External Shocks versus Domestic Policies in Emerging Markets

Emilio Espino, Julian Kozlowski, Fernando M. Martin, and Juan M. Sánchez

Abstract

Debt crises in emerging markets have been linked to large fiscal deficits, high inflation rates, and large devaluations. This article studies a sovereign default model with domestic fiscal and monetary policies to understand Argentina's experience during the 2000s commodity boom (2005–2017), following the default of 2001. The model suggests that domestic policies played a critical role in Argentina's poor economic performance. Despite exceptionally favorable terms of trade, a rise in government spending led to higher taxation, inflation and currency depreciation, and lower output. Economic performance would have been worse had Argentina followed a strict, rather than accommodative, monetary policy without curbing its expansionary fiscal policy. Finally, limited access to international credit markets during this episode did not appear to play a significant role.

JEL codes: E52, E62, F34, F41, G15

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1. INTRODUCTION

Inflation, exchange rates, and fiscal deficits play key roles in sovereign debt crises. Revisiting the history of Latin America, Kehoe, Nicolini, and Sargent (2020) argue that "despite their different manifestations, all economic crises in Latin America have been the result of poorly designed or poorly implemented macro-fiscal policies." On the other hand, there is a long tradition connecting domestic economic performance to external factors. For example, Drechsel and Tenreyro (2017), Fernández, Schmitt-Grohé, and Uribe (2017) and Fernández, González, and Rodríguez (2018) find a significant contribution of commodity price shocks to output fluctuations.

In this article, we contribute to the classic debate on whether external factors or domestic policies explain the poor economic performance of emerging countries. To this effect, we study the experience of Argentina following the default of 2001, specifically between 2005 and 2017. Two driving forces, favorable terms of trade, and an increase in government expenditure go a long way in explaining the country's macroeconomic performance during that period. Our exercise suggests that government expansion accounted for the rise in taxation, inflation, and currency depreciation and kept output growth low, countering the benign effects of favorable terms of trade. We also argue that following a strict monetary policy, though potentially successful in containing inflation and currency depreciation, would have been detrimental without addressing the rise in spending. Finally, we find that varying Argentina's access to international credit markets does not alter the story significantly.

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Our analysis employs the framework developed by Espino, Kozlowski, Martin, and Sanchez (2022, hereafter EKMS). The economy is a version of a tradable-nontradable (TNT) small open economy (as in Uribe and Schmitt-Grohé, 2017, §8), extended to include production, money, and sovereign default. The government makes transfers and provides a public good, and it obtains resources from labor taxes, money creation, and external debt issued in foreign currency. Each period, the government may choose to repudiate the debt, at the cost of temporary exclusion from international credit markets and lower productivity. Importantly, the government lacks the ability to commit to future policies.

The experience of Argentina from 2005 to 2017 allows us to use the model to shed light on the debate of the role of external factors and government policy in explaining macroeconomic outcomes. During this period, Argentina experienced favorable terms of trade due to a global boom in commodity prices. At the same time, government spending grew considerably and taxation and inflation rose significantly. In our analysis, we take the term-of-trade boom and the rise in government spending as given and let the model predict debt, taxes, inflation, currency depreciation, and output. We also conduct several counterfactuals to understand the role of exogenous and endogenous factors.

We obtain four main results. First, our model simulations imply that the rise in government spending, coupled with an accommodative monetary policy, was the main driver of higher taxation and inflation and lower output. In other words, domestic policy was to blame for Argentina's poor economic performance. Absent the expansion of government, the boom in commodity prices would have implied a rise in real output.

Second, the interaction of fiscal and monetary policies played an important role. If Argentina had followed a strict monetary policy by fixing the money growth rate, inflation would have been contained at the cost of even higher taxation. The result would have been lower output. One could further conjecture that an unwillingness to raise taxes to accommodate a strict monetary policy in this counterfactual scenario might eventually lead to debt crisis.

Third, the simulations and counterfactuals suggest that the boom in commodity prices might have facilitated the rise in government spending. In our benchmark scenario, inflation rises 10 percentage points between 2006 and 2012, which closely matches the experience for Argentina. In the absence of a commodity boom, the increase in inflation would have been 15 percentage points. Similarly, gross domestic product (GDP) expressed in US dollars would have decreased rather than increased and would have limited Argentina's ability to borrow internationally when it reentered credit markets in full in 2016.

Finally, we find that exclusion from international credit markets did not play a major role in explaining domestic policies or macroeconomic performance. We show this result by running a counterfactual in which the government gains full access to international debt markets in 2005 instead of 2016. Although the government would have used debt upon reentry (driving the debt-to-GDP ratio to be 10 percentage points larger by 2016), the evolution of the model's main variables is affected in only a minor way. However, we find that earlier debt accumulation would have lowered Argentina's capacity to handle the adverse shock to its terms of trade that occurred in 2013.

The rest of the article is structured as follows. Sections 2 and 3 describe the model and its calibration, respectively. Section 4 details the main analysis, which studies the case of Argentina in 2005–2017. Section 5 concludes.

2. MODEL

In this section we briefly describe the main ingredients of the model. For a full characterization and analytical results, see EKMS.

Preferences, Endowments, and Technology. A large number of identical infinitely lived agents live in a small open economy. A nontradable good is produced (y^N), and it is consumed domestically (c^N) and is also used as the only input by the government to produce a one-to-one public good, g. A tradable good is imported for domestic consumption (c^T) but cannot be produced locally. Finally, another tradable good is produced domestically (y^T) and is exported for foreign consumption.

