^p}-1\right)^2-\kappa^p\left(\frac{x_t^p}{x_{t-1}^p}-1\right)\frac{x_t^p}{x_{t-1}^p}\right]+\kappa^p\mathbb{E}_t\Lambda_{t,t+1}q_{t+1}\left(\frac{x_{t+1}^p}{x_t^p}-1\right)\left(\frac{x_{t+1}^p}{x_t^p}\right)^2\\
\Lambda_{t,t+1} &= \beta\frac{\lambda_{t+1}}{\lambda_t}\\
\lambda_t &= \frac{(c_t^p+\alpha^g y_t^g)^{-\sigma}}{1+\tau_t^c}\\
k_{t+1}^p &= (1-\delta^p)k_t^p+x_t^p\left[1-\frac{\kappa^p}{2}\left(\frac{x_t^p}{x_{t-1}^p}-1\right)^2\right]\\
y_t^p &= A_t\left(k_t^p\right)^{\alpha}\left(n_t^p\right)^{1-\alpha}\left(k_t^g\right)^{\theta_1}\\
\Pi_t^e &= \frac{p_t^*}{p_t}y_t^p-w_t^p n_t^p-r_t^k k_t^p\\
r_t^k &= \alpha\ mc_t\frac{y_t^p}{k_t^p},\\
w_t^p &= (1-\alpha)\ mc_t\frac{y_t^p}{n_t^p}\\
\frac{p_t^*}{p_t} &= \frac{\theta}{\theta-1}\frac{\mathbb{E}_t\sum_{j=0}^{\infty}\omega^j\Lambda_{t,t+j}(1-\tau_{t+j}^{\Pi})mc_{t+j}\left(\frac{p_{t+j}}{p_t}\right)^{\theta}y_{t+j}^p}{\mathbb{E}_t\sum_{j=0}^{\infty}\omega^j\Lambda_{t,t+j}(1-\tau_{t+j}^{\Pi})\left(\frac{p_{t+j}}{p_t}\right)^{\theta-1}y_{t+j}^p}\\
p_t &= \left[\omega(p_{t-1})^{1-\theta}+(1-\omega)(p_t^*)^{1-\theta}\right]^{\frac{1}{1-\theta}}
\end{aligned}
$$

$$
\begin{aligned}
y_t^g &= (k_t^g)^{\alpha_1}(n_t^g)^{1-\alpha_1} \\
k_{t+1}^g &= (1-\delta^g)k_t^g + x_t^g\left[1-\frac{\kappa^g}{2}\left(\frac{x_t^g}{x_{t-1}^g}-1\right)^2\right] \\
d_t &= \left(\frac{1+i_{t-1}}{1+\pi_t}\right)d_{t-1} + (G_t - R_t) + Tr_t, \\
R_t &= \tau_t^c c_t + \tau_t^w(w_t^p n_t^p + w_t^g n_t^g) + \tau_t^k r_t^k k_{t-1} + \tau_t^{\Pi}\Pi_t^e \\
\tau_t^j &= \rho^j \tau_{t-1}^j + (1-\rho^j)\tau_{ss}^j + \varepsilon_t^j \ , \quad j = \{c, w, k, \Pi^e, \} \\
G_t &= c_t^g + x_t^g + w_t^g n_t^g \\
\frac{c_t^g}{c_{ss}^g} &= \left(\frac{c_{t-1}^g}{c_{ss}^g}\right)^{\rho^{cg}}\left(\frac{y_t^p}{y_{ss}^p}\right)^{\rho^{cy}}\left(\frac{d_{t-1}}{d_{ss}}\right)^{\gamma_1}\exp\{\varepsilon_t^{cg}\} \\
\frac{x_t^g}{x_{ss}^g} &= \left(\frac{x_{t-1}^g}{x_{ss}^g}\right)^{\rho^{xg}}\left(\frac{y_t^p}{y_{ss}^p}\right)^{\rho^{xy}}\left(\frac{d_{t-1}}{d_{ss}}\right)^{\gamma_2}\exp\{\varepsilon_t^{xg}\} \\
w_t^g &= (1+\mu_t^{inef})w_t^p \\
\mu_t^{inef} &= \rho^{inef}\mu_{t-1}^{inef} + (1-\rho^{inef})\mu_{ss}^{inef} + \varepsilon_t^{inef} \\
\frac{1+i_t}{1+\bar{i}} &= \left(\frac{1+i_{t-1}}{1+\bar{i}}\right)^{\rho^i}\left[\left(\frac{1+\pi_t}{1+\overline{\pi}}\right)^{\phi_\pi}\left(\frac{GDP_t}{\overline{GDP}}\right)^{\phi_y}\right]^{1-\rho^i}\exp\left(\xi^i\right) \\
y_t^p &= c_t^p + x_t^p + c_t^g + x_t^g \\
GDP_t &= y_t^p + y_t^g
\end{aligned}
$$

