The Politics of Debt in the Era of Rising Rates*

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Abstract

We examine how the post-pandemic trajectory of risk-free rates—from historically low levels in 2020 to a steep rise in 2022—affects sovereign debt management and default risk in emerging markets (EMs). Using a dynamic political economy model, we show that weak institutional environments with political incentives to engage in corruption spending lead to over-borrowing and increased default risk, especially during low-rate periods. As rates rise, EMs face high risks of default or the need for austerity programs, depending on the severity of productivity shocks. While International Financial Institution (IFI) lending provides short-term relief, it can fuel moral hazard and corruption. Making IFI loans contingent on anit-corruption efforts reduces default risk. However, even full monitoring cannot eliminate the incentives for fiscal mismanagement, as governments may still over-borrow during favorable periods without addressing sustainability. We also find that Quantitative Performance Criteria (QPC), such as a debt-ceiling rule, are less effective as they leave room for corruption that creates default risk and can generate welfare losses relative to a scenario without IFI debt.

Keywords— Sovereign Debt Crises, Tax Smoothing, Representation and Accountability, Corruption, Sovereign Default, Fiscal Pro-Cyclicality, Emerging Markets

JEL— D72, E43, F34, E62, F41

*The views expressed herein are those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of Richmond or CAFRAL.

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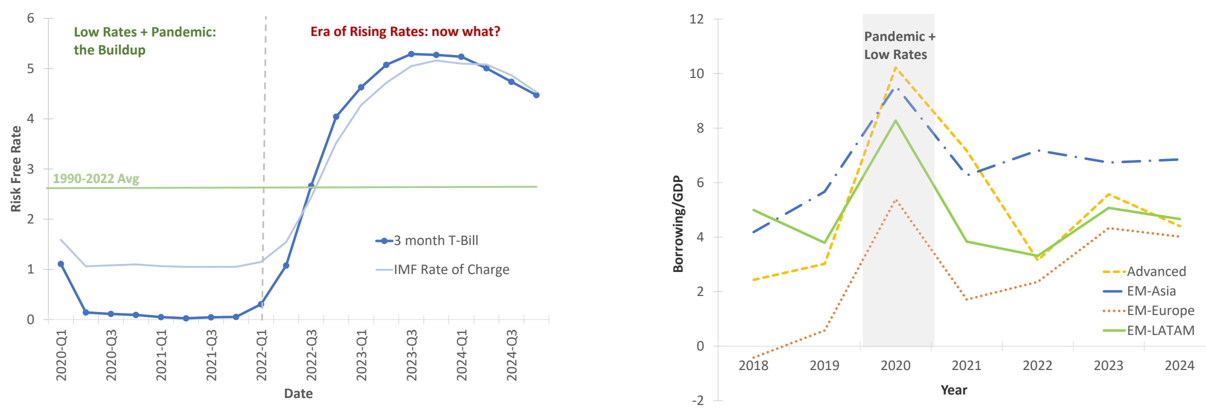
1 Introduction

In the early 2020s, global financial markets experienced a period of historically low risk-free interest rates (see Panel (a) of Figure 1)[1]. At the same time, the COVID-19 pandemic caused significant economic disruptions, leading countries worldwide to engage in substantial borrowing to stabilize their economies. Panel (b) of Figure 1 shows that borrowing as a percentage of GDP increased for advanced economies and emerging market economies alike[2]. As deficits widened and inflation began to rise—partly due to pandemic-induced supply chain disruptions—central banks in developed economies responded by raising their target rates. This, coupled with a surge in the demand of safe assets, triggered a rapid increase in risk-free rates in 2022.

Figure 1: Emerging markets' base rates and borrowing

(a) Risk Free Rate **(b)** Borrowing



A higher interest rate environment, particularly in developed countries, presents significant challenges for emerging markets. With much of their debt denominated in foreign currency (such as US dollars), servicing these obligations becomes more expensive as rates rise. This also risks triggering capital outflows, as investors seek higher returns in developed countries, further tightening financial conditions in these economies. By 2022, EMs were grappling with elevated debt levels (see Table 1), much of which had been accumulated during the pandemic[3]. As interest rates climbed, concerns over the sustainability of their debt intensified.

The objective of this article is to quantify the impact of recent interest rate shifts on near-term sovereign debt management and default decisions in emerging market economies. The study examines how rising rates influence the incentives for EMs to default on their debt, with a focus on political-economy factors such the strength of institutions and the ability to curb corruption

[1]Risk-free rates in solid blue are represented by the 3-month US Treasury Bill, obtained from the CBO. For reference, we also include the 'base rate of charge,' obtained from the IMF page 'SDR interest rate calculation'. It can be downloaded here.

[2]Borrowing corresponds to 'Net lending/borrowing (also referred as overall balance)' from the IMF. It was downloaded from here.

[3]Debt as a percentage of GDP is obtained from the IMF

Table 1: Pre- and Post- Pandemic Debt (% GDP) in EMs

Country	2022 Debt	Long Run (90-22)
Argentina	86	57
Brazil	73	61
Chile	32	16
Colombia	57	37
Costa Rica	70	50
Ecuador	51	44
El Salvador	75	58
Greece	172	151
India	87	75
Italy	145	123
Korea	55	36
Mexico	50	32
Portugal	119	100
Singapore	167	97
Spain	115	73
Thailand	55	32
Uruguay	71	68

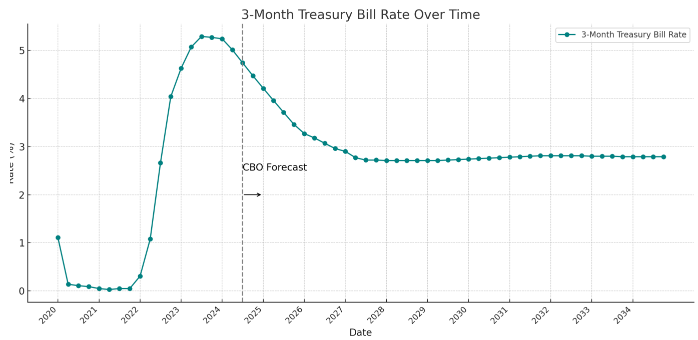
spending. Specifically, we address two key questions: first, how rising risk-free rates affect EMs in contexts where corruption is present, and second, how short-term lending programs from International Financial Institutions (IFIs)—such as the IMF—influence these dynamics.

We build on the political economy model of sovereign default developed by Azzimonti and Mitra (2023b), which describes how representatives from various groups with veto power negotiate over national taxes, public expenditure, international borrowing levels, and default decisions. In this model, a group leader, randomly selected to make a policy proposal, requires the support of a 'minimum winning coalition' to enact policy. To secure this support, the proposer may offer political favors and engage in corruption spending (in the form of targeted public goods, bribes, subsidies, or policies benefiting specific non-economic interests). These expenditures, though costly, are designed to benefit particular groups and depend on the country's institutional strength. We first show that, in the long run, countries with weak institutions endogenously engage in higher levels of corruption-related spending, financed in part through increased borrowing. In equilibrium, this results in a higher probability of default[4]. These dynamics are further exacerbated during periods of low global interest rates, such as those following the pandemic, which encouraged EMs to accumulate excessive debt, thereby amplifying their fiscal vulnerabilities.

We then turn to the medium-term where rates are not constant. We introduce a time-varying trajectory for the risk-free rate, reflecting the real-world path observed between 2020 and 2024, along with Congressional Budget Office (CBO) projections for the near future, shown in Figure 2. Assuming that all agents in the economy are aware of this trajectory, the prospect of rising rates, coupled with high post-pandemic indebtedness, makes default highly likely. Our Monte Carlo

[4]See Azzimonti and Mitra (2023a) and Qian and Roch (2024) for empirical evidence relating institutional weakness to higher default risks. The former considers 'checks and balances' whereas the latter focuses on other measures such as rule of law and corruption control.

Figure 2: Risk-free rate (CBO forecast).



simulations reveal that approximately 60% of cases result in outright default as interest rates begin to rise.

We also analyze the effect of introducing an IFI lending program, which allows countries to borrow at a pre-determined price schedule similar to that in Boz (2011a). Our simulations show that, without conditionality rules, as global rates increase, outcomes for EMs diverge based on their exposure to productivity (TFP) shocks. Countries benefiting from positive TFP shocks manage to avoid default but continue accumulating debt irresponsibly, often postponing necessary fiscal adjustments, and substituting more expensive private debt with cheaper IFI debt. These "lucky" countries may appear stable in the short term but remain vulnerable to future crises. Conversely, "unlucky" countries facing negative shocks are driven into default due to already fragile fiscal positions (e.g. unsustainable high debt levels), entering a vicious cycle of borrowing and default that exacerbates their sovereign debt crises over time. This is the result of the short-sightedness introduced by politics: policymakers prefer to use IFI debt to fund corruption rather than to fix their budget. Through Monte Carlo simulations, we find that the introduction of an IFI lending program leads to a higher incidence of default compared to the benchmark scenario, with approximately 90% of cases resulting in default.

Most IFI lending programs include conditions that must be met before loans are disbursed. These conditionality rules typically involve prior actions (reforms required before funds are released), quantitative performance criteria (QPCs) (measurable targets such as fiscal balances or debt limits), and structural benchmarks (long-term reforms aimed at improving governance or tax administration). In this paper, we introduce two specific conditionality rules for IFI loans: (i) one that targets corruption spending and (ii) a debt-ceiling rule. The anti-corruption conditionality restricts the use of government resources for corrupt practices, ensuring that IFI funds are allocated toward legitimate fiscal needs. Our findings indicate that when this conditionality is effectively enforced, it reduces the probability of default and helps countries stabilize their debt at more sustainable levels. Under perfect monitoring, only 20% of the cases result in default in our Monte Carlo simulations (relative to 60% without IFI lending). Interestingly, simulations with the debt-reduction conditionality only partially achieve this result. Since it does not explicitly target corruption, countries are more likely to default than the anti-corruption outcome, as current or future corruption is the main driver of current default[5].

Despite these positive outcomes, the simulations also reveal persistent moral hazard challenges. Even with monitoring, some countries benefit from the lower borrowing costs and improved investor confidence that IFI programs bring, leading them to borrow more than they would in the absence of the program. While conditionality helps reduce defaults, it does not eliminate the incentives for irresponsible fiscal behavior among countries that are not directly facing negative productivity shocks (and hence, do not seek borrowing from the IFIs). The IFIs therefore face a trade-off: In a country with weaker institutions, lower current defaults lead to higher borrowing in the absence of IFI lending, leading to higher chances of future default and an associated higher chance of IFI borrowing. This may lead to repeated use of IFI resources making countries perpetually depend on them to ensure the stability of the international payments system. Debt-ceiling rules can curb borrowing effectively, and hence reduce moral hazard, but they are less effective at preventing defaults and carry welfare losses. The latter happens because the government re-directs resources away from public good provision and into corruption spending when the conditionality rule is on debt to GDP.

In summary, our simulations highlight the critical importance of politics in shaping sovereign debt outcomes in the 'era of rising rates.' They also underscore the need for a robust yet balanced IFI conditionality to ensure that lending programs promote long-term fiscal responsibility rather than exacerbate the very crises they are intended to prevent.

2 Related Literature

Prior literature has largely overlooked the implications of evolving global interest rates and IFI conditionality on sovereign debt management. Our paper fills this gap by providing a comprehensive analysis of how predictable interest rate paths influence fiscal decisions and default dynamics in politically constrained EMs.

