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SELECTED ISSUES PAPER

Public Investment Efficiency, Growth and Debt Sustainability in Guatemala

Andrea Paloschi

SIP/2025/129

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on July 31, 2025. This paper is also published separately as IMF Country Report No 25/261.

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IMF Selected Issues Paper
Western Hemisphere Department

Public Investment Efficiency, Growth and Debt Sustainability in Guatemala

Prepared by Andrea Paloshi (RES)

Authorized for distribution by Alex Culiuc
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ABSTRACT: Despite having moderate levels of public debt sovereign spreads, Guatemala is a country with limited levels of public investment efficiency (PIE) that actively constrain much needed infrastructure and social investment. This Selected Issues Paper (SIP) analyzes the effects of improving PIE on key real, fiscal and external macroeconomic indicators and finds that higher PIE would allow Guatemala to sustain higher levels of external debt, weaker fiscal balances and current account balances without worsening sovereign risk premia. The overall effect amplifies the welfare benefits of higher PIE for households through higher private consumption.

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Public Investment Efficiency, Growth and Debt Sustainability in Guatemala

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GUATEMALA

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July 31, 2025

Approved By
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PUBLIC INVESTMENT EFFICIENCY, GROWTH AND DEBT SUSTAINABILITY IN GUATEMALA[1]

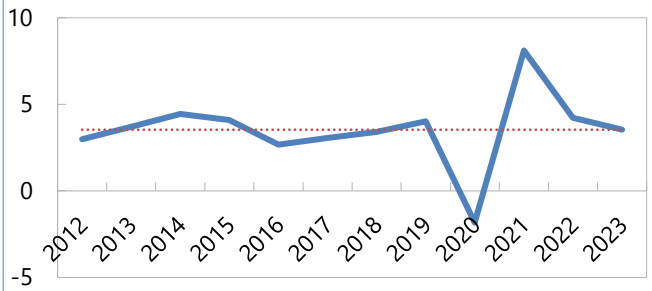
Increasing public spending efficiency is a key policy goal for Guatemala. What would be the expected consequences of such an increase on growth, consumption, debt policy, sovereign spreads and the external position? This study uses a standard open-economy sovereign default model calibrated to replicate observed patterns of public debt and sovereign spreads for the period 2012–24. Improving public spending efficiency to levels comparable with Costa Rica (approximately 20 percent) could produce a 2.3 percent increase in consumption and GDP, a 0.7 percent increase in debt-to-GDP with no increases in sovereign spreads. Higher levels of efficiency improvements generally help sustaining higher long-run levels of public debt-to-GDP without negative effects on sovereign spreads and the current account balance.

A. Economic Development in Guatemala

1. Guatemala's gross domestic product has increased by 3.5 percent on average from 2012 to 2023 (Figure 1). The country has experienced sustained and steady growth after the Great Recession, with growth rates around 3.5 percent from 2012 to 2019. The COVID-19 pandemic caused a 1.8 percent drop in GDP, but Guatemala has managed to recover strongly in 2021, 2022 and 2023, and returning to its historical growth rates.

2. Public debt-to-GDP remains low around 27 percent of GDP and sovereign spreads are moderate (Figure 2). Guatemala's public finances are healthy, with a debt-to-GDP ratio that has remained on a sustainable path over the years, with an increment of almost 5 percentage points in 2020, followed by a rapid convergence towards historical values. Despite moderate volatility, sovereign spreads have remained in a neighborhood of 2.4 percent, with a peak of 2.8 percent in 2020 and end-2024 spreads are below 2 percent.

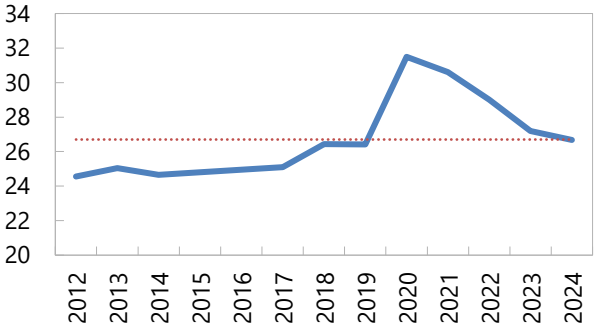
Figure 1. Gross Domestic Product
(Percent Growth)



Source: IMF Staff Elaborations

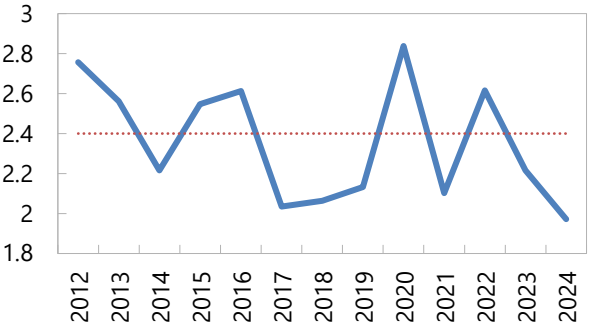
[1] Prepared by Andrea Paloschi.