# D Endogenization of inefficiency

To derive the cost function (32), we rewrite the government constraint (21). In nominal terms, it can be written as:

$$P_t d_t - (1+i_{t-1})P_t d_{t-1} = P_t c_t^g + P_t x_t^g + W_t^g n_t^g - \tau_t^c P_t c_t - \tau_t^w W_t^p n_t^p - \tau_t^w W_t^g n_t^g - \tau_t^k r_t^k P_t k_{t-1} - \tau_t^{\Pi} P_t \Pi_t$$

Rearranging and isolating the terms involving $W_t^g n_t^g$, we obtain

$$P_t d_t - (1+i_{t-1})P_t d_{t-1} - P_t(c_t^g + x_t^g) + \tau_t^c P_t c_t + \tau_t^w W_t^p n_t^p + \tau_t^k r_t^k P_t k_{t-1} + \tau_t^{\Pi} P_t \Pi_t = (1-\tau_t^w)W_t^g n_t^g$$

Let $\Omega_t(W_t)$ denote the entire left-hand side of the latter constraint. Writing it in a compact form, we obtain the public wage cost function,

$$\Omega_1(W_t^g) = (1-\tau_t^w)W_t^g n_t^g$$

The equilibrium condition of the following problem,

$$\min_{\{W_t^g(j)\}} \sum_{i=0}^{\infty} \beta^i \left[ \frac{1-\tau_t^w}{\gamma} \left( \frac{\Pi_{t,i} W_t^g(j)}{W_t^p} - 1 \right) \Pi_{t,i} W_t^g(j) + \frac{\lambda}{2} \left( \frac{\Pi_{t,i} W_t^g(j)}{\Pi_{t,i-1} W_{t-1}^g(j)} - 1 \right)^2 W_t^g n_t^g \right]$$

s.t.

$$\gamma_t^w \Pi_{t,i} W_t^g(j) \geq W_t^p, \tag{39}$$

When $i = 0$, is given by

$$\begin{aligned} &\frac{1-\tau_t^w}{\gamma} \left( \frac{2\Pi_t^2 W_t^g}{W_t^p} - \Pi_t \right) + \lambda \left( \frac{\Pi_t \Pi_{g,t}^w}{\Pi_{t-1}} - 1 \right) \frac{\Pi_t \Pi_{g,t}^w}{\Pi_{t-1}} n_t^g - \\ &- \lambda\beta \mathbb{E}_t \left[ \left( \frac{\Pi_{t+1} \Pi_{g,t+1}^w}{\Pi_t} - 1 \right) \frac{\Pi_{t+1} (\Pi_{g,t+1}^w)^2}{\Pi_t} n_{t+1}^g \right] - \mu_t \gamma_t^w \Pi_t = 0. \end{aligned}$$

Where $\Pi_t = (1 + \phi\pi_t)$ is the general price level inflation, $\Pi_{g,t}^w = \dfrac{W_t^g}{W_{t-1}^g} \equiv 1 + \pi_{g,t}^w$ is public wage inflation, and $\mu_t$ is the Lagrange multiplier. Taking these rates into account, we have:

$$\begin{aligned} &\frac{1-\tau_t^w}{\gamma} \left( \frac{2\Pi_t^2 W_t^g}{W_t^p} - \Pi_t \right) + \lambda \left( \frac{(1+\phi\pi_t)(1+\pi_{g,t}^w)}{1+\phi\pi_{t-1}} - 1 \right) \frac{(1+\phi\pi_t)(1+\pi_{g,t}^w)}{1+\phi\pi_{t-1}} n_t^g - \\ &- \lambda\beta \mathbb{E}_t \left[ \left( \frac{(1+\phi\pi_{t+1})(1+\pi_{g,t+1}^w)}{1+\phi\pi_t} - 1 \right) \frac{(1+\phi\pi_{t+1})(1+\pi_{g,t+1}^w)^2}{1+\phi\pi_t} n_{t+1}^g \right] - \mu_t \gamma_t^w \Pi_t = 0. \end{aligned}$$