There have been papers establishing that higher risk-free rates significantly affect the fundamentals of emerging market (EM) economies. For instance, Neumeyer and Perri (2005) shows that exogenous shocks to real interest rates drive business cycles in EMs, while Uribe and Yue (2006) finds a strong correlation between world interest rates and EM business cycles. Similarly, Johri et al. (2022) highlight that time-varying volatility in risk-free rates impacts spreads in sovereign default models akin to those in Arellano (2008) and Aguiar and Gopinath (2006). Much of this literature focuses on how interest rate shocks affects business cycle volatility. Our paper, instead, shifts the focus to a specific time-varying path of world interest rates, like the one experienced since 2020, and examines its effect on the likelihood of default in EMs facing political frictions. This approach en-

[5]see Azzimonti and Mitra (2023a) for details. By the same logic, any other QPC that by definition does not target corruption would lead to more defaults than the full monitoring case.

ables us to explore how sovereign debt dynamics change in response to predictable, gradual changes in global interest rates, particularly in economies with weak institutions and incentives to engage in corruption spending.

A small number of previous studies have explored how the introduction of non-defaultable debt influences default incentives. Hatchondo et al. (2017) shows that non-defaultable debt can temporarily reduce spreads and default risk, though its long-term impact is constrained. In contrast, our findings indicate that non-defaultable debt actually *increases* spreads and default rates. A key difference is our explicit consideration of political frictions, emphasizing how non-defaultable debt with conditionality rules can address these distortions, as inspired by Boz (2011b), who first introduced IFI debt with conditionality in a sovereign default framework. Unlike Boz (2011b), who captures impatience through a reduced-form discount factor, we model a political economy environment that endogenously generates myopic behavior. A notable contribution of our paper is that, because over-borrowing is driven by a desire to fund corruption, conditionality rules can be specifically tailored to mitigate these political distortions directly.

Our paper is also related to the extensive literature on fiscal rules. Azzimonti et al. (2016) consider instead a deficit rule in a legislative bargaining model similar to ours, but abstract from sovereign default. For instance, Chatterjee and Eyigungor (2015) examine the effects of introducing seniority structures on sovereign debt, while Hatchondo et al. (2016) explore the role of debt covenants in penalizing excessive borrowing and addressing debt dilution. Though these are not explicitly fiscal rules, they complement fiscal frameworks designed to eliminate deficit bias. Similarly, Hatchondo et al. (2022) compare debt brakes with spread brakes in a heterogeneous union of countries, finding that spread brakes are welfare-enhancing and more effective than debt brakes. In contrast, we focus on a conditionality rule that restricts spending on corruption as a requirement for IFI loans. Our work also relates to Beetsma and Uhlig (1999), which examines the role of fiscal rules (such as the EU Stability and Growth Pact) in a monetary union with short-sighted policymakers, as well as to Halac and Yared (2014) and Halac and Yared (2018), who analyze deficit bias and the role of fiscal rules in both single-country and multi-country settings. Additionally, Chari and Kehoe (2008) discuss the importance of fiscal rules in addressing time inconsistency problems in monetary unions. While we abstract from monetary policy and inflation, we focus on a simple debt-reduction rule as a complement to IFI lending, similar to that in Esquivel and Samano (2024). Although we do not seek to identify the optimal rule in terms of welfare or default risk reduction, our paper identifies a qualitative benchmark and paves the way for future evaluation of quantitative rules that could deliver outcomes closer to this benchmark.

The rest of the paper is organized as follows. Section 3 introduces the economic and political environments. The quantitative evaluation is described in Section 4, which calibrates the economy and describes its behavior in the long run. The medium-term environment with rising rates is studied in Section 5, and IFI lending programs are introduced in Section 6, while Section 7 concludes.

3 Model

The economic model follows the structure of Azzimonti and Mitra (2023b), with the key distinction that the risk-free rate evolves deterministically over time, rather than remaining constant. A reader already familiar with that model may skip this section; otherwise, a summary is provided below.

3.1 Economic Environment

There is a domestic sector with households and competitive firms, a government that sets fiscal policy, and international investors who buy government debt. Time is discrete. In the domestic economy, there are infinitely lived agents divided into n groups who share the common objective of gaining a 'piece of the pie,' π_i. This can include group-specific political favors, provision of targeted public goods, implementation of rights and regulations matching a specific ideology (gun control, same-sex marriage, abortion rights, etc), or simply nepotism and bribes. It is the possibility of diverting resources towards 'the pie' that opens the door for corruption in our model. Agents in group i derive utility from private consumption c, labor l, a pure public good g, and the flow of goods and services obtained from π_i,

$$U(c, l, g, \pi_i) = u(c, l) + \eta v(g) + \pi_i. \tag{1}$$

The constant η represents the weight of public goods relative to the consumption-leisure aggregate. We assume that

$$u(c, l) = \frac{1}{1-\sigma}\left(c - \frac{l^{1+\gamma}}{1+\gamma}\right)^{1-\sigma} \quad \text{and} \quad v(g) = \frac{g^{1-\sigma}}{1-\sigma},$$

where $\sigma > 0$ captures the degree of risk aversion and $\gamma > 0$ represents the Frisch elasticity of labor supply. Agents discount the future at a rate β. Similar to small open economy models of sovereign default, we assume imperfect capital markets prevent individuals from using assets to smooth aggregate fluctuations, implying $c_t = (1 - \tau_t)w_t l_t$, with w_t as the economy-wide wage rate and τ_t denoting a distortionary tax on labor income[6]. The individual labor supply and optimal consumption decisions are static and satisfying,

$$l_t^* = [w_t(1-\tau_t)]^{\frac{1}{\gamma}} \quad \text{and} \quad c_t^* = (1-\tau_t)w_t l_t^*. \tag{2}$$

Firms produce a single non-storable consumption good, y, using the linear technology

$$y_t = h(z_t, d_t)l_t.$$

[6] Alternatively, we could assume that firms pay distortionary taxes on revenues, yielding a similar formulation in equilibrium.

Aggregate TFP shocks z_t follow a first-order Markov process $\mu(z_{t+1}|z_t)$. The function $h(z,d)$, increasing in z, takes different forms in states of repayment ($d=0$) and default ($d=1$). Firms are competitive and maximize profits, yielding the equilibrium wage rate $w_t^* = h(z_t, d_t)$. Equilibrium output given policy is thus $y_t^* = h(z_t, d_t)l_t^*$.

The government collects revenue $Rev(\tau_t) = \tau_t y_t^*$, which allocates towards the provision of public goods and corrupt public practices (e.g., the 'pie'). Additionally, if the government maintains good credit standing ($\Omega_t = 1$), it can issue one-period non-contingent real bonds in international markets. The raised by the government from capital market are $q_t b_{t+1} - b_t$, where b_{t+1} represents newly issued bonds. The government budget constraint is

$$\text{Rev}(\tau_t) - g_t + (1-d_t)\Big[q_t b_{t+1} - b_t\Big] \geq \sum_i \pi_{i,t}, \tag{3}$$

with $\pi_{i,t} \geq 0$ and $\sum_i \pi_{i,t}$ representing the total size of the pie. If the government defaults, it is excluded from international credit markets for a stochastic number of periods, determined by probability θ. In default, $b_{t+1} = 0$, credit standing is downgraded to $\Omega_t = 0$, and expenditures are financed solely with $Rev(\tau_t)$. The total amount of resources that can be diverted from the budget is thus

$$\Pi_t = \begin{cases} \text{Rev}(\tau_t) - g_t + (1-d_t)\Big[q_t b_{t+1} - b_t\Big] & if\ \Omega_t = 1 \\ \text{Rev}(\tau_t) - g_t & if\ \Omega_t = 0, \end{cases} \tag{4}$$

with the government budget constraint collapsing to $\Pi_t \geq \sum_i \pi_{i,t}$. In equilibrium, this constraint will hold with equality.

International lenders are modeled following Arellano (2008): An infinite number of identical risk-neutral lenders can borrow and lend at a risk-free (but potentially time-varying) risk-free rate r_t and buy government debt at a price q_t. We assume that the sequence of risk-free interest rates is deterministic and known to all agents in the economy, and denote it by $R = \{r_0, r_1, ...\}$. We sometimes use R_t to denote this sequence from period t onwards, $R_t = \{r_t, r_{t+1}, ...\}$. In equilibrium, lenders earn no profits, so

$$q_t^* = \int_{(z_{t+1}, m_{t+1}) \in \Psi_{t+1}} \left[\frac{1-d_{t+1}}{1+r_{t+1}}\right] \partial z_{t+1} \partial m_{t+1} | (z_t, m_t), \tag{5}$$

where d_{t+1} is tomorrow's equilibrium default choice and $\Psi_{t+1} = \{(z_{t+1}, m_{t+1}) : d_{t+1} = 0\}$ is the repayment set for the government. The variable m_t represents political shocks, described in detail in the following section.

The expressions above determine a competitive equilibrium given government policy and the path of risk-free rates R. Corresponding equilibrium variables are denoted with asterisks. The next section defines how policy is determined.

3.2 Political Environment

Each group in society has a politically influential leader who holds a seat at the bargaining table where policies are decided. Policy proposals require the support of a sufficient number of leaders, $m_t \leq n$, to be implemented. This grants each leader some veto power and incentivizes the distribution of political favors. The term m_t represents the size of the 'minimum winning coalition' (mwc) at period t. The value of m_t can change stochastically over time, reflecting the evolving political landscape of a country. We assume m_t follows a first-order Markov process with transition probability $p(m_{t+1}|m_t)$. Temporary shocks to m_t are seen as fluctuations in the balance of power due to electoral outcomes or varying political importance of certain groups over time.

The bargaining protocol is as follows: At the beginning of each period, group leaders convene, and one is randomly chosen to make a policy proposal. Since individuals are identical across groups, the identity of their leader is irrelevant. A proposal is defined as

$$\Phi_t = \begin{cases} \{\tau_t, g_t, b_{t+1}, d_t, \pi_{1,t}, \pi_{2,t}, ..., \pi_{n,t}\} & if\ \Omega_t = 1 \\ \{\tau_t, g_t, \pi_{1,t}, \pi_{2,t}, ..., \pi_{n,t}\} & if\ \Omega_t = 0. \end{cases} \tag{6}$$

If the proposal secures the support of m_t leaders, the policy is implemented. If not, leaders proceed to the next proposal round with a new randomly chosen proposer. If no agreement is reached after $T \geq 2$ proposal rounds, an outsider is appointed to select a reference (symmetric) policy.

We focus on a Markov-perfect equilibrium, where variables depend on payoff-relevant state variables and are independent of the identity of the proposer. The aggregate state variables at the outset of any period are the stock of debt b_t, the TFP shock z_t, the size m_t of the mwc, the credit standing $\Omega_t \in \{0, 1\}$. Policymakers also need to know the sequence of risk-free rates $R_t = \{r_t, r_{t+1}...\}$, since these affect the price of bonds. It is useful to define the exogenous state space $\mathbf{s_t^e} = \{z_t, m_t, \Omega_t, R_t\}$ and $\mathbf{s_t} = \{\mathbf{s}_t^e, b_t\}$, the full state-space. In equilibrium, variables depend on endogenous policy Φ_t and the current state $\mathbf{s_t}$.

As in Azzimonti and Mitra (2023b), we restrict attention to symmetric MPEs. Given that the other $n-1$ group leaders are identical, the $m_t - 1$ coalition members required to pass the proposed policy are randomly chosen from among them. To gain their consent, the proposer offers favors $\pi_{i,t} = \pi_t$ to members of the selected minimum winning coalition and $\pi_{i,t} = 0$ to those outside it. This follows from symmetry. The proposer retains $\pi_{p,t} = \Pi_t - (m_t - 1)\pi_t$.