Figure 2A. Debt-to-GDP
(percent)



Source: IMF Staff Elaborations

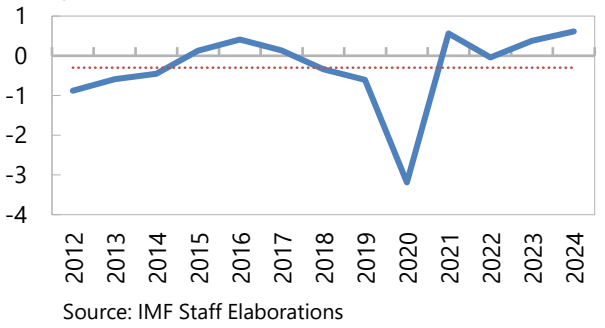
Figure 2B. Sovereign Spreads
(percent)



Source: IMF Staff Elaborations

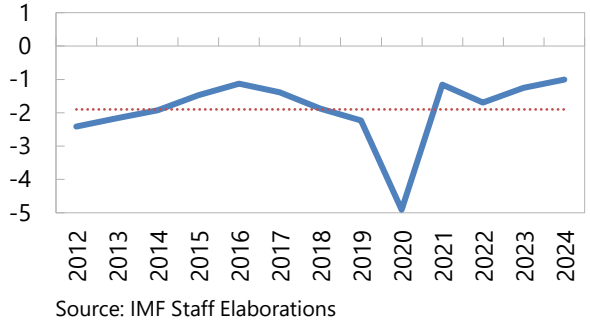
3. Guatemala's debt stability has been sustained by moderate primary and overall fiscal deficits (Figure 3). The country has recorded moderate negative primary balances, mainly determined by the COVID-19 pandemic (-3.2 percent). At end-2024 Guatemala has recorded a primary surplus close to 0.6 percent of GDP. The prudent fiscal policy, and the sustainable levels of public debt and sovereign spreads have translated into moderate levels of the overall fiscal balance. Over the period 2012-2024, Guatemala has reported an average fiscal balance-to-GDP ratio close to -2 percent, with a peak of -4.9 percent in 2020.

Figure 3A. Primary Balance-to-GDP
(percent)



Source: IMF Staff Elaborations

Figure 3B. Fiscal Balance-to-GDP
(percent)



Source: IMF Staff Elaborations

B. A Quantitative Model to Study Public Investment Efficiency Growth

4. This paper aims at studying the effects of a permanent increment in Public Investment Efficiency (PIE) on GDP, government debt and sovereign spreads. As outlined in Baum et al (2020), Guatemala's efficiency is limited, with a Physical Public Investment Efficiency Score of 0.49 for the period 2000-2019. We study the impact of a potential increase of Guatemala's PIE to the levels of Costa Rica (roughly 20 percent higher), a regional peer often studied for comparison purposes. To do so, in this project we construct a structural model that captures the change from a low-PIE to a high-PIE regime and its transitional dynamics. We study the dynamics of such transition using the

impulse response functions approach, which shows the evolution of GDP, consumption, government spending, government debt, sovereign spreads, among other outcomes. Furthermore, we compare different models of increased PIE to assess how PIE can affect the economy under different improvement scenarios.

5. We build a small open economy sovereign default model to reproduce the dynamics of the Guatemalan economy (Box 1). The model is an adaptation of the Arellano (2008) economy that incorporates production of a final good using private and public capital, which may differ in terms of productivity. In the model there are households, sovereign, and international investors. Households consume a single tradable good that is produced using labor, private capital and public capital; in addition, they pay lump-sum taxes to the sovereign. The sovereign collects lump-sum taxes and issue Eurobonds to international investors in order to finance investment in public capital; moreover, the sovereign has the option to default on its debt. International investors buy one-period defaultable claims from the sovereign. PIE represents a technology that converts public investment into units of public capital.