Rewriting,

$$2\Pi_t^2 \frac{W_t^g}{W_t^p} = \Pi_t - \lambda\gamma \frac{A}{1-\tau_t^w} n_t^g + \lambda\beta\gamma \mathbb{E}_t \left[ \frac{B}{1-\tau_t^w} n_{t+1}^g \right] + \frac{\gamma \mu_t \gamma_t^w \Pi_t}{1-\tau_t^w} \tag{40}$$

Where $A$ and $B$ are auxiliary parameters given by:

$$\begin{aligned} A &= \left[ \frac{(1+\phi\pi_t)(1+\pi_{g,t}^w)}{1+\phi\pi_{t-1}} - 1 \right] \frac{(1+\phi\pi_t)(1+\pi_{g,t}^w)}{1+\phi\pi_{t-1}} \\ B &= \left[ \frac{(1+\phi\pi_{t+1})(1+\pi_{g,t+1}^w)}{1+\phi\pi_t} - 1 \right] \frac{(1+\phi\pi_{t+1})(1+\pi_{g,t+1}^w)^2}{1+\phi\pi_t} \end{aligned}$$

Simplifying these parameters and taking into account first-order approximations, for example $\phi\pi_t\pi^w_{g,t} \approx 0$ and $2\phi\pi_{t+1}\pi^w_{g,t+1} \approx 0$, we obtain:

$$A = \frac{\pi^w_{g,t} + \phi\Delta\pi_t}{1 + 2\phi\pi_{t-1}} \tag{41}$$

$$B = \frac{\pi^w_{g,t+1} + \phi\Delta\pi_{t+1}}{1 + 2\phi\pi_t} \tag{42}$$

Substituting (41) and (42) into (40), we obtain,

$$2\Pi_t^2 \frac{W^g_t}{W^p_t} = \Pi_t - \lambda\gamma \frac{\pi^w_{g,t} + \phi\Delta\pi_t}{(1 + 2\phi\pi_{t-1})(1 - \tau^w_t)} n^g_t + \lambda\beta\gamma\mathbb{E}_t \left[ \frac{\pi^w_{g,t+1} + \phi\Delta\pi_{t+1}}{(1 + 2\phi\pi_t)(1 - \tau^w_t)} n^g_{t+1} \right] + \frac{\gamma\mu_t\gamma^w_t\Pi_t}{1 - \tau^w_t}$$

By means of the transformation $\frac{W^g_t}{W^p_t} = \frac{1}{2\Pi_t^2}\Phi \equiv \Psi_t$, we can deduce $\Phi = 2\Pi_t^2\Psi$. Substituting into the penultimate relation, it follows that $2\Pi_t^2 \frac{W^g_t}{W^p_t} = 2\Pi_t^2\Psi$, therefore,

$$\begin{aligned}\frac{W^g_t}{W^p_t} =& 1 + \phi\pi_t - \lambda\gamma \left( \frac{\pi^w_{g,t} + \phi\pi_t - \phi\pi_{t-1}}{1 - \tau^w_t + 2\phi\pi_{t-1}} \right) n^g_t + \lambda\beta\gamma\mathbb{E}_t \left[ \left( \frac{\pi^w_{g,t+1} + \phi\pi_{t+1} - \phi\pi_t}{1 - \tau^w_t + 2\phi\pi_t} \right) n^g_{t+1} \right] + \\ &+ \gamma \left( \frac{1 + \phi\pi_t}{1 - \tau^w_t} \right) \gamma^w_t\mu_t\end{aligned}$$