At period t, in any round $k \in \{1, 2, ..., T\}$, the proposer chooses $\Phi_t^k = \{\tau_t^k, g_t^k, \pi_t^k\}$ to maximize

$$\begin{aligned} &\max_{\Phi_t^k} \left\{ V_t^{Pk}(\mathbf{s_t}, \Phi_t^k) \equiv U\left(c_t^*, l_t^*, g_t^k\right) + \pi_{p,t}^k + \beta\, \mathbb{E}_{\mathbf{s}_{t+1}}\, J_{t+1}(\mathbf{s_{t+1}}, \Phi_{t+1}|\Phi_t^k) \right\} \\ \text{s.t.} \quad & V_t^{Ik}(\mathbf{s_t}, \Phi_t^k) \geq J_t^{k+1}(\mathbf{s_t}, \Phi_t^{k+1}) \\ & \pi_{p,t}^k = \Pi_t^k - (m_t - 1)\pi_t^k \geq 0 \\ & \tau_t^k, g_t^k, \pi_t^k \geq 0. \end{aligned} \tag{7}$$

The first equation is an incentive compatibility constraint (IC): the value of accepting the proposal for members of the *mwc*, $V_t^{Ik}(\mathbf{s_t}, \Phi_t^k)$, must be at least as large as the value of rejecting it, $J_t^{k+1}(\mathbf{s_t}, \Phi_t^{k+1})$. In round $k+1$ policies are Φ_t^{k+1} and the status of the group leader may change (e.g. become a proposer or not be part of the *mwc*). The second equation guarantees the feasibility of government policies by ensuring that the diverted pie Π_t^k is sufficient to cover the cost of providing political favors to the coalition members. Favors must be non-negative. The expected future value in the following period is $J_{t+1}(\mathbf{s_{t+1}}, \Phi_{t+1}|\Phi_t^k)$, conditional on the current proposal being accepted. Note that equilibrium c_t^* and l_t^* are evaluated at policy Φ_t^k.

Since members of the *mwc* obtain π_t in political favors, the value of accepting the proposal for anyone in the mwc, $V_t^{Ik}(\mathbf{s_t}, \Phi_t^k)$, satisfies

$$V_t^{Ik}(\mathbf{s_t}, \Phi_t^k) = U\left(c_t^*, l_t^*, g_t^k\right) + \pi_t^k + \beta\, \mathbb{E}_{\mathbf{s}_{t+1}}\, J_{t+1}(\mathbf{s_{t+1}}, \Phi_{t+1}|\Phi_t^k).$$

If the proposal is rejected, a new proposer is elected in round $k+1$ with probability $\frac{1}{n}$. If a member of round-k's minimum winning coalition mwc_k becomes a proposer, he/she will receive $V_t^{Pk+1}(\mathbf{s_t}, \Phi_t^{k+1})$ in the next round. The state space does not change, as all proposal rounds happen in period t. A member of mwc_k is chosen to be part of mwc_{k+1} with probability $\frac{m_t-1}{n}$, in which case they get $V_t^{Ik+1}(\mathbf{s_t}, \Phi_t^{k+1})$. With probability $\frac{n-m_t}{n}$, a member of mwc_k is not selected to be part of the mwc_{k+1} and gets instead $V_t^{Ok+1}(\mathbf{s_t}, \Phi_t^{k+1})$. Anyone outside of the *mwc* obtains

$$V_t^{Ok}(\mathbf{s_t}, \Phi^k) = U\left(c_t^*, l_t^*, g_t^k\right) + \beta\, \mathbb{E}_{\mathbf{s}_{t+1}}\, J_{t+1}(\mathbf{s_{t+1}}, \Phi_{t+1}|\Phi_t^k).$$

The continuation value of rejecting a proposal to any member of mwc_k, $J_t^{k+1}(\mathbf{s_t}, \Phi_t^{k+1})$, is computed by taking expectations over these three possibilities (where we abstract from the functions' arguments $\mathbf{s_t}$ and Φ_t^{k+1} to reduce notation).

$$J_t^{k+1} = \frac{1}{n}\, V_t^{P,k+1} + \frac{m_t - 1}{n}\, V_t^{I,k+1} + \frac{m_t - n}{n}\, V_t^{O,k+1}. \tag{8}$$

Re-arranging the expression above,

$$J_t^{k+1}(\mathbf{s}_t, \Phi^{k+1}) = U\left(c_t^*, l_t^*, g_t^k\right) + \frac{\Pi_t^k}{n} + \beta\, \mathbb{E}_{\mathbf{s}_{t+1}}\, J_{t+1}(\mathbf{s_{t+1}}, \Phi_{t+1}|\Phi_t^k). \tag{9}$$

where Φ_t^{k+1} is the optimal policy of the next round's proposer (given any continuation value).

As shown in Appendix B.2 of Azzimonti and Mitra (2023b), the proposed policy tuple is accepted in the first round and the proposer's problem is equivalent to one where the welfare of the average mwc member is maximized,

$$\begin{aligned} &\max_{\Phi_t} U\left(c_t^*, l_t^*, g_t\right) + \frac{\Pi_t}{m_t} + \beta \mathbb{E}_{\mathbf{s}_{t+1}}\, J_{t+1}(\mathbf{s_{t+1}}) \\ &\text{s.t.} \quad \Pi_t \geq 0, \end{aligned} \tag{10}$$

with $J_{t+1}(\mathbf{s_{t+1}})$ denoting the expected value of continuation utility for the proposer given that the next period's Markov-perfect equilibrium policy is $\Phi^*_{t+1}(\mathbf{s_{t+1}})$,

$$J_{t+1}(\mathbf{s_{t+1}}) = U\Big(c^*_{t+1}(\mathbf{s_{t+1}}), l^*_{t+1}(\mathbf{s_{t+1}}), g^*_{t+1}(\mathbf{s_{t+1}})\Big) + \frac{\Pi^*_{t+1}(\mathbf{s_{t+1}})}{n} + \beta\, \mathbb{E}_{\mathbf{s}_{t+2}}\, J_{t+2}(\mathbf{s_{t+2}}). \tag{11}$$

4 Quantitative Evaluation

We need to solve the simplified proposer's problem, defined in equations (10) and (11), with equilibrium allocations given in equation (2), bond prices in equation (5), and the government budget in equation (4). This problem is complex to compute due to its non-stationary nature, which arises from time-varying risk-free rates.

If we assumed a constant risk-free rate—a common assumption in standard sovereign-default models—we could express the model recursively. Since we are focusing on a Markov-perfect equilibrium, the stationary nature of the problem with a constant r would simplify computation because the functions would be time-invariant. However, in our case, the sequence in R is non-recursive. As a result, value functions and policy functions must include time subscripts. In other words, we need to compute different equilibrium functions for each point in time, which is an almost impossible task.

There are two alternatives in this case. One is to assume that interest rates can be expressed recursively, with r_{t+1} being a function of r_t. In this scenario, we would need to extend the model to include the current value of the risk-free rate as an additional state variable. However, since our goal is to assess how the sequence of r_t estimated by the CBO, shown in Figure 2, impacts the path of fiscal policy and spreads, this might not be the best approach. It is unclear which recursive formulation would be consistent with the figure. A close examination of the figure shows that the sequence of rates stabilizes around 2.8%. The second alternative is to assume that after T periods, the risk-free rate becomes constant, such that $R_{T+k} = r_T$ for $k \geq 0$. In this case, the problem would become stationary after period T, allowing us to express it recursively with time-invariant functions. This is the approach we will follow.

We first solve the problem at period T assuming $R_{T+k} = 2.8\%$ following Azzimonti and Mitra (2023b). This is considered the "stationary steady state" of the model. With the solution to this problem, we can then solve the proposer's problem backward, starting from period T and using the sequence of interest rates depicted in Figure 1. Specifically, given the continuation value $J_T(\mathbf{s})$ and policy $\Phi_T(\mathbf{s})$ in period T, we can use eq. (5) to recover bond prices q^*_{T-1}. With this, we can solve the proposer's problem in $T-1$, which yields $J_{T-1}(\mathbf{s}_{T-1})$ and $\Phi_{T-1}(\mathbf{s}_{T-1})$ for all states $\mathbf{s}_{T-1}$. We continue this iterative process backward in time until the first period, ultimately obtaining the sequences $\{J_{T-k}(\mathbf{s}_{T-k}), \Phi_{T-k}(\mathbf{s}_{T-k}), q^*_{T-k}\}_{k=1}^{T-1}$.

4.1 Calibration

We calibrate the model to Argentina during the period 1993-2022. In the model, each period represents one quarter. The risk-free interest rate sequence follows the CBO estimate corresponding to the 3-month U.S. T-Bill. Values until Q2:2023 are observed and the rest are forecasted with information up to that date. Treasury bill rate shown in Figure 2 between 2020:Q1 and 2030:Q1. The stationary steady-state interest rate, corresponding to T =2030:Q2 onwards, is set to $r_T = 2.8\%$ (annually). The discount factor, β, is set to match the inverse of the gross risk-free rate in the model $\beta = \frac{1}{1+r} = 0.9932$, a similar value to that in standard macroeconomic models. The risk aversion parameter $\sigma = 2$ and the inverse of the Frisch elasticity of labor supply $\gamma = 2$, also take standard values.

The exogenous productivity shock is assumed to follow an auto-regressive process (AR(1)) $z_{t+1} = (1-\zeta_z)\bar{z} + \zeta_z z_t + \epsilon^z_{t+1}$. We normalize its average $\bar{z} = 1$ and assume a mean zero ϵ^z_{t+1} with variance σ^2_z. The parameters ζ_z and σ_z are determined by fitting the AR(1) process to real GDP per employed person, annually (HP-filtered using a parameter of 100). The fitted AR(1) process is discretized into 21 possible realizations of the productivity shock using the method by Tauchen and Hussey (1991). Table 2 reports the resulting ζ_m and σ_z values.

We assume there are $n = 20$ groups in the population. The size of the *mwc* m_t, is assumed to follow an AR(1) process $m_{t+1} = (1-\zeta_m)\bar{m} + \zeta_m m_t + \epsilon^m_{t+1}$, with ϵ^m_{t+1} having a mean of zero and a variance of σ^2_m. The values for ζ_m and σ_m are chosen as in Azzimonti and Mitra (2023b), by estimating an AR(1) process on the normalized series of 'representation and accountability' R&A for Argentina during the period under consideration [7].

Table 2: Calibration Targets

Parameter	Value	Target	Description
ζ_z	0.925	Persistence Real GDP	AR(1)
σ_z	0.018	Volatility of Real GDP	
ζ_m	0.954	Persistence of R&A	AR(1)
σ_m	0.234	Volatility of R&A	
α_0	-0.36	$\mathbb{E}$(Spreads) = 7%	Jointly Calibrated
α_1	0.40	$\frac{\text{Debt}}{\text{GDP}} = 53\%$	
η	1.2	$\frac{\text{Spend}}{\text{Y}} = 0.14$	
$\bar{m}$	5		

[7] The degree of representation and accountability (R&A) captures public perceptions about (i) the extent to which citizens can participate in selecting their government through free elections, freedom of expression, freedom of association, and a free media (also known as 'vertical accountability') and (ii) de-facto checks and balances (or 'horizontal accountability'). It is obtained from the World Bank's Worldwide Governance Indicators.

The probability of market re-entry following a default, θ, is set to 0.0385 as in Chatterjee and Eyigungor (2012) [8]. We also assume that default entails a loss in productivity following Chatterjee and Eyigungor (2012)[9].

The parameters α_0, α_1, $\bar{m}$ and π are jointly calibrated. To do this, we minimize a quadratic loss function to match: average spreads, average of external debt to GDP, and the average value of government spending to GDP in the data. The value obtained for $\bar{m}$ will be used for our benchmark economy. We use a large evenly spaced grid for debt ranging from 0 to 100, which is larger than the maximum value at which the government defaults.

4.2 The stationary steady state

Before we can analyze how the forecasted path for risk-free rates affects our economy, we compute the equilibrium in the long-run stationary steady state (it is stationary because, given the shocks, the economy is not in a steady state but instead in a steady region of the state space). We simulate the economy over time assuming that the interest rate is fixed at $r = 2.8\%$ and report statistics of key variables in the steady state. To do this, we run the economy for a 100,000 periods, exclude the first 10,000, and average out the series corresponding to each variable in the remaining periods.