The representative household has one unit of time each period to use for leisure, ℓ, or work, h. Thus, $\ell + h = 1$. A time-separable, expected discounted utility function represents preferences. Let the period utility be given by

$$u(c^N, c^T) + v(\ell) + \vartheta(g),$$

where u, v, and ϑ are strictly increasing, strictly concave, C^2, and satisfy standard boundary conditions. Agents discount the future by factor $\beta \in (0, 1)$.

An aggregate production technology transforms hours worked, h, into nontradable output, y^N, and exported goods, y^T. This technology can be represented by a cost function $F : \mathbb{R}^2_+ \to \mathbb{R}_+$, which is strictly increasing, strictly convex, and homogeneous of degree 1. Given h, feasible levels of (y^N, y^T) must satisfy

$$F(y^N, y^T) - h \leq 0. \tag{1}$$

The technological possibilities described by F will depend on the government's default decision. Specifically, there will be a productivity penalty while the country is excluded from international credit markets due to past default. This dependence is omitted here for convenience, and we specify it explicitly in Section 3.

Market Structure. Agents can exchange tradable and nontradable goods and domestic currency (fiat money). The international price of exported goods, p^T, is exogenous and denominated in dollars, while the international price of imported goods is assumed to be 1. Thus, p^T is also the terms of trade. Nominal variables, normalized by the stock of the aggregate supply of money, are domestic prices p^N, wages w, exchange rate (units of domestic currency per unit of foreign currency) e, and money holdings m. The growth rate of the money supply is represented by μ.

Households must use cash to purchase nontradable goods, so they face the cash-in-advance constraint

$$p^N c^N \leq m. \tag{2}$$

This constraint implies that (normalized) expenditure on nontradable goods, $p^N c^N$, cannot exceed (normalized) money holdings at the beginning of the period, m.

Government Budget Constraint. Government uses of funds consist of (i) endogenous government purchases, g; (ii) exogenous lump-sum nonnegative transfers to households, γ (expressed in units of the nontradable good); and (iii) payments of maturing external debt, B. The government has three sources of funds at its disposal: (i) endogenous labor income taxes, τ; (ii) endogenous growth of the money supply or seigniorage, μ; and (iii) one-period external debt denominated in foreign currency, B'. New debt is issued to international lenders at discount price Q. The government budget constraint, expressed in units of local currency, is then

$$p^N(g + \gamma) + eB \leq \tau wh + \mu + eQB'. \tag{3}$$

Note that external debt payments and issuance is multiplied by the exchange rate since debt is denominated in foreign currency.

Balance of Payments Constraint. The relationship of the country with the rest of the world must satisfy the following balance of payments constraint:

$$p^T y^T - c^T = B - QB', \tag{4}$$

where the left-hand side represents the trade balance and the right-hand side net-external borrowing. Note that the balance of payment is expressed in units of foreign currency.

If we combine (3) and (4), we can express the government budget constraint as the relationship between the external sector (the trade balance) and the public sector (the primary surplus plus seigniorage):

$$\tau wh - p^N(g + \gamma) + \mu - e(p^T y^T - c^T) \geq 0. \tag{5}$$

International Lenders. The debt prices used in equations (3) and (4) are determined by risk-neutral international lenders. They must make zero-expected profits in equilibrium. The price of debt $Q(B', s)$ depends both on the amount borrowed, B', and the exogenous state of the economy, s. The state s may include any variable that evolves over time, e.g., the terms of trade, p^T. The zero-profit condition implies the following functional equation for debt prices:

$$Q(B', s)B' = \frac{\mathbb{E}\left[\mathcal{P}(B', s')|s\right] B' + \mathbb{E}\left[(1 - \mathcal{P}(B', s'))Q^d(s')|s\right] B^d}{1 + r}. \tag{6}$$

Here, $\mathcal{P}$ represents the repayment probability (explained below); B^d is the renegotiated level of debt, which is exogenous; and $Q^d(s')$ stands for the price of debt in default. The first term in (6) represents the expected value

in case of repayment and the second term the expected value in case of default. The price of debt in default must satisfy

$$Q^d(s') \equiv \delta Q(B^d, s') + \frac{(1-\delta)\mathbb{E}[Q^d(s'')|s']}{1+r}.$$

The Representative Firm and the Resource Constraint. Local firms hire domestic labor at wage w to produce nontradable and tradable goods using the technology F. The assumption that there are constant returns to scale implies that the industry behaves as if there were a representative firm solving

$$\max_{y^N, y^T, h} \{p^N y^N + ep^T y^T - wh\},$$

subject to (1).

Since households are identical, c^N, c^T, and h are also aggregate quantities. Thus, the resource constraint in the nontradable sector is

$$c^N + g = y^N. \tag{7}$$

Representative Household. The decisions made by households depend on aggregate and individual state variables. First, there are endogenous state variables, which depend on government choices: the beginning-of-period government debt, B, and the current default decision, $\mathcal{I}$. Next, there is the exogenous state of the economy, represented by s, which includes any variable that varies over time (for example, export prices p^T). Finally, the individual state variable is the household's (normalized) money balances at the beginning of the period, m. Also note that households know the evolution of all aggregate variables and how prices and policies depend on the aggregate state.