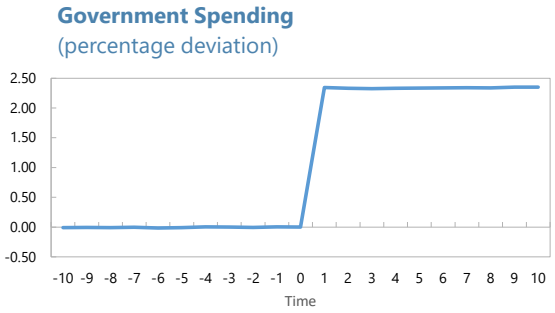
6. The model simulates an increase in PIE by 20 percent, comparable with Costa Rica, and generates an estimated 2.3 percent increase in GDP (Figure 4). We calibrate the model to replicate the observed levels of debt-to-GDP and sovereign spreads observed from 2012 to 2024. Additionally, we calibrate the model to match the long-run ratio of public to private capital in Guatemala. The PIE increment is modeled as a permanent and unexpected 20 percent increase. The model predicts a 2.3 percent increase in GDP, driven by higher public and private investment. Intuitively, increased PIE optimally calls for additional public investment, as the latter is relatively more productive. The complementary of the two sources of capital induces higher private investment, further contributing to higher GDP growth.

7. The model predicts a 0.6 percent increase in government debt in the long-run, with no significant changes in sovereign spreads. The increase in PIE leads to additional external borrowing, owing to higher future consumption and the sovereign's desire to better frontload the gains. The increase in debt comes at no extra default risk for the sovereign, since defaulting is more costly for a government with higher levels of GDP. The sovereign increases borrowing initially, which then stabilizes to permanently higher levels. Sovereign risk premia are not affected in equilibrium.

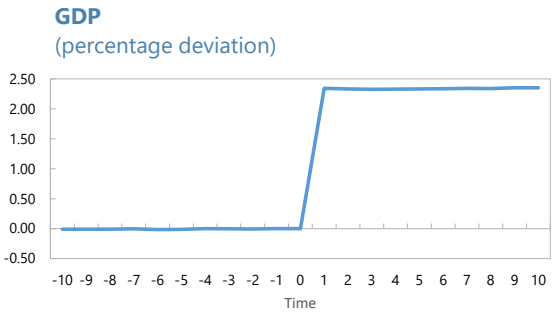
8. The external balance would temporarily deteriorate to finance extra units of consumption. The additional external borrowing post-PIE increases would temporarily deteriorate the Current Account (CA) Balance by 1 percent, freeing additional resource for households. In turns, private consumption temporarily increases by 4 percent, and rapidly converges to 2.3 percent above pre-shock values, as additional borrowing call for higher long-run interest payment on the stock of public debt.

Figure 4. Impulse Response Functions

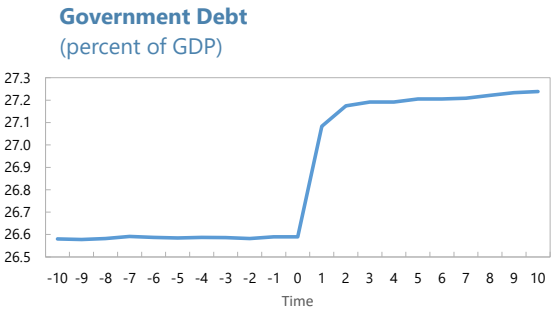
At time t=0 PIE increase by 20%, leading to higher government (investment) spending….



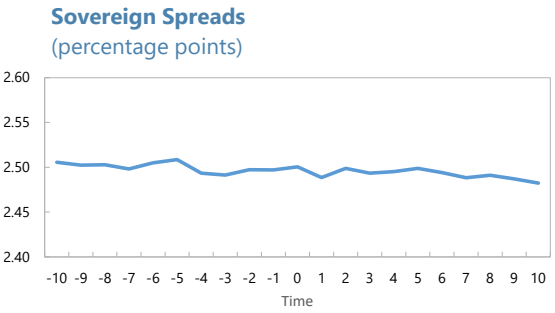
…leading to higher levels of GDP.



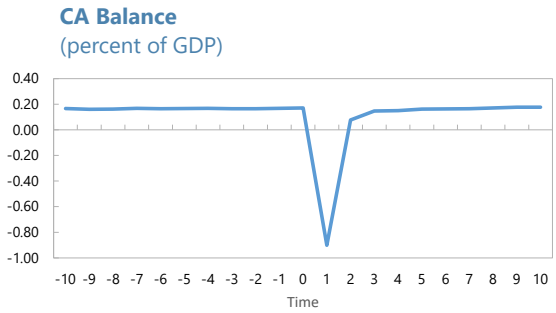
…which allows to sustain higher levels of public debt….