In the first column of Table 3, we show the long-run statistics for our benchmark calibrated economy, with $\bar{m} = 5$. The second column shows the results under a planner, equivalent to assuming $m_t = n$ for all t. Higher values of $\bar{m}$ correspond to a larger size of the *mwc*, reflecting stronger institutional constraints on the group in power (see Azzimonti and Mitra (2023b) for details). As the number of veto players increases, the incentives to engage in corruption diminish. At the extreme, a planner abstains entirely from corrupt public practices, resulting in an average pie size of zero[10]. In contrast, in the benchmark economy the pie accounts for 4.5% of output, a significant number given that public spending is 14% of output.

Spreads are around 6.7% in the EM economy, a value matched during calibration. The country defaults approximately four times every 100 periods, as indicated by the 'Rate of Default' variable in the table[11]. The 'Periods in Default' variable shows that the benchmark economy is in a state

[8] This is approximately equal to $\frac{1}{\theta} \cong 26$ quarters (6.5 years) of exclusion from financial markets after a default event.

[9] In particular, we assume that labor productivity takes the following form

$$h(z,d) = \begin{cases} z & \text{if } d = 0 \\ z - \max\{0, \alpha_0 z + \alpha_1 z^2\},\ \alpha_1 \geq 0 & \text{if } d = 1 \end{cases} \tag{12}$$

[10] This needs not be true always, but it is true in this calibration. An important assumption driving the results is that the planner does not save (e.g. our grid for debt is bounded below by zero). Given the discount factor, the planner's solution will be similar to that in Aiyagari et al. (2002), in which the planner wants to accumulate a large amount of assets and never tax again. In that scenario, it would be possible to observe positive transfers even under the planner in some states of the world.

[11] The rate of default is calculated as the proportion of periods in which a new default occurs.

Table 3: Long-run moments

Moment	Benchmark	Planner
$\mu\left(\frac{\text{Debt}}{\text{y}}\right)$	53%	18.3%
$\rho(\frac{\text{TB}}{\text{y}}, \text{y})$	-0.57	0.55
$\mu(\Pi/y)$	4.5%	$= 0$
Spreads	6.7%	$\simeq 0$
Rate of Default	3.6 %	$\simeq 0$
Periods in Default	24 %	$\simeq 0$

of default 24% of the time[12]. In contrast, in the planner's solution, spreads are 0.0001% and there are no defaults. This outcome arises because the planner avoids the default region, maintaining a relatively low debt-to-GDP ratio of 18%, compared to around 53% in the benchmark scenario.

What's the intuition? A higher m means diverting resources towards the pie is less appealing since it must be shared among a larger number of groups. In the limit, when $m = n$, the pie is distributed equally among the entire population. The distortionary costs of taxation outweigh the benefits of using resources for corruption under this calibration for a planner. In the benchmark case, however, politicians in power use corruption to claim a larger share of the pie. They have incentives to over-tax and over-borrow relative to the planner's choices, leading to excessive debt in equilibrium. Importantly, this short-sightedness is not due to a lower discount factor (which is identical in both cases and equal to the inverse of $1 + r$ in the calibration), but rather stems from political incentives. Policymakers are endogenously myopic in this model: through bargaining, a proposer can offer part of the resources diverted from the budget to other groups in order to pass legislation beneficial to its own. Because there is a chance of losing proposal power in the future—which depends on the turnover rate m_t/n—, there are strong incentives to engage in corruption when in power rather than behaving responsibly.

As a result, when a negative shock occurs, the government faces strong incentives to default or borrow less, as the price offered by external creditors is low due to excessive debt levels. This drives a counter-cyclical primary deficit as a percentage of GDP, meaning the trade balance is counter-cyclical, $\rho(\frac{\text{TB}}{\text{y}}, \text{y}) < 0$. In other words, the benchmark economy borrows in good times but defaults or implements severe austerity measures (i.e., repays debt) in bad times, which is sub optimal. By contrast, the planner pays down debt during good times rather than diverting resources to corrupt practices. This creates fiscal space to borrow cheaply during bad times, resulting in a pro-cyclical trade balance.

[12]This is calculated by averaging the number of periods in the simulation where $d = 1$.

5 Default in a world of rising risk-free rates

In this section, we perform our analysis of interest. The main idea is to quantify how a time-varying—but predictable—path of risk-free interest rates like the one in Figure 2 affects the debt management decisions of our benchmark economy. To that end, we feed in the 3-month US T-Bill forecasted by the CBO into our model and simulate the economy for 40 quarters. The initial period corresponds to Q1:2022, where the annualized risk-free rate was 0.31%. We use a higher-than-average initial value for the debt/GDP ratio of 64%. That is, we are in a 'post-pandemic" world where rates are still low but the debt burden is high.

Clearly, since z_t and m_t are stochastic, the evolution of these shocks will greatly affect the time path of spreads, debt and default in our simulation. To simplify the exposition we assume that m_t is constant and equal to $\bar{m} = 5$ through the experiment (e,g, the first 40 periods). This is reasonable given the high persistence of political shocks. TFP shocks, however, will follow the long-run process. A country is more likely to default if the economy has a long sequence of negative productivity shocks and lower-than-average institutional quality than under more favorable conditions. Because z_t is persistent, in such a short horizon the evolution of endogenous variables will be sensitive to initial conditions. To account for this, we draw run a Monte Carlo simulation with 1,000 different paths of these variables following the AR(1) process described in Section 4.1, and compute the equilibrium for each of these plausible cases. We start z_t at values consistent with the long-run distribution for these two variables[13]. We then average out, in each quarter, the resulting time series across the alternative 1,000 scenarios and plot the results in Figure 3.

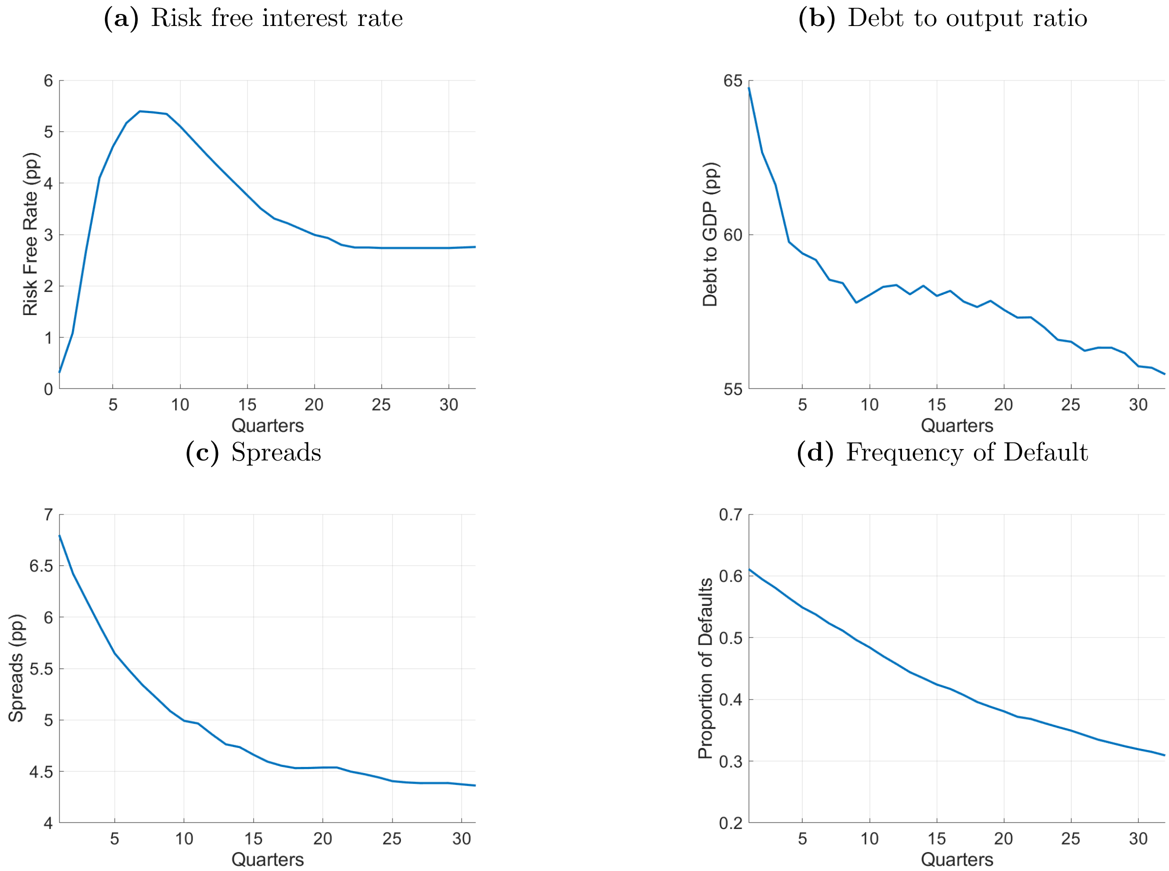
Panel (a) shows the evolution of r_t used in all scenarios. Panel (b) shows the evolution of average debt/GDP ratios at each point in time across synthetic economies that are still active in capital markets[14]. Panel(c) presents the spreads, whereas Panel (d) shows the probability of default, which is computed as the proportion of economies in the simulation that are in default at each point in time.

The main takeaway from the figure is that the pandemic shock, coupled with a period of low interest rates, drove debt-to-GDP ratios to unsustainable levels. As rates began to rise, our model indicates a high likelihood of default for emerging markets, with 60% of the simulations resulting in default within the first quarter, as shown in Panel (d). The countries that avoided default do so largely due to exceptionally favorable TFP shock realizations. However, these countries still

[13]This is important. If we start all simulations at $\bar{z}$ we are have most periods in the simulation with 'average' realizations, rather than those that are more likely to happen in economies such as these in the stationary distribution. We have then run the processes for z_t run for 10,000 periods and just use the last 40. By doing so, we are capturing TFP realizations that are most likely observed in the long run

[14]When an economy defaults, it is excluded from capital markets and it is *not* incorporated in the reported averages. Otherwise, we would be artificially generating declining debt levels over time, simply due to the assumption that once an economy defaults, debt is set to zero (which does not happen in real life, as there are non-trivial renegotiation and haircuts). Hence, the figure must be understood as the most likely scenario assuming that the economy was not hit by bad enough shocks that its government would find it beneficial to default and exit the market. In other words, there is some 'survivor bias'.

Figure 3: Evolution of variables given path of risk-free rates



face spreads exceeding 6.5% (Panel c), as international investors recognize that even the survivors remained in the 'danger zone.'

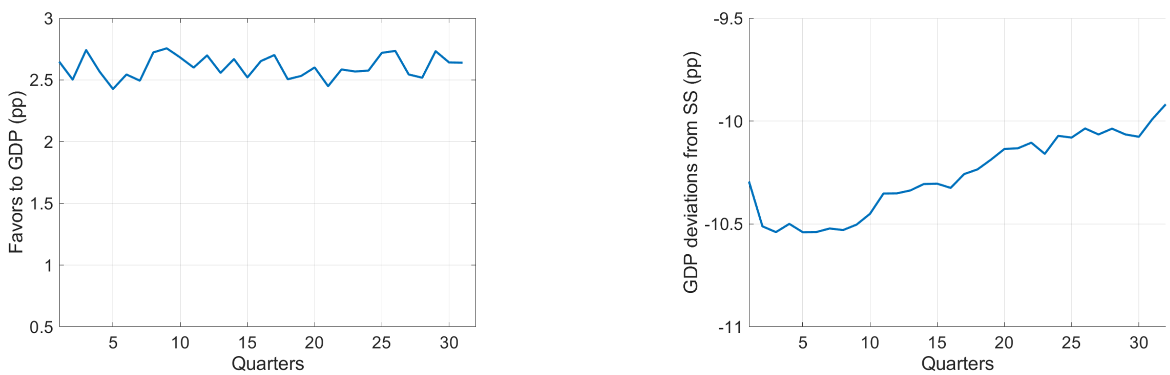
Additionally, rising risk-free rates over the first eight quarters add to their debt burden. As borrowing became increasingly expensive, the surviving countries in our panel aggressively cut down their debt over the first five quarters (Panel b). Spreads gradually decline as a result of strict austerity measures implemented by the non-defaulters, though there is a 'survivor bias' reflected in the average spreads. Over time, debt levels return to their long-run average of 53%. By period 30, the proportion of defaults decreases to around 30%. It is worth noting, however, that the pace of adjustment is much slower than what a Planner would aim for.