The household budget constraint is given by

$$p^N c^N + ec^T + m'(1+\mu) \leq (1-\tau)wh + m + p^N \gamma. \tag{8}$$

The left-hand side of the household budget constraint represents the expenses in nontradable ($p^N c^N$) and imported consumption (ec^T), and money holdings for the next period ($m'(1+\mu)$). The right-hand side represents its resources: labor income net of taxes ($(1-\tau)wh$), money holdings (m), and transfers ($p^N\gamma$).

The household's problem is given by

$$V(m, B, \mathcal{I}, s) = \max_{(c^N, c^T, m', h)} u(c^N, c^T) + v(1-h) + \vartheta(g) + \beta\mathbb{E}\left[V(m', B', \mathcal{I}', s')|B, \mathcal{I}, s\right],$$

subject to (2) and (8), and where $V(m, B, \mathcal{I}, s)$ represents the value for a household starting the period with individual (normalized) money holdings m and aggregate state $(B, \mathcal{I}, s)$.

Government Problem. At the beginning of each period, once the exogenous state s is realized, the government chooses between default and repayment. If it decides to repay its debt, B, it chooses the new level of debt, B', labor income taxes, τ, the growth rate of money, μ, and government purchases, g—recall that transfers to households, γ, are exogenous. When making these choices, the government takes into account the response of domestic firms, domestic households, and international lenders to the new set of policies. It is further restricted by the balance of payments (4), the government budget constraint (5), and the resource constraint for nontradable goods, (7).

The government takes as given how future policy will respond to future shocks and the inherited amount of debt. If the government decides to default, it is excluded from international credit markets. It regains access at the beginning of the period with probability δ with a renegotiated level of debt $B^d \geq 0$, which is exogenous. While the country is in default, it experiences a productivity penalty $\Omega(s)$ (detailed below) that depends on state s. EKMS explain how the government problem can be written recursively, using what is known as the *primal approach*, and characterize the main trade-offs faced by the government.

3. CALIBRATION

We now describe the functional forms adopted for the quantitative analysis, discuss the sources of the parameters set externally, and explain how we set the remaining parameters' values to match some relevant statistics. The calibration is similar to EKMS, so we discuss it briefly here.

3.1 Functional Forms

The utility functions for consumption and leisure are

$$\begin{aligned} u(c^N, c^T) &= \alpha^N \frac{\left(c^N\right)^{1-\sigma}}{1-\sigma} + \alpha^T \frac{\left(c^T\right)^{1-\sigma}}{1-\sigma}, \\ v(\ell) &= \alpha^H \frac{\ell^{1-\varphi}}{1-\varphi}, \\ \vartheta(g) &= \alpha^G \ln g. \end{aligned}$$

Under this specification, $1/\sigma$ is both the intratemporal elasticity of substitution between c^N and c^T and the intertemporal elasticity of substitution.

The function specifying how much labor is required for production is

$$F(y^N, y^T) = \frac{\left[\left(y^N\right)^\rho + \left(y^T\right)^\rho\right]^{1/\rho}}{A}.$$

Note that A represents labor productivity and ρ is the parameter determining how easy it is (in terms of labor units) to change from the production of y^N to y^T.

Finally, following Arellano, 2008, productivity in default takes the following form:

$$A^{def} = A \times [1 - \Omega(s)] \tag{9}$$

with

$$\Omega(s) = \max\left\{\omega_1 + \omega_2\left(\frac{s-\bar{s}}{\bar{s}}\right), 0\right\}. \tag{10}$$

The key parameters are $\omega_1 > 0$ and ω_2 (which is a vector if there are multiple shocks). With this specification, the default cost depends on the deviation of the shock, s, from its steady-state value $\bar{s}$.

3.2 Exogenous Parameters

Table 1 shows the values of the parameters set externally. For most of these parameters, we follow the same strategy as in EKMS. The risk-free interest rate is 3 percent to coincide with the average real interest rate of the world since 1985 in King and Low, 2014. The value of φ to 1.50 reproduces a Frisch elasticity of one-half (on average). The parameter δ determines the length of exclusion after default. We chose $\delta = 1/6$ so that that duration is six years, in line with the length of restructuring negotiations in Das, Papaioannou, and Trebesch, 2012 and the length of exclusion after restructuring from Cruces and Trebesch, 2013.

Recall that σ captures the intratemporal elasticity of substitution between c^N and c^T. This parameter is important for the impact of inflation. EKMS show that with $\sigma = 0.5$, the model reproduces well the response of inflation to shocks. This value is in line with estimates in Ostry and Reinhart, 1992. The value of ρ, which determines the elasticity of substitution between y^N and y^T in production, is set to $\rho = 1.5$. Hence, F is convex; i.e., the production possibilities frontier is concave.

Terms-of-trade shocks follow

$$\ln(p^T_{t+1}) = \rho_p \ln(p^T_t) + \varepsilon_{t+1},$$

where $\varepsilon \sim N(0, \sigma_p^2)$. We set $\rho_p = 0.8803$ and $\sigma_p = 0.0756$ as estimated in EKMS. These terms-of-trade shocks will be the first out of three external shocks that we consider in the next section.