Assuming that $2\phi\pi_t\tau^w_t \approx 0$ and using the fact that $\gamma^w_t = 1 + \mu^w_t$, we have

$$\begin{aligned}\frac{W^g_t}{W^p_t} =& 1 + \phi\pi_t - \lambda\gamma \left( \frac{\pi^w_{g,t} + \phi\pi_t - \phi\pi_{t-1}}{1 - \tau^w_t + 2\phi\pi_{t-1}} \right) n^g_t + \lambda\beta\gamma\mathbb{E}_t \left[ \left( \frac{\pi^w_{g,t+1} + \phi\pi_{t+1} - \phi\pi_t}{1 - \tau^w_t + 2\phi\pi_t} \right) n^g_{t+1} \right] + \\ &+ \gamma \left( \frac{1 + \phi\pi_t}{1 - \tau^w_t} \right) \mu_t + \gamma \left( \frac{1 + \phi\pi_t}{1 - \tau^w_t} \right) \mu^w_t\mu_t\end{aligned}$$

Since the last term depends on the shock to the public wage, we can use a reasonable approximation as follows,

$$\gamma \left( \frac{1 + \phi\pi_t}{1 - \tau^w_t} \right) \mu^w_t\mu_t \approx \kappa^w_t,$$

where

$$\kappa^w_t = \rho^\kappa\kappa^w_{t-1} + \varepsilon^\kappa_t$$

an exogenous shock to the wage premium. This approximation implies that the effect of the public wage shock $\mu^w_t$ on the wage premium is amplified by the value of the Lagrange multiplier $\mu_t$. This makes sense because:

- The multiplier $\mu_t$ is binary in nature. The constraint is either active or not. This can be approximately constant during the periods when the constraint is active. This would justify $\mu_t^w \mu_t$ as an exogenous process.

- Economically, the combination $\mu_t^w \mu_t$ introduces a persistence component in the wage distortion due both to institutional rigidities (Lagrange multiplier) and to exogenous shocks.

Therefore,

$$\begin{aligned}\frac{W_t^g}{W_t^p} =& 1 + \phi\pi_t - \lambda\gamma\left(\frac{\pi_{g,t}^w + \phi\pi_t - \phi\pi_{t-1}}{1 - \tau_t^w + 2\phi\pi_{t-1}}\right) n_t^g + \lambda\beta\gamma\mathbb{E}_t\left[\left(\frac{\pi_{g,t+1}^w + \phi\pi_{t+1} - \phi\pi_t}{1 - \tau_t^w + 2\phi\pi_t}\right) n_{t+1}^g\right] + \\ &+ \gamma\left(\frac{1 + \phi\pi_t}{1 - \tau_t^w}\right)\mu_t + \kappa_t^w\end{aligned}$$

From this,

$$W_t^g = (1 + \mu_t^{inef}) W_t^p$$

This nominal wage equation is also valid for the real wage. As observed,

$$\mu_t^{inef} = f(\pi_t, \pi_t^w, \tau_t^w, n_t^g) + \gamma\left(\frac{1 + \phi\pi_t}{1 - \tau_t^w}\right)\mu_t + \kappa_t^w \tag{43}$$

where

$$f = \phi\pi_t - \lambda\gamma\left(\frac{\pi_{g,t}^w + \phi\pi_t - \phi\pi_{t-1}}{1 - \tau_t^w + 2\phi\pi_{t-1}}\right) n_t^g + \lambda\beta\gamma\mathbb{E}_t\left[\left(\frac{\pi_{g,t+1}^w + \phi\pi_{t+1} - \phi\pi_t}{1 - \tau_t^w + 2\phi\pi_t}\right) n_{t+1}^g\right].$$

From this, we can identify the sources of public hiring inefficiency $\mu_t^{inef}$. Finally, regarding the Lagrange multiplier $\mu_t$,

- Binding constraint. If the constraint $W_t^g \geq W_t^p$ is binding, then the optimal solution will lead to $W_t^g = W_t^p$, which implies that the constraint is active and, therefore, $\mu_t \neq 0$ and $\mu_t > 0$.

- Non-binding constraint. If the constraint $W_t^g \geq W_t^p$ is not binding, then the optimal solution implies $W_t^g \neq W_t^p$ and $W_t^g > W_t^p$, consequently $\mu_t = 0$, i.e., the constraint is not active.