The figures across the four panels illustrate economies that are heavily constrained at the start of the period, forcing them to reduce debt at a time when interest rates are high. Despite efforts to manage their budgets, the proximity of their debt levels to the default threshold pushes many of these economies into default, even as rates eventually decline. Their heavy debt burden stems not only from elevated interest rates but also from institutional weaknesses, such as short-sighted policies that prioritize political gains over long-term fiscal stability.

The implementation of austerity measures results in lower debt and higher taxes, but corruption remains unchecked. As shown in Panel (a) of Figure 4, non-defaulters cut back on everything except corruption: throughout the simulation, average Π_t remains consistently above 2.5% of output, indicating that political inefficiencies persist despite fiscal tightening.

Figure 4: The costs of corruption

(a) The Pie **(b)** GDP Deviations from SS



So, what do high interest rates and elevated post-pandemic debt levels mean for EMs? They face a stark choice: either a swift default or the implementation of severe austerity measures. While austerity may reduce debt, it often fails to significantly lower the country's near-term risk of default. Both options—default and austerity—come at a heavy cost, with painful GDP losses. As shown in Panel (b) of Figure 4, GDP deviations from the steady state can reach as much as 10% in the first two years, highlighting the economic toll of these measures.

This raises the question of what can be done. One potential solution is institutional reform, a topic we addressed in our previous paper. However, as we showed in Azzimonti and Mitra (2023b), implementing such reforms is challenging, as policymakers often lack both the capacity and the incentives to pursue meaningful institutional changes. In the next section, we explore an alternative approach: the role of international financial institutions in providing lending programs.

6 International Financial Institutions (IFIs)

International Financial Institutions (IFIs) like the International Monetary Fund (IMF) play a critical role in lending to countries, especially during times of economic distress. Their primary goal is to stabilize economies, support sustainable growth, and help countries overcome financial crises. The IMF, in particular, provides financial assistance through crisis support and stabilization: it steps in when countries face balance of payments problems or sovereign debt crises, providing short-term loans to stabilize their economies. This support helps countries address liquidity issues and maintain confidence in their financial systems, preventing capital outflows or defaults. In this section, we introduce an IMF lending program similar to those from the Extended Fund Facility (EFF).

We model the lending program following the guidelines in the EFF website (see EFF website). We assume that it is available for 5 years (or 20 quarters) starting at the outset of our simulation period. The rationale for this is that the program was set in response to the temporary nature of rising rates and high indebtedness following the Pandemic. At period t, our benchmark country may borrow from both: (i) private markets at price q_t, as in the previous section and (ii) the IFI at price $q_{I,t}$. We denote IFI debt with $b_{I,t}$. In contrast to private debt, which is defaultable, we assume that there are no commitment problems in repaying $b_{I,t}$. We borrow this assumption from Boz (2011a) who emphasized the IMF's preferred creditor status and showed that major EMs almost always repay their IMF debt. The government budget constraint now becomes

$$Rev(\tau_t) + (1 - d_t)\Big[q_t b_{t+1} - b_t\Big] + q_{I,t} b_{I,t+1} - b_{I,t} \geq g_t + \sum_i \pi_{i,t}, \tag{13}$$

where the new term is highlighted in red. The price schedule $q_{I,t}$ is not determined in equilibrium, but instead follows a pre-determined formula described in detail in their website and summarized in Vasic-Lalovic et al. (2024).

In particular, $q_{I,t}$ is comprised of several components. The headline rate, or basic rate of charge, includes a fixed lending margin of 100 basis points, plus the variable Special Drawing Right (SDR) interest rate, shown in Figure 1 in light blue[15]. Additionally, surcharges are applied on loans to countries whose outstanding credit surpasses specific thresholds based on loan size[16].

Following Boz (2011a), we can capture the cost of borrowing from the IFI as depending on both the risk free rate and the amount borrowed from the IFI:

$$q_{I,t}(b_{I,t+1}) = \frac{1}{1 + r_t + \phi(b_{I,t+1})}, \tag{14}$$

where r_t denotes the risk-free rate used in the rest of the model.

Typically, when a country borrows from the IFI, it commits to implementing economic policy adjustments to resolve the issues that led to the need for financial assistance. These policy changes, known as *conditionality*, are required as part of the loan agreement and are intended to ensure the adoption of strong, effective measures for long-term stability. In the next section, we set aside

[15]The SDR rate is calculated weekly based on a weighted average of short-term government bond yields in the currencies of the SDR basket. The SDR basket includes the U.S. dollar (USD), euro (EUR), Chinese renminbi (CNY), Japanese yen (JPY), and British pound (GBP). The specific bonds used are typically 3-month treasury bills or similar instruments from the corresponding countries or economic zones.

[16]Borrowing costs also include a commitment fee—a deposit refunded if the country follows through with its agreement and all disbursements are made as planned—along with a service fee, which is charged each time new funds are disbursed. These are small and we will abstract from them at the moment. In addition, the basic rate of charge can theoretically be adjusted upward through the IMF's 'burden-sharing mechanism,' In practice, this adjustment has been set to zero since at least January 2020. For details, see Vasic-Lalovic et al. (2024).

conditionality to provide intuition on how these debt programs affect incentives, and then we introduce a program that incorporates conditionality in the model in Section 6.3.

6.1 Debt management with IFI lending: no conditionality

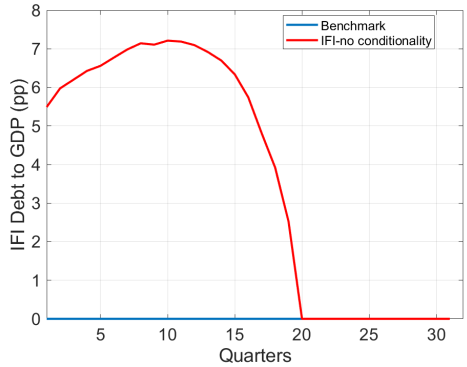
We solve the model described in Section 3.2, but using the budget constraint eq. (13) instead. The price schedule follows eq. (14) and the government is now allowed to freely choose $b_{I,t+1}$. All other details of the model, and in particular the bargaining protocol, remain the same. Computation becomes slightly more complicated because $b_{I,t}$ introduces an additional state variable into the model. The function $\phi(b_{I,t+1}) = \kappa b_{I,t+1}$ is specified as in Boz (2011a), with $\kappa = 1.42$. This value was chosen by the author to obtain an average IFI debt to GDP of about 5%, as observed in the data. Since $q_{I,t}$ is a function of the time-varying risk-free rate r_t, we use the same path as in the rest of the paper. That is, the one stipulated by the CBO in Figure 2 and then a constant when the series stabilizes.

Because the program is implemented for only 20 quarters, there is no change in the long-run equilibrium computed in Section 4.2. This means that the stationary functions are the same once r_t becomes constant. The medium-term evolution of variables is where the IFI program has a bite. We simulate the model following the steps in Section 5 assuming that all countries start without IFI debt, that is $b_{I,0} = 0$. The resulting averages across simulations are shown in Figure 5.

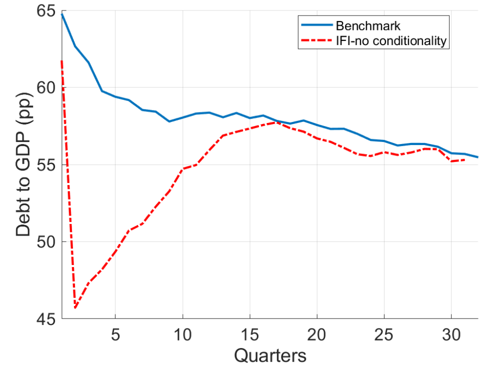
The first panel illustrates the evolution of $b_{I,t}$, assuming the program is introduced in period 0 and phased out in period 20. There is significant uptake in the first period, with IFI debt averaging out well above 5%. This happens because $b_{I,t}$ is cheap in the first few quarters where risk-free rates are at a historical low and the country has zero holdings (so surcharges are minimal), so $q_{I,t}$ is high. After period 10, holdings trend downward. This is partly due to the fact that rates are higher and that all outstanding debt must be fully repaid by period 20. Panel (b) indicates that countries are substituting private debt for IFI debt, as seen by the steep decline in b_t, depicted in dotted red. The decline is much faster than in the benchmark model, depicted in solid blue in the same panel. Countries are taking advantage of the fact that IFI rates are lower than private debt. Again, this is the result of an unusually high private debt/GDP ratio but low IFI debt (assumed to be zero in the first period). Over time, countries cut down on IFI debt and replace it by private debt. After period 20 the lines move close to each other as they converge to the original steady state.

Panel (c) is surprising at first. Even though the whole point of the program is to provide aid when countries are close to the default region (as in the first period of our simulation) to avoid defaults, we see that the proportion of defaults shoots up to 90%. It remains above the benchmark case throughout the sample. This illustrates the perverse incentives created by a program with no conditionality. In our model, countries can borrow from the IFI when excluded from private capital markets. This happens because either the country chooses to default in the current period (when $d_t = 1$) or has defaulted in the past and did not regain access (when $\Omega = 0$). The pie now becomes

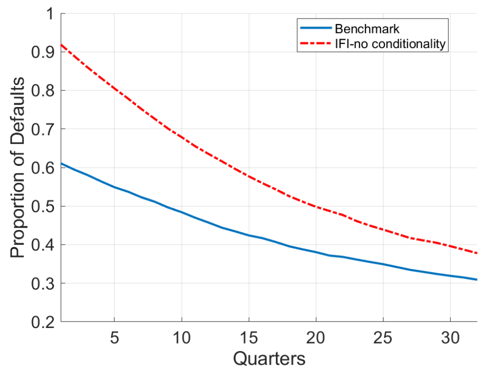
Figure 5: IFI lending: no conditionality



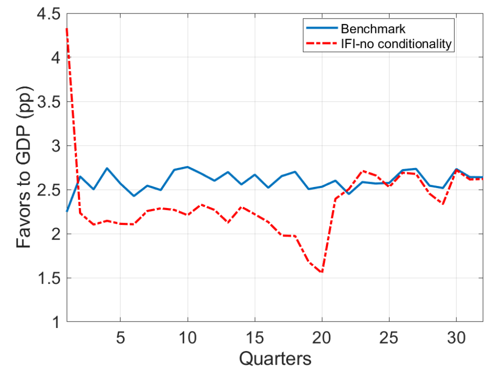
(a) IFI debt



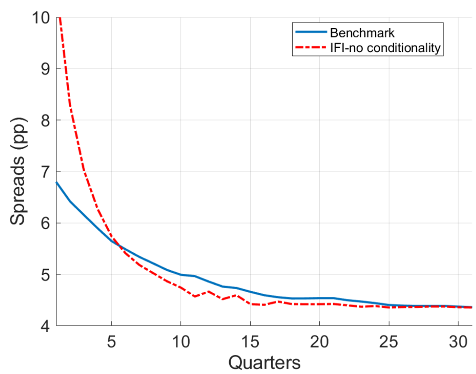
(b) Private Debt



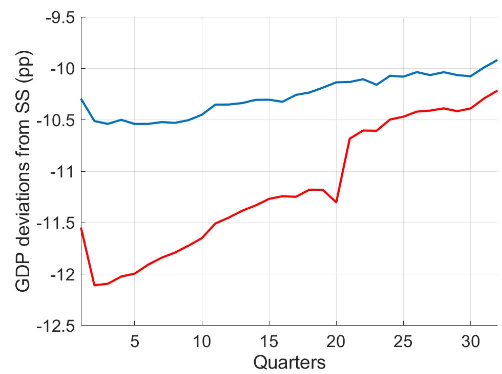
(c) Frequency of Default



(d) The Pie



(e) Spreads



(f) GDP losses

$$\Pi_t = \begin{cases} \text{Rev}(\tau_t) - g_t + (1-d_t)\Big[q_t b_{t+1} - b_t\Big] + q_{I,t} b_{I,t+1} - b_{I,t} & if\ \Omega_t = 1 \\ \text{Rev}(\tau_t) - g_t + q_{I,t} b_{I,t+1} - b_{I,t} & if\ \Omega_t = 0. \end{cases} \tag{15}$$

The extra term in red introduces moral hazard: IFI debt expands their borrowing capacity which means that there are more resources that can be devoted towards corruption spending. Defaulting becomes cheaper because the outside option has gone up as the IFI becomes a 'lender of last resort' to some of these economies. Some countries choose to borrow from the IFI and default anyway. The pie is larger and average corruption spending is significantly higher than in the benchmark case, as illustrated in Panel (d). Because countries do not implement austerity programs, as soon as rates start going down again their private spending goes up. GDP losses are significant, reaching 12% in the first few quarters. Clearly, without conditionality, the IFI lending program is not only ineffective but also counter-productive in this environment.