3.3 Endogenous Parameters

To determine the value of the remaining parameters, we target averages of macroeconomic variables for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay for 1991–2018.[1] Although all the parameters are jointly calibrated, there is a close connection between some parameters and targets. The steady-state value of labor productivity A is normalized so that real GDP is 1 in steady state. The discount factor β allows the model to reproduce the target inflation rate of 3.8 percent. The transfer level γ helps match the ratio of transfers to GDP, which in the data averages 11.7 percent. The weight of leisure in utility, α^H, can be picked so that the model reproduces the long-run average for the employment-to-population ratio, 0.59. The weight of the

1. The corresponding expressions for each target are presented in Appendix Appendix 1.

Table 1
Exogenous Parameters

Parameter	Description	Value	Basis
r	Risk-free rate	0.03	Long-run average
φ	Curvature of leisure	1.50	Frisch elasticity
δ	Reentry probability	0.17	Exclusion duration
α^T	Preference share for c^T	1.00	Normalization
σ	Curvature of $u(c^N, c^T)$	0.50	See EKMS
ρ	Elasticity of substitution between y^N and y^T	1.50	See EKMS
ρ_p	Persistence of p^T	0.88	See EKMS
σ_p	Standard deviation of shocks to p^T	0.076	See EKMS

Table 2
Calibration Parameters and Targets

Parameter	Value	Statistic	Target	
			Data	Model
A	1.4575	Real GDP	1.000	0.995
β	0.8675	Inflation, %	3.800	4.210
γ	0.1082	Transfers/GDP	0.117	0.118
α^N	2.6888	Exports/GDP	0.209	0.208
α^H	0.9265	Employment/Population	0.587	0.586
α^G	0.4240	Gov. Purchases/GDP	0.133	0.133
B^d	0.149	Debt/GDP	0.185	0.172
ω_1	0.059	Haircut, Share of Debt	0.305	0.213
ω_2	0.656	Semi-Elasticity Spreads	-0.054	-0.053
κ	0.0235	Default, %	2.500	2.658

public good in utility, α^G, is helpful to reproduce government purchases over GDP of 13.3 percent. Similarly, the weight of nontradable consumption in utility, α^N, allows the model to reproduce the ratio of exports to GDP, which is 21 percent in the data. The next section considers unanticipated shocks to both γ and α^G as the second and third sources of external shocks.

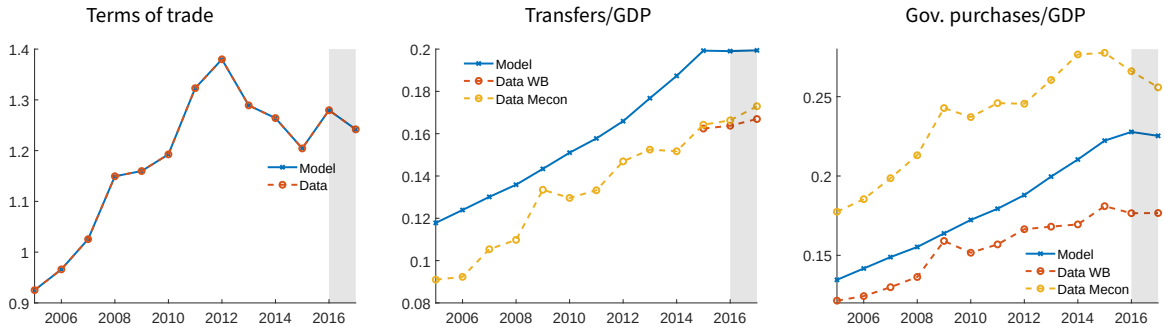
The parameters determining the cost and benefits of defaults, ω_1 , ω_2, and B^d, are crucial in determining the implied haircut obtained by the country in default, the external debt-to-GDP ratio, and the semi-elasticity of spreads to terms-of-trade shocks. In addition, random additive shocks to utility influence the decision to repay or default; see EKMS. The scale parameter's value of this distribution, κ, helps reproduce a probability of sovereign default of 2.5 percent annually.

4. EXTERNAL SHOCKS VERSUS DOMESTIC POLICIES: ARGENTINA 2005–2017

One of the classic debates in explaining outcomes in emerging countries concerns the role of external factors and government policy. In Latin America, there is a long tradition connecting economic performance with the evolution of commodity prices. In recent work, Drechsel and Tenreyro (2017) and Fernández, González, and Rodríguez (2018) find that the contribution of commodity price shocks to output fluctuations is close to 40 percent. Poor economic performance is also attributed to government policy, e.g., high fiscal deficits and inflation. As mentioned above, Kehoe, Nicolini, and Sargent (2020) take this view and argue that economic crises in Latina America are mainly driven by inappropriate monetary and fiscal policies.

This section sheds light on this debate by studying the case of Argentina, from 2005 to 2017, through the lens of our model. During this period, Argentina fits the profile of a commodity-exporting emerging economy with rising fiscal deficit and inflation. The country experienced favorable terms of trade (good luck) due to a global boom in commodity prices. At the same time, government spending grew considerably and inflation rose significantly. Our exercise consists of simulating the Argentine experience and running counterfactuals to understand the role of external factors (favorable terms of trade) and domestic policy (increased government expenditure coupled with accommodative monetary policy).

Figure 1
Exogenous Changes



NOTE: The shaded areas correspond to the period in which Argentina had access to credit markets. "WB" is the World Bank, and "Mecon" is the Ministry of Economics in Argentina. For terms of trade, we report the data of the World Bank. Appendix 2 provides more details on the data sources.