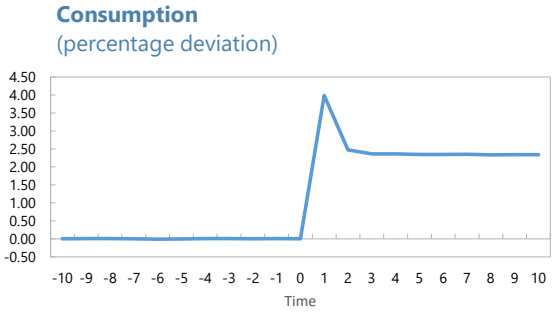
…without hampering sovereign default premia….



The additional borrowing temporarily deteriorates the CA balance…



…helping sustaining additional consumption in the short-run.

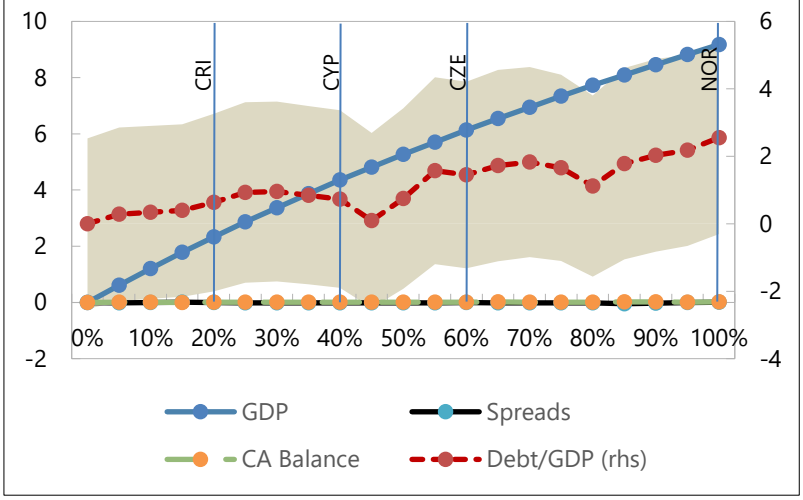


Source: IMF Staff elaboration.

9. Higher increases in PIE produce stronger GDP gains and allow to sustain higher levels of debt in the long run (Figure 5). We simulate the model for different increments of PIE – ranging from 0 to 100 percent of the baseline economy – and compute the long-run statistics associated with the permanent changes. As reference, the 40, 60, and 100 percent thresholds of comparison are represented by, respectively, Cyprus, Czech Republic and Norway. GDP gains grow with higher PIE,

10. reflecting the catalyzing effect of improved efficiency on public and private capital investment. In addition, the higher GDP gains allow to sustain higher levels of debt; while a 20 percent increase in PIE produces 0.6 percent higher levels of debt, a 100 percent increase could produce a 2.5 percent permanently higher level of debt. Furthermore, as in the baseline simulation, higher PIE does not affect neither sovereign default risk premia, nor the CA balance in the long-run.

Figure 5. Improved Efficiency: Long-Run Statistics
(percent deviation (GDP); percent difference)



C. Conclusions

11. Increased PIE would allow to increase public (and private) capital spending, with significant GDP gains. Improving PIE to levels comparable with Costa Rica would allow Guatemala to achieve substantial GDP gains. As discussed above, a 20 percent increase in PIE could lead to a 2.3 percent higher GDP in the long-run. Such increase would allow to permanently increase consumption, leading to a permanent welfare gain for Guatemalans.

12. Higher PIE would allow to sustain higher levels of public debt without market punishment. The increased PIE, and the increased output, would allow the government to temporarily boost consumption through increased external borrowing. The increase in borrowing would lead to permanently, yet sustainable, higher levels of public debt. The temporary CA balance deterioration is determined by increased Eurobond issuances, causing the fiscal balance to deteriorate in the short-run. Sovereign spreads do not display significant changes, owing to the higher cost of defaulting generated by permanently higher levels of GDP. The model produces, on average, consistent results for different levels of PIE gains, with sovereign spreads and external balance not affected, while public debt is optimally allowed to increase with higher PIE.