6.2 IMF lending with conditionality: full monitoring

IMF conditionality refers to the policy adjustments that borrowing countries agree to implement in exchange for financial assistance (see IMF conditionality website), often with a focus on budget rules or structural reforms. These conditions can take the form of prior actions, such as fiscal reforms or governance reforms, which must be completed before a loan is disbursed. they can also qualify under 'quantitative performance criteria (QPCs),' which are specific, measurable conditions for IMF lending that always relate to macroeconomic variables. Examples are budget rules like ceilings on external or internal government borrowing or limits on government spending. There are also 'structural benchmarks' which constitute reform measures that often cannot be quantified. Examples are strengthening the tax administration, improving fiscal transparency and improving anti-corruption initiatives and the rule of law.

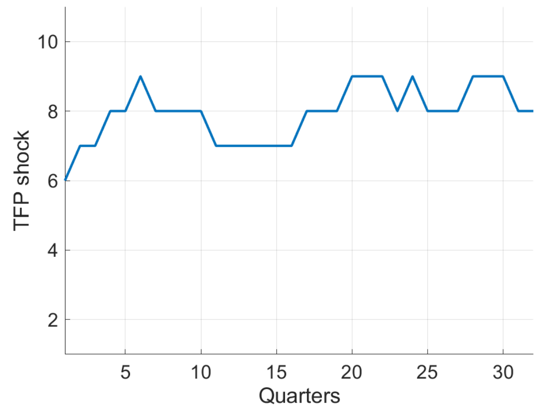
While numerous studies have examined the role of budget rules, such as private debt limits or constraints on deficit spending, there is comparatively little research on the impact of implementing anti-corruption measures. Since corruption drives over-borrowing in our model, we will explore the effects of a rule specifically targeting corruption-related expenditures. In particular, we augment the model with IFI debt from Section 6.1 with the following constraint

$$\text{IFI Conditionality:} \quad \pi_{i,t} = 0 \quad \text{if} \quad b_{I,t+1} > 0. \tag{16}$$

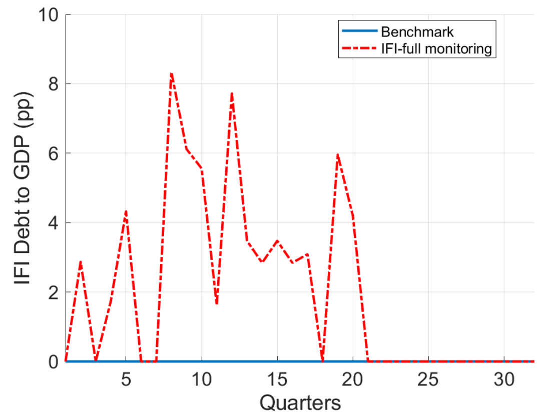
Equation (16) suggests that when countries borrow from the IFI, they are prohibited from using government revenues for political favors. This assumes that the IFI can perfectly monitor government spending, ensuring that no resources are diverted toward corruption or political patronage. While this is an extreme assumption—since, in reality, it is difficult to distinguish between legitimate government spending and nepotism, bribes, or politically motivated transfers—it provides a useful theoretical framework. Even if such monitoring were possible, perfect enforcement is unlikely. However, for the sake of analysis, we assume this idealized scenario and examine the effects of this constraint on fiscal policy, which we refer to as a model of "full monitoring." In the next section, we will explore the impact of imperfect monitoring.

The intuition is clearest when we focus on a specific simulation, such as the one shown in Figure 6. This allows us to compare how variables behave under IFI lending with conditionality (dashed

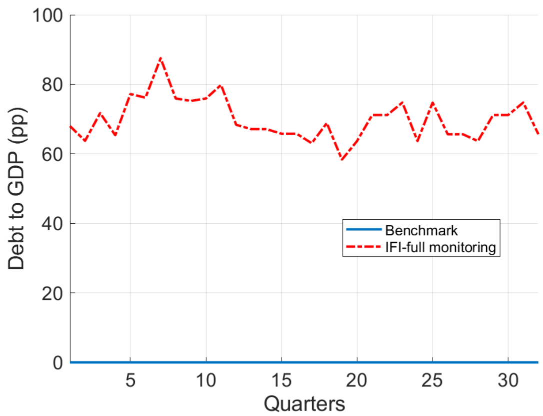
Figure 6: Debt management with IFI debt and conditionality: a Defaulter



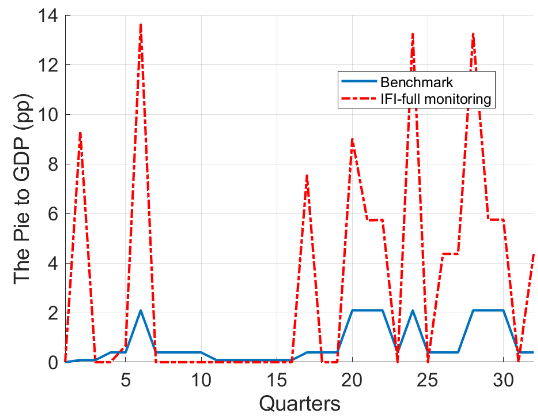
(a) TFP shocks



(b) IFI debt



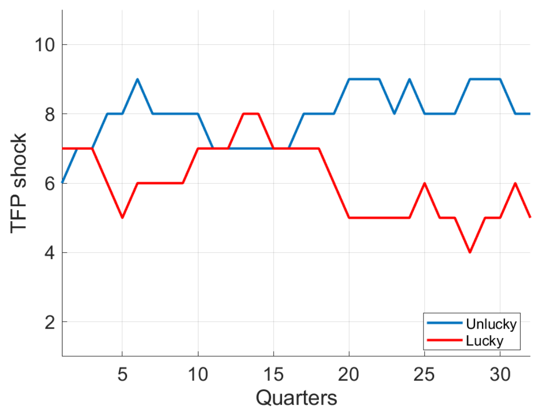
(c) Private Debt



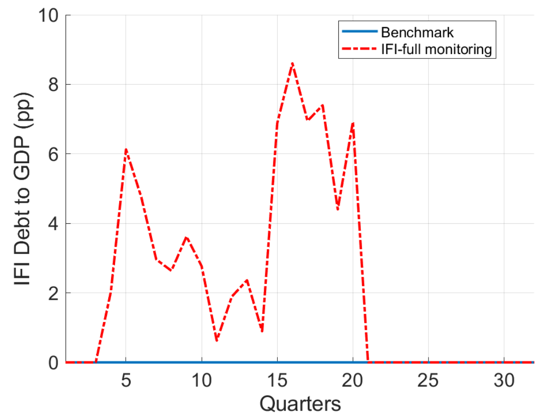
(d) The Pie

red) versus the benchmark model (blue), given a particular sequence of shocks as depicted in Panel (a). Panel (b) illustrates IFI debt as a percentage of output, while Panel (c) shows the evolution of private debt. The size of the 'pie' is depicted in Panel (d). A few key observations emerge: first, the existence of IFI can effectively prevent default. By making borrowing available at a cheaper price when the country is near the default region (e.g. high initial, increasing rates, and unfavorable TFP shocks), the IFI is able to avoid a default. This can be seen by the fact that private debt is zero in the benchmark case, whereas it remains at around 64% in the first period in the IFI-full monitoring case (Panel c, in dashed red). This is a success for the program. However, the country does not implement an austerity program, as the IFI would like. Why? Because it can gamble to keep consuming the pie in good times, and borrow from the IFI in bad times. Hence, some moral hazard remains even with perfect monitoring. Third, the EM's government does not always opt to borrow from the IFI. This happens because when shocks are good, the proposer would rather distribute π_i, something it is unable to do when borrowing from the IFI (e.g., when constraint 16 binds). We can eyeball a negative correlation between the TFP shock and IFI borrowing as a result. Finally, note that when it does not borrow from the IFI, the average size of the pie is significantly larger than in the benchmark case (or even than in the long run). This illustrates that the myopia is exacerbated by the fact that constraint 16 may bind in the future.

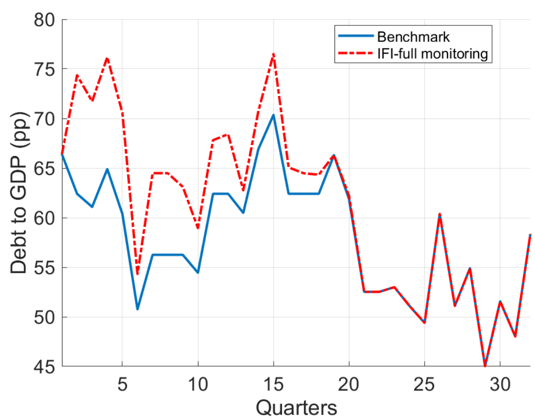
Figure 7: Debt management with IFI debt and conditionality: a Non-Defaulter