4.1 Calibrating the Driving Forces

After the default of 2001, Argentina only had a limited number of debt issuances until 2016. To capture this period, we assume that between 2005 and 2015, the country was excluded from international credit markets but was no longer suffering a total factor productivity (TFP) penalty for being in the default state. The assumption of exclusion is evaluated below in a counterfactual exercise. The assumption of no TFP cost is motivated by two facts: (i) the period of analysis starts toward the end of the expected exclusion period, and (ii) there was no output boom when Argentina fully reentered credit markets in 2016.[2]

Except for the changes outlined above, we use the calibration from Section 3, which, as detailed, targets the average of several Latin American countries for 1991–2017. We use this economy as a benchmark and subject it to the changes in terms of trade and government spending experienced by Argentina from 2005 onward.

The terms of trade are expected to evolve as described in the previous section, and thus the simulation follows a particular realization path, as observed in the data. The initial value for the terms of trade are set at $p^T = 0.913$, which, in the data, matches the value in 2005 relative to the average between 1991 and 2017.[3] The increase in government expenditure is modeled as a series of unexpected, permanent shocks. Since the actual levels in Argentina do not exactly match our calibration, we instead target the changes in government transfers and purchases. Specifically, we model a series of unexpected and permanent increases in two model parameters. First, we increase the transfer γ to match the increase in transfers to GDP in the data (middle panel). We then raise the multiplicative parameter in the government good's utility function, α_G, to match the increase in government purchases to GDP (i.e., $p^N g/GDP$; see right panel).[4]

Figure 1 shows the evolution of the exogenous driving forces of the Argentine experience. The blue solid lines show the outcomes from the model simulation, while the other lines represent data according to different sources, as appropriate. The left panel shows the evolution of the terms of trade, and the other two panels show the increase in transfers and purchases, both in terms of GDP.

We compare the evolution of key macro variables in the model to those in the data to show that the simulation captures the Argentine experience reasonably well. Figure 2 presents the evolution of six macroeconomic variables.[5] The top panel shows that the tax-revenue-to-GDP ratio and inflation increased significantly to finance government expansion while debt grew once the country reentered credit markets. The bottom left panel shows that the currency depreciation rate also increased during this period.[6] The other two bottom panels show that the paths for real GDP and GDP measured in dollars match the data well. Overall, these findings suggest that although other things occurred in Argentina during this period, the driving forces we model capture a significant share of the macroeconomic performance.

2. Note that we maintain the assumption that the country would experience a TFP penalty if it were to default in the future.

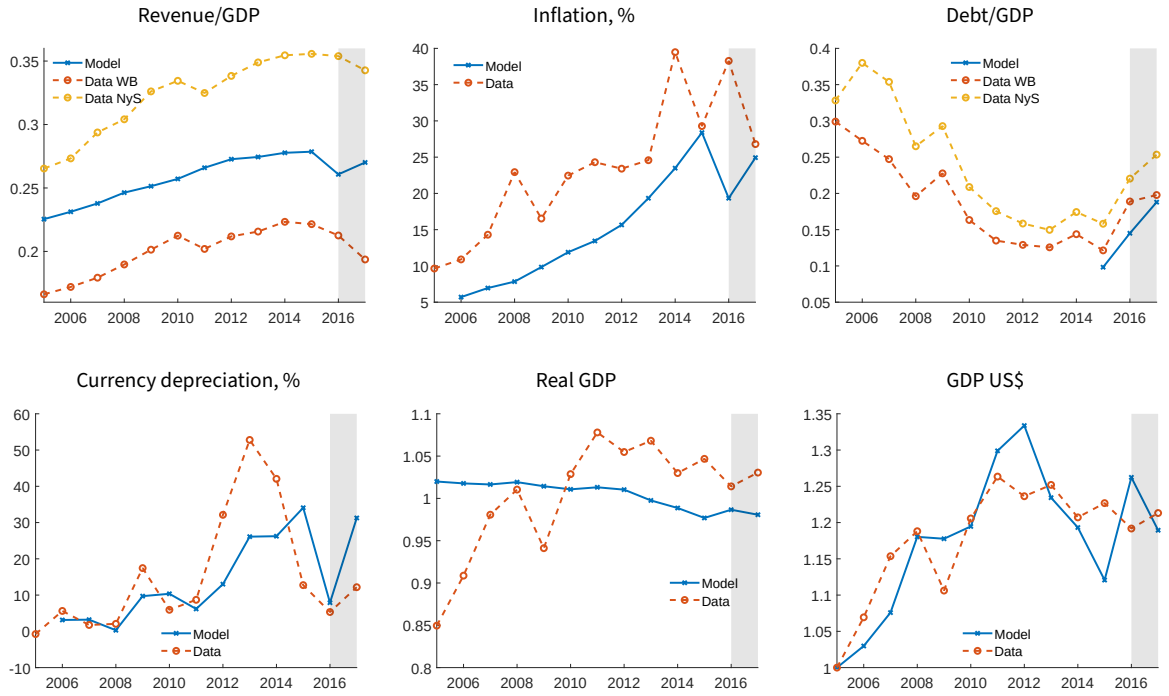
3. We also computed the exercises for different initial values of p^T. Our results do not change fundamentally if we instead started at the average value for the terms of trade.

4. Specifically, we assume that between 2005 and 2015, γ and α_g grow at 5.14 percent and 6.40 percent per year, respectively.

5. The exercise starts in 2005, so the model predictions for inflation and currency depreciation start in 2006 as both of these variables depend on the previous year's Consumer Price Index (CPI) and exchange rate, respectively.