Box 1. A Small Open Economy Sovereign Default Model for Guatemala

Model structure. The model is a small open economy sovereign default model which follows Arellano et al (2008), with a single final good produced and three agents, i.e. households, sovereign, and international investors. The single final good is produced combining labor L, private capital s, and public capital g. Public capital is generated through public investment, which is assumed to be relatively inefficient compared to private capital. We denote with e the degree of PIE. The production function takes the form of:

$$y = z(eg)^{\alpha\gamma}s^{\alpha(1-\gamma)}]^{1-\alpha}$$

where z, α, γ denote, respectively, total factor productivity, capital share in the production function and public capital share's contribution. The stochastic process for the aggregate productivity follows a log-normal AR(1) process.

The types of agents are:

- *Households:* consume the single final good c, supply labor to produce the good, invest in private capital, and pay lump-sum taxes T to the sovereign. The budget constraint of households can be represented as:

$$c = y - s - T$$

  Subject to the budget constraint and the production function, households choose the optimal values c, l, s that solve the maximization problem:

$$\max_{c,l,s} E \sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma}}{1-\sigma}$$

  The instantaneous utility function displays risk aversion in consumption σ; β represents the discount factor of households.

- *International Investors:* when the sovereign has access to international financial markets, international investors buy government bonds at the risk-neutral price:

$$q_t = \beta^* E_t(1 - d_{t+1})$$

  where $q_t, \beta^*, E_t, d_{t+1}$ denote, respectively, the price of the government bonds, the international discount factor, the expected value operator, and the default set in the following period.

- *Sovereign:* given the optimality conditions of the households, in states of default the sovereign solves the problem:

Box 1. A Small Open Economy Sovereign Default Model for Guatemala (concluded)

$$V^D(z,e) = \max_{c,l,s,g} \frac{c^{1-\sigma}}{1-\sigma} - \phi(z) + \beta E\big(\theta V(z',e',0) + (1-\theta)V^D(z',e')\big)$$

Where $V^D, \phi(z), V, \theta$ denote, respectively, the value function in states of default, the disutility cost associated with defaults, the value function of the sovereign, and the probability of re-entering financial markets when in states of default. In states of the default the goods market clearing condition is given by:

$$c = y - s - g$$

In states of repayment, the sovereign solves the problem:

$$V^R(z,e,b) = \max_{c,l,s,g,b'} \frac{c^{1-\sigma}}{1-\sigma} + \beta \mathrm{E}\left(\mathrm{V}(z',e',b')\right)$$

Subject to the budget constraint and the price equation:

$$c = y - s - g + q(z,e,b')b' - b$$

$$q(z,e,b') = \beta^* E(1-d')$$

When the sovereign has access to international financial markets, the sovereign decides whether to repay or default:

$$V(z,e,b) = \max_{d\in\{0,1\}} d \cdot V^D(z,e) + (1-d)V^R(z,e,b)$$

The model is solved using non-linear solution techniques. The model is solved using value function iteration with linear interpolation over a grid of bonds and TFP realizations, while expectations are computed using Gauss-Hermite polinomials. Long-run statistics are computed for the period 2012-2024 and reported in Table 1. The parameters are calibrated from the literature and long-run moments of Guatemala's data.

Table 1. Model Statistics

	Data	Model
Targeted Moment		
Average		
(-) Debt/GDP (%)	26.7	26.6
(-) Spreads (p.p.)	2.4	2.5
Untargeted Moment		
Average		
(-) Fiscal Balance/GDP (%)	-1.9	-1.0
(-) CA Balance/GDP (%)	0.6	0.2
Standard Deviation		
(-) Debt/GDP (%)	2.2	5.1
(-) Spreads (p.p)	0.3	2.7
Correlation		
(-) Debt/GDP, Spreads	0.1	0.3
(-) Debt/GDP, GDP	-0.7	-0.1
(-) GDP, Spreads	-0.4	-0.8
(-) GDP, CA Balance/GDP	-0.6	-0.1

Note: Data statistics are computed for the period 2012-2024. Model statistics are computed by simulating the model for 5,000,000 periods and eliminating the first 50,000 periods. Model statistics are computed in repayment states only.

Source: IMF Staff elaborations.

References

Arellano, C. (2008), Default Risk and Income Fluctuations in Emerging Economies, American Economic Review, Vol. 98, No. 3, pp. 690-712.

Baum, A., Mogues, T., Verdier, G. (2020), Getting the Most from Public Investment, Well Spent: How Strong Infrastructure Governance Can End Waste in Public Investment, Chapter 3.