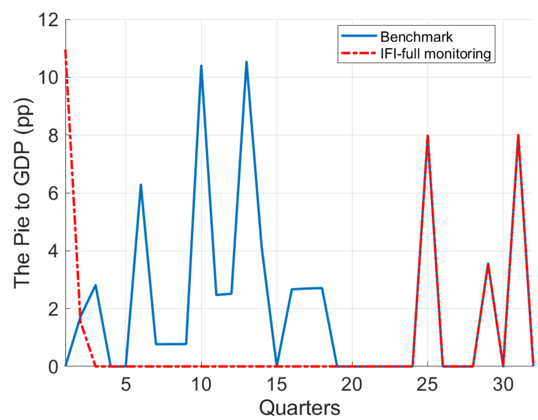
(a) TFP shocks



(b) IFI debt



(c) Private Debt

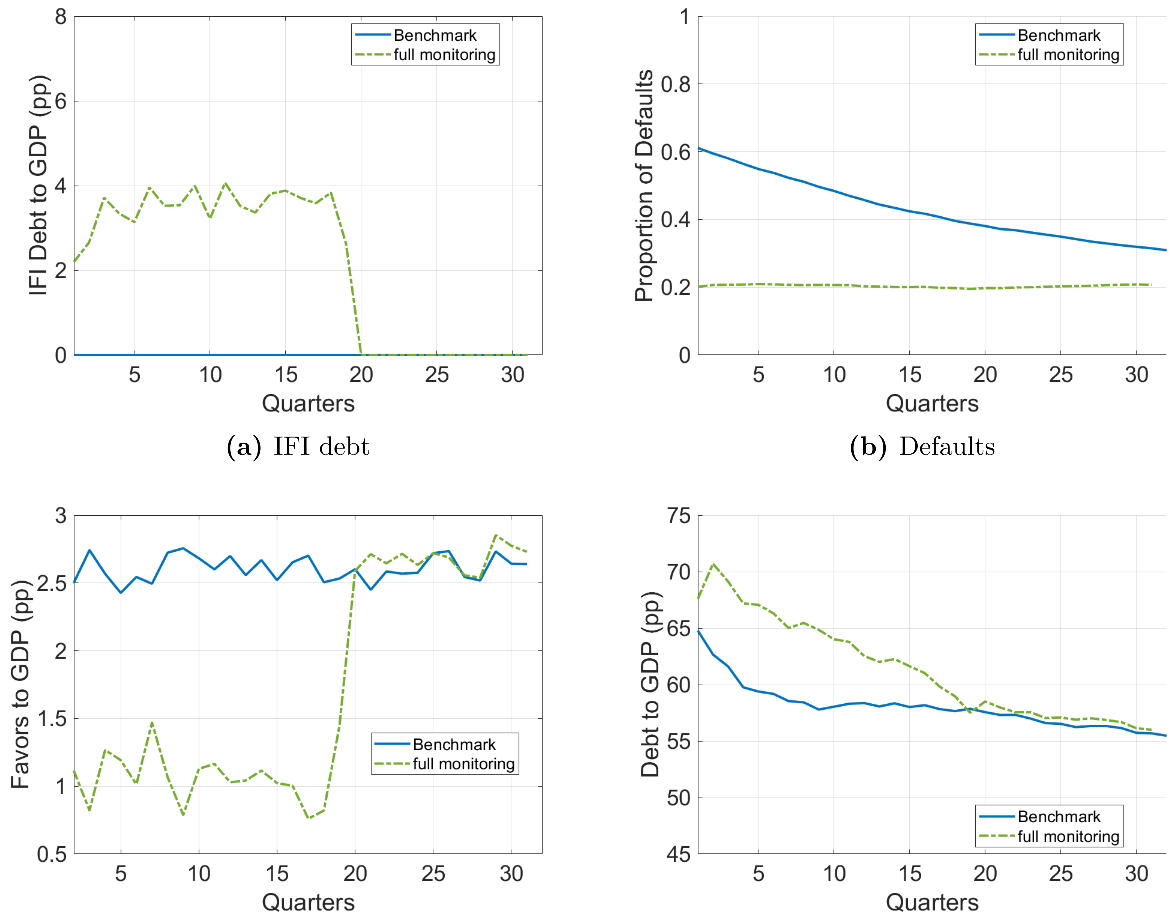


(d) The Pie

In Figure 7 we illustrate a simulation for a different sequence of TFP shocks: one where the initial realization is slightly higher, so the government would not have defaulted in the benchmark case. The blue line of Panel (a) corresponds to the TFP sequence from Figure 6, the 'unlucky case,' whereas the red line corresponds to the new scenario, a 'lucky case.' Panels b-d are all simulated under the 'lucky' TFP sequence, where dashed lines are for the case with IFI debt and solid ones correspond to the benchmark case. Let us only compare the initial period, since the subsequent realizations are determined by a different realization of shocks.

This EM government would not have defaulted absent IFI lending, and it does not default when the program is implemented (note that private debt is the same in the initial period). The proposer does not borrow from the IFI, but the existence of the program induces it to consume a huge Π. In the benchmark, corruption spending would have been zero, because the government would have instated an austerity program. When the IFI is available, the government chooses to *borrow more* instead: It is less prudent because the outside option of being able to borrow from the IFI if bad shocks were to hit reduces the desire to cut down on private debt.

Figure 8: IFI debt with full monitoring: average across simulations



(a) IFI debt

(b) Defaults

(c) The Pie

(d) Private Debt

In Figure 8, we present the average outcomes across simulations for the scenario with full monitoring. Panel (a) shows that, on average, emerging markets borrow around 4% of IFI debt during the program—significantly less than in the scenario without conditionality (see Figure 5). The program is highly effective in preventing defaults, as countries on the brink of default can avert it with relatively small IFI loans. Across the sample, the default rate is around 20%, much lower than in the benchmark case. With conditionality, IFI debt becomes available when countries face severe negative shocks, but remains "expensive" for those that don't need it (i.e., the fortunate ones). The cost does not manifest through the price q_I but rather through the inability to allocate resources to corruption (Π). In our model, countries tend to engage in corruption during good times, not during bad ones. Therefore, monitoring enables the IFI to effectively price out lucky EMs while providing critical support to those facing adverse conditions.

The only disadvantage of the program is that average private debt to output is higher when the program is available. Since program reduces spreads, private debt gets cheaper and borrowing capacity grows even above the benchmark case, increasing the likelihood of "repeat users" of the program. The key problem arises because the existence of the program produces an externality to those EMs who do not use it in terms of reduced spreads (e.g. making future defaults less likely). Rather than using this to their advantage, that is, use the additional funds to reduce the private debt burden, politicians choose to waste them in corruption spending. While the program goes a long way into improving allocations, it is not perfect.

6.3 IMF lending with imperfect monitoring

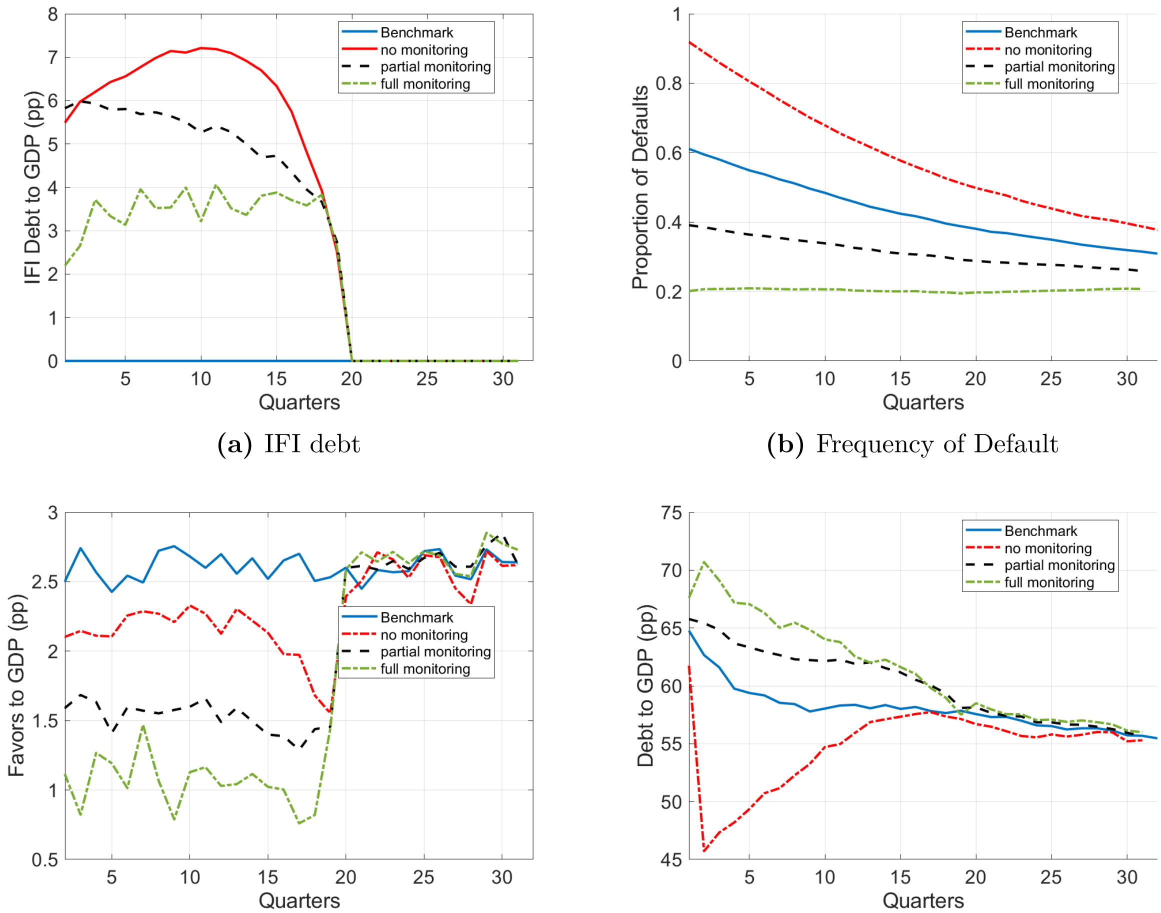
The previous section assumed that the IFI has the perfect capacity to monitor and implement conditionality rules. In this section, we relax this assumption and consider imperfect monitoring. A country that borrows from the IFI at time t, that is with $b_{I,t} > 0$, is subject to monitoring. Politicians get away with engaging in corruption (and can consume the whole $\Pi_t > 0$) with probability φ. With probability $1 - \varphi$ they get caught and lose the pie $\Pi_t = 0$. On expectation, they consume $\varphi \Pi_t$. The conditionality rule can be re-written as

$$\text{IFI Conditionality:} \quad \sum_i \pi_{i,t} = \varphi \Pi_{i,t} \quad \text{if} \quad b_{I,t+1} > 0. \tag{17}$$

We solve the model as in the previous section but replace the constraint eq. (16) with eq. (17). Imperfect conditionality reduces the value of engaging in corruption relative to the no-conditionality case, but less than under perfect monitoring. The question we are after is by how much. Assuming $\varphi = 0.9$, we re-computed our simulation exercise and plotted the results in Figure 9 with dotted black lines.

Even though the ability to detect corruption is significantly small, at 10% efficacy, the conditionality is effective in reducing defaults: at the outset, about 40% of the countries default once the IFI lending program is introduced and this converges down slowly. This value is significantly lower than the case under no conditionality but defaults double relative to the case with full monitoring. When the constraint cannot be perfectly enforced, there is a higher take-up rate of IFI debt and less private borrowing than in the full monitoring case. This suggests that there is a trade-off between tighter constraints and the ability to curb private borrowing. The average amount of corruption spending lies in between the full monitoring and no conditionality case. The figure suggests that as we move φ from 1 (no conditionality) to 0 (full monitoring), the variables in equilibrium will move from the red line toward the green one. To the extent the objective of the program is to provide stability (e.g. reduce defaults) at least temporarily, a tighter rule is better on average.

Figure 9: IFI debt with imperfect monitoring (simulation avg)



(a) IFI debt

(b) Frequency of Default

(c) The Pie

(d) Private Debt

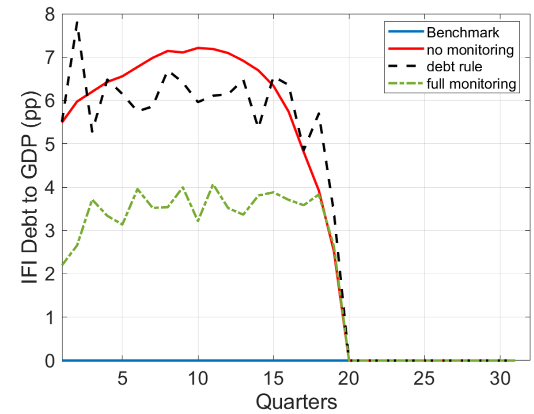
6.4 Quantitative Performance Criteria – Debt Reduction

Implementing anti-corruption monitoring as a conditionality for IFI credit may be ineffective, as countries can employ sophisticated accounting maneuvers to divert resources for corruption spending despite oversight mechanisms. In this section, we propose a debt ceiling rule that is required to be adopted if countries borrow from IFIs. The objective is to assess whether this rule could achieve outcomes comparable to those of an anti-corruption measure but at significantly lower monitoring costs. To this end, we propose the following debt rule to accompany IFI lending:

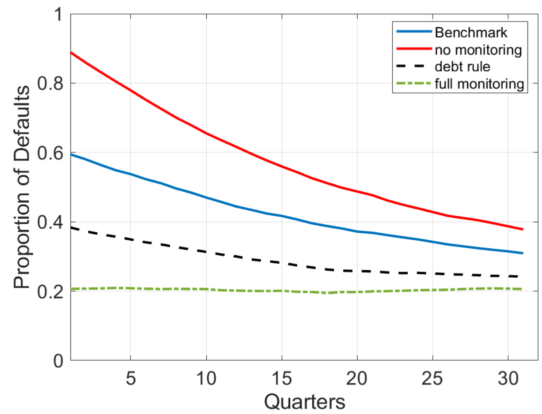
$$\text{IFI Conditionality:} \quad \frac{b_{t+1}}{y_t} \leq \max\left\{\delta\frac{b_t}{y_t}, \frac{\bar{b}}{\bar{y}}\right\} \quad \text{if} \quad b_{I,t+1} > 0, \tag{18}$$

where δ is set to 0.95 in our simulation, and $\frac{\bar{b}}{\bar{y}}$ denotes the long-run debt to GDP ratio (e.g., 53% in our calibration). This conditionality mandates that if the country borrows from the IFI, it must implement an austerity program to reduce private debt by 5 percent of its current debt-to-GDP ratio, as long as this ratio exceeds the long-run average. If the private debt to GDP is already below the long-run average, the EM can no longer increase its debt beyond $\frac{\bar{b}}{\bar{y}}$. Note that, as before, the rule applies only for the case in which $b_{I,t+1} > 0$, that is, as a condition for lending rather than as a permanent structural change imposing a debt ceiling rule in the country. Simulations with this conditionality are plotted as black dashed lines in Figure 18.