6. During part of this period, Argentina had multiple nominal exchange rates. The figure shows the devaluation in the black market rate (as reported in recent updates of the data set constructed in Ferreres, 2005).

Figure 2
Comparison of Key Macro Variables—Model versus Argentina



NOTE: The shaded areas correspond to the period in which Argentina had access to credit markets. "WB" is the World Bank, and "NyS" corresponds to recent updates of the data set constructed by Ferreres, 2005. Data for inflation are from "NyS." For depreciation, exchange corresponds to the black market as reported in "NyS." Real GDP is from the World Bank, and GDP in US$ is from "NyS." Appendix 2 provides more details on the data sources.

4.2 The Role of External Factors and Domestic Policy

Having shown that the model fits the evolution of macroeconomic variables in Argentina reasonably well, we proceed to perform some counterfactual exercises. First, to isolate their relative contribution, we run our simulations assuming that only one of the driving forces is present at a time. Figure 3 shows the evolution of several macroeconomic variables under alternative scenarios. First, we consider the case with only shocks to the terms of trade, and we keep the values of α^G and γ at the original level. Second, we consider only the shocks to fiscal expansion and keep the terms of trade constant at the original level. Third, we also show the benchmark with all shocks for comparison.

The improvement in the terms of trade does not contribute to the increase in government purchases, though it has a clear effect on revenue. Similarly, more favorable terms of trade do not explain the increase in inflation and depreciation, but they do contribute to short-term fluctuations in these variables. We can also see that the rise in the terms of trade has a positive effect on real GDP.

On the other hand, the expansion of government spending explains the rise in inflation and currency depreciation and, in part, the increase in tax revenue. The permanent nature of these changes implies that the impact on debt is minor. Importantly, the increase in distortions associated with larger government expenditure (purchases and transfers) proves a significant drag to the real economy, pushing real GDP down.

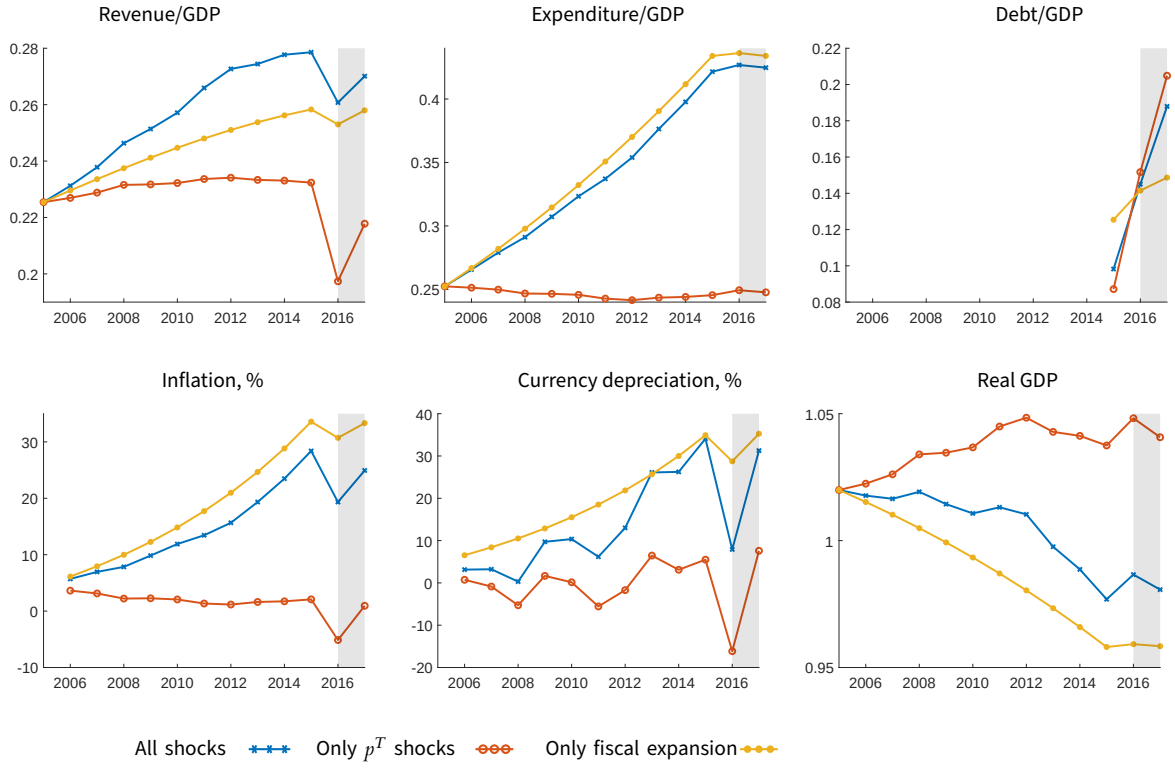
Our simulations suggest that had there not been a dramatic expansion of the government, Argentina would have reaped the benefits of favorable terms of trade: inflation and currency depreciation would have been low and output high. However, the rapid expansion of foreign currency debt after the country regained access to credit markets appears entirely attributable to international circumstances rather than to the profligacy of its government.

4.3 The Role of Monetary Policy

A natural follow-up question is what would have happened if Argentina adopted a more disciplined monetary policy. In a follow-up article, we study the role and welfare effects of fiscal and monetary rules in emerging markets—see Espino et al. (2023). Here, we study the effect of a monetary rule in a specific context.

Figure 4 shows the effects of assuming a constant money growth rate throughout this period, a type of

Figure 3
Evolution of Key Macro Variables in Alternative Scenarios



policy that was eventually adopted in late 2018 to curb inflation.[7] Relative to our benchmark, this monetary policy would have kept inflation low and stable (except for the year in which the country reentered international credit markets). In addition, currency depreciation would have mostly been explained by the variation in the terms of trade. Note that seigniorage (defined as μ over GDP) is about 3 percent in 2005 and would have decreased with a constant μ. However, in the benchmark simulation with the fiscal expansion, seigniorage increases to about 14 in 2014. However, implementing a constant money growth rate would have required a significant increase in taxation to finance the expansion of government. This suboptimal choice of distortions would have resulted in a lower real GDP.

To better understand the countercyclical role of policy in offsetting terms-of-trade shocks, we now focus on 2013, when the terms of trade fell by 6.6 percent after reaching their peak in 2012. Relative to the benchmark, the impact of this event when adopting a constant monetary policy is smaller on inflation (0.8 percentage points versus 3.7 percentage points) and currency depreciation (8.6 percentage points versus 13.1 percentage points). However, taxes should have increased more (2.3 percentage points versus 0.2 percentage points), so the decline in real GDP is even more significant (–1.7 percent versus –1.3 percent).

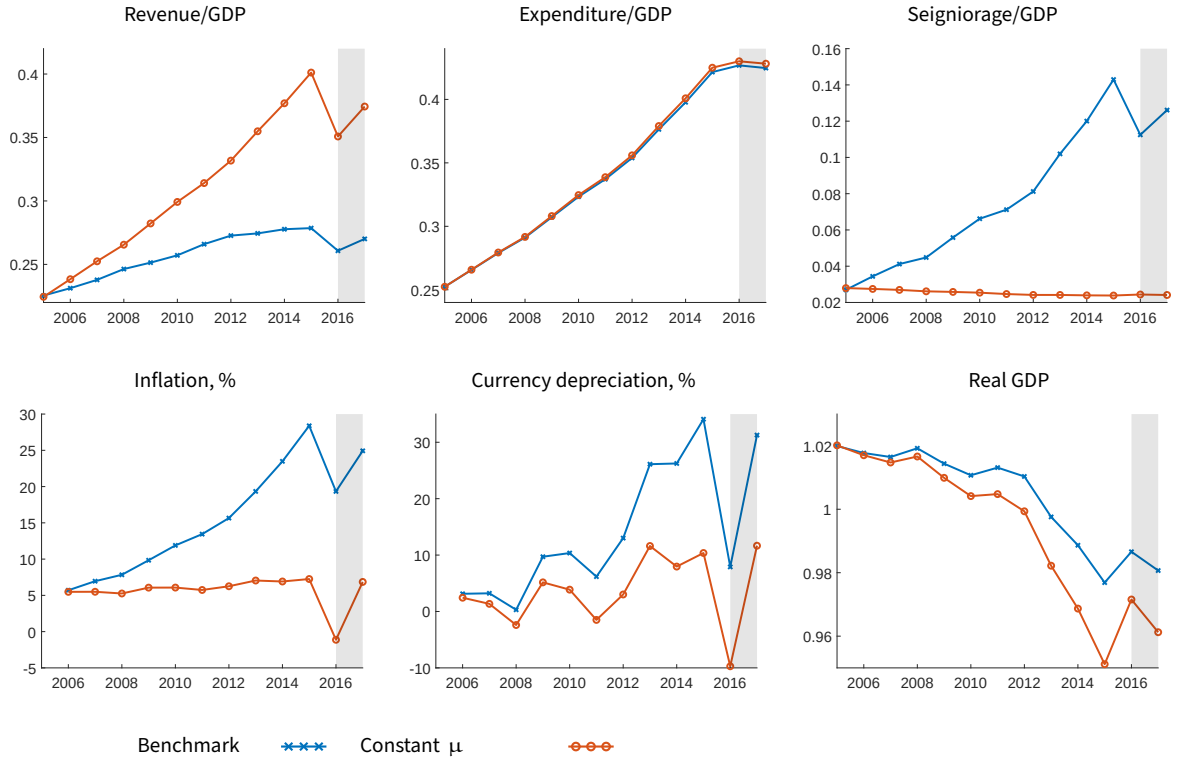
These results provide a cautionary tale for policy recommendation: implementing a conservative monetary policy in the face of an expanding government may succeed in keeping inflation under control but without addressing the underlying fiscal imbalance, and so it may also lead to a deeper economic recession. In addition, a strict monetary policy hinders the government's ability to handle external shocks. In our counterfactual exercise, we have allowed revenue to adjust as necessary, so the cost is borne by the real economy in the form of lower real output due to higher distortions. One could also imagine a scenario in which taxes cannot be raised sufficiently due to political considerations. If the central bank were not to relent under these circumstances, this scenario might eventually lead to a debt crisis.