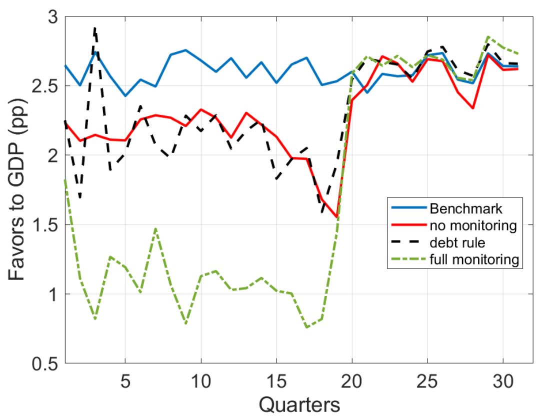
Figure 10: IFI debt with debt rule as a conditionality (simulation avg)



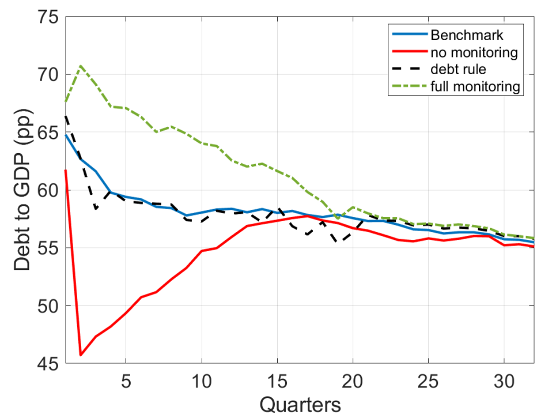
(a) IFI debt



(b) Frequency of Default



(c) The Pie



(d) Private Debt

On average, the country's level of private borrowing remains close to that of the benchmark case but defaults are much smaller (60% vs 40% with the debt ceiling rule). Why does this happen? When IFI debt is introduced, some 'unlucky' EMs (those with bad TFP shocks) who would have defaulted in the benchmark case can now avert default. This force is present in all the scenarios with IFI debt that we discuss in this section. The difference between no-monitoring, full monitoring, and a debt ceiling rule is primarily how continuation values are affected, and hence the price of debt today.

In the no-monitoring scenario, the government is more likely to enter any period burdened by high levels of legacy IFI and private debt that require servicing. This situation raises the cost of debt today and increases the likelihood of immediate default, with simulations showing an initial default rate of 90%, underscoring how anticipated future obligations affect current borrowing decisions. Under full monitoring, countries that want to engage in corruption spending cannot borrow from the IFI, which reduces their overall desire to rely on IFI debt. This has immediate benefits: both private and IFI debt become cheaper, reducing default rates. Furthermore, lower current spending, combined with the availability of IFI debt as a backup option, distances EMs from their default threshold.

With a debt-ceiling rule, the government is restricted from increasing debt within the current period, indirectly limiting corruption spending, and is required to implement an austerity program. This discourages reliance on IFI debt, as shown by the small difference between the red and black dashed lines in the IFI debt-to-GDP plot; the difference remains minimal as the model predicts only a few periods until reaching the pre-default state. Consequently, the government hesitates to use IFI debt or reduce private debt unless absolutely necessary, as any new IFI debt would limit future borrowing capacity once the debt-to-GDP ratio stabilizes, effectively halting additional borrowing altogether.

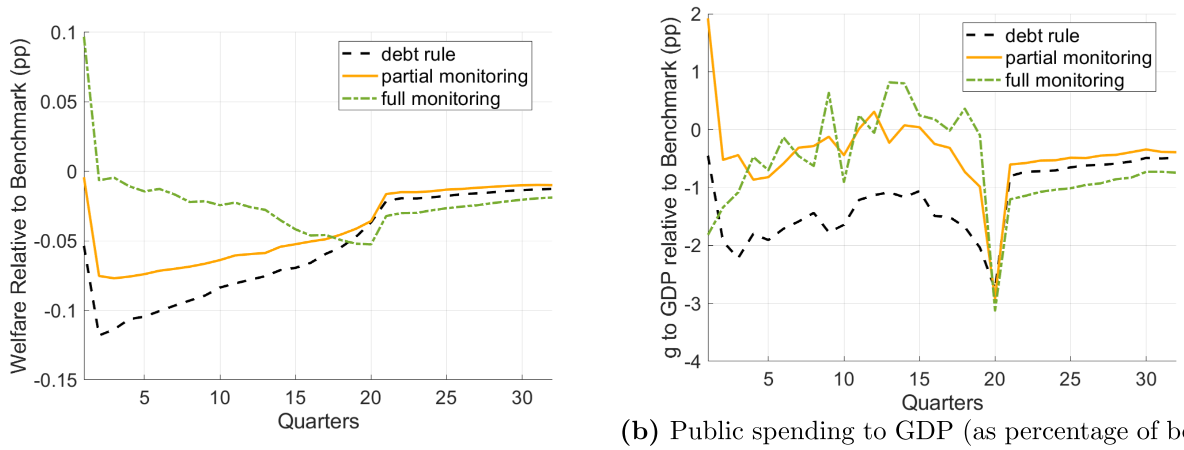
Ultimately, the debt-ceiling rule falls short of the perfect-monitoring approach in preventing defaults, as it allows continued diversion of resources to corruption. As shown in Azzimonti and Mitra (2023a), corruption spending raises the cost of new debt issuance, thereby increasing default risk. We propose that any conditionality not directly targeting corruption will be unable to lower default rates to those achievable with perfect monitoring. This situation creates a clear trade-off for the IFI: the higher costs of perfect monitoring reduce defaults and mitigate moral hazard by discouraging excessive borrowing and recurrent IFI reliance, whereas imperfect monitoring via quantitative performance criteria (QPCs) may lead to increased default rates.

6.5 Which is the best rule?

The answer depends on the IFI's objectives and the costs associated with implementing different conditionality rules. A straightforward success measure might focus on their impact on default rates. Among the rules, full monitoring consistently achieves the lowest default rates, outperforming the alternatives. However, the costs of effectively detecting corruption could be prohibitive, or even unfeasible. In this case, the choice narrows to the other options: imperfect monitoring (where only 10% of corruption spending is detected) and a debt-ceiling rule (which indirectly curtails corruption spending). Both alternatives result in similar default reductions, as shown in Figure 9. However, the debt-ceiling rule is associated with a higher IFI take-up rate and less private borrowing, suggesting potentially higher cost today but a reduced future reliance on the program. Given that debt-ceilings are a more conventional and easy-to-implement type of rule, we might conclude that they offer a viable, though imperfect, alternative.

Alternatively, we can assess welfare gains relative to the benchmark, incorporating not only default rates but also broader fiscal and economic policy dimensions. If the objective extends

Figure 11: Comparing conditionality rules



(a) Welfare gains relative to benchmark

(b) Public spending to GDP (as percentage of benchmark)

beyond financial stability alone, our model allows us to evaluate the overall costs and benefits for agents in the borrowing country. Panel (a) in Figure 11 shows the average welfare gains relative to the benchmark case under different rules, based on our Monte Carlo simulations. Here, imperfect monitoring consistently outperforms a debt-ceiling rule throughout the program's duration.

Why does this occur? The main reason is that while both rules limit spending, thereby curbing excessive borrowing and defaults, imperfect monitoring more directly addresses the root of the problem: by reducing the size of the 'pie,' it targets a limited group within the economy (primarily those in the minimum winning coalition, mwc). This not only reduces default risk but also increases public goods provision relative to the benchmark, as borrowing becomes more affordable (see Panel b of Figure 11). In contrast, the debt-ceiling rule leads to a reduction in public goods provision, as politicians may choose to divert resources for personal benefit rather than for public spending that serves the average citizen. Furthermore, partial monitoring results in lower tax burdens, as there is no need to implement austerity programs upon receiving IFI loans (as required under a debt ceiling) and no opportunity to divert funds to corruption, reducing revenue requirements. This increases labor participation, boosting GDP and private consumption. As a result, welfare gains are higher under imperfect monitoring than under a debt-ceiling rule.

7 Conclusion

Debt management decisions in emerging markets are deeply influenced by their institutional environment. Weak institutions and flawed political processes create incentives for corruption, leading to irresponsible policymaking, such as over-borrowing, overspending, and frequent defaults. The combination of historically low risk-free rates and the pandemic has further heightened EMs' financial fragility. As interest rates rise, these countries face a difficult choice: default or implement harsh austerity measures, with their fate often hinging on the luck of favorable shocks. While fortunate countries may take advantage of the situation by increasing debt and avoiding tough reforms, the less fortunate ones are trapped in a vicious cycle of default, only to borrow heavily once they regain access to financial markets, perpetuating a sovereign debt crisis.

IFI lending programs, while providing short-term relief, can exacerbate this problem by offering an attractive outside option in the event of default, further reducing policymakers' incentives to be prudent and increasing their likelihood of engaging in corruption. This underscores the importance of conditionality in lending programs such as those from the IMF. Effective monitoring, even if applied only to countries borrowing from the IFIs, can help prevent defaults by allowing struggling countries to access funds when needed. However, moral hazard remains an issue, as countries that avoid borrowing still benefit from lower spreads and more lenient financial conditions, enabling them to increase borrowing and corruption. Imperfect monitoring can reduce monitoring costs as well as the moral hazard of over-borrowing at the cost of higher defaults.

When monitoring corruption is not feasible or appears to be an intrusion on sovereignty, the IFIs may resort to Quantitative Performance Criteria. In this paper, we considered a guided debt reduction strategy paired with a debt ceiling. Both imperfect monitoring and a debt-ceiling rule allow some resources to be diverted toward corruption spending, so while they are less effective at reducing defaults than perfect monitoring, they significantly discourage IFI debt uptake during relatively stable periods. The choice of rule ultimately depends on the IFI's objectives. If the primary goal is merely to reduce defaults, a debt-ceiling rule may be sufficient. However, if IFI loans are contingent upon anti-corruption measures, this approach delivers greater welfare gains relative to a debt ceiling rule. This happens because under an anti-corruption conditionality rule, taxes are generally lower, boosting private consumption, while government spending is directed more towards public goods rather than costly political favors.

Finally, it is essential to recognize that none of these strategies address the underlying institutional weaknesses in countries reliant on IFI debt. A gap remains in multilateral policy-making to design and implement irreversible structural reforms in emerging markets, specifically targeting corruption, that could foster a more sustainable, long-term impact. Establishing such structural policies is crucial for building resilience in EMs and reducing reliance on conditional lending alone.

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