4.4 The Role of Exclusion from International Credit Markets

We have assumed that the country was excluded from international credit markets from 2005 to 2015 since, in reality, access to external credit was minimal during this period. We now study the role of this exclusion by simulating an economy that can issue external debt throughout the entire period. The red lines in Figure

7. In our simulation, we set the money growth rate equal to the average rate in the benchmark economy, $\mu = 0.0418$.

Figure 4
Evolution of Key Macro Variables When μ Is Constant

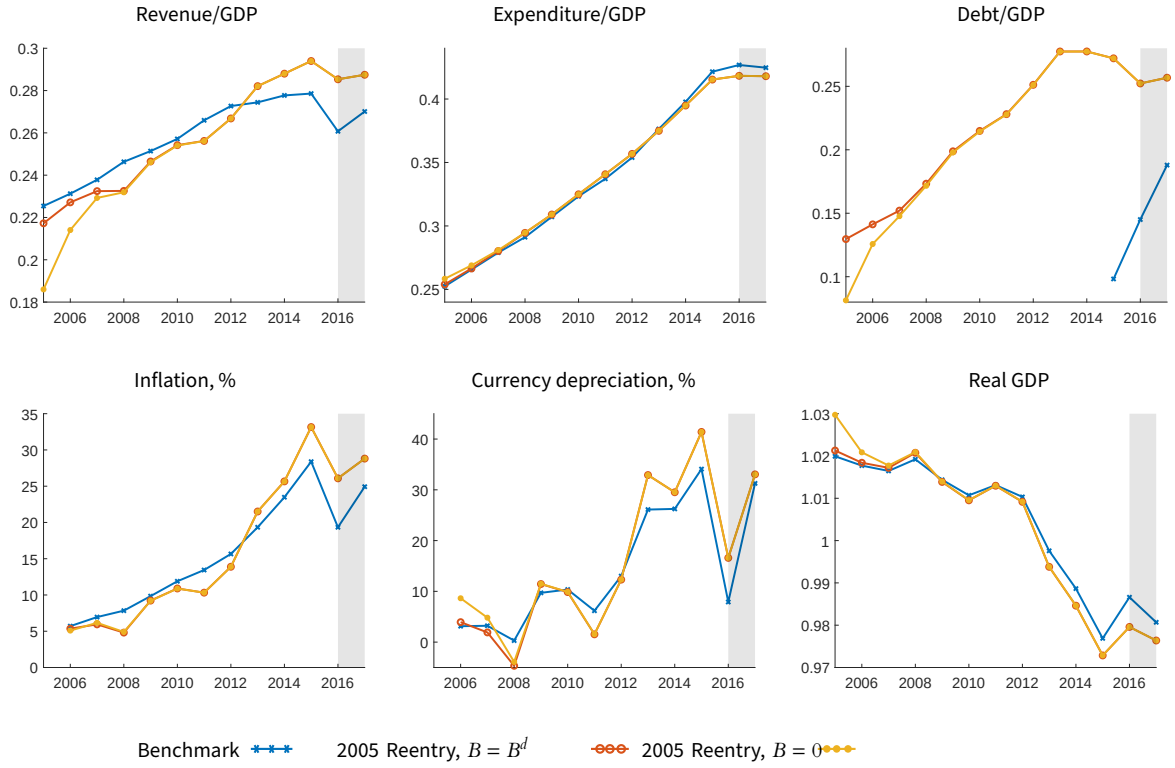


5 follow the economy with access to international credit markets, starting off in 2005 with a debt level of B^d, as highlighted by the evolution of debt in the right top panel. The yellow lines also assume that the economy can issue debt but with a reentry level of debt equal to zero, i.e., with a haircut after default of 100 percent of the debt.

Overall, the impact of having earlier access to international credit markets is not as significant as one might have expected. Having access to external credit allows the government to borrow from abroad and thus impose lower distortions (taxes and inflation) early on. These lower early policy distortions come at the cost of higher later distortions, as debt builds up and its service costs increase. As a consequence, at the end of the period of analysis, real GDP is slightly lower with early access to international credit than in the benchmark economy. The value of the debt haircut (i.e., the level of debt at reentry) only affects the transition in the first two years. With a higher haircut (lower initial debt), the government implements lower taxes, lower inflation, and slightly higher expenditure. These effects are only present in 2006 and 2007. Starting in 2008, the two economies with different haircuts experience the same economic performance.

Again, we find it instructive to focus on the reaction of policy and real variables in 2013, when the terms of trade dropped sharply after reaching their peak. A priori, one would think that having access to external debt would have enabled the government to better smooth the shock. However, for the case when the government has access to international credit markets as of 2005, the country reaches 2012 with a high debt-to-GDP ratio—recall that, in the benchmark, the government is still not allowed to issue external debt. Relative to the benchmark, when the government has access to international credit, there is a larger reaction of inflation (7.6 percentage points versus 3.7 percentage points) and currency depreciation (20.6 percentage points versus 13.1 percentage points), which leads to a larger contraction in real GDP (–1.5 percent versus –1.3 percent). The higher debt burden in the alternative scenario results in the need for higher policy distortions, increasing both taxes and money financing. This implies a higher output loss, more inflation, and a more pronounced nominal depreciation. Hence, the moral is that access to international credit markets without dealing with the underlying fiscal imbalance ends up limiting the capacity of the country to absorb the fall in the terms of trade and implies a more extreme negative response of the economy.

Figure 5
Evolution of Key Macro Variables with Alternative Exclusion and Reentry



5. CONCLUDING REMARKS

We use the framework of EKMS to study the experience of Argentina in 2005–2017, focusing on the role of external shocks and domestic policies in shaping economic outcomes. During that period, Argentina experienced exceptionally favorable terms of trade but also embarked on a significant expansion of its government. According to our findings, the rise in spending accounted for the large increase in the size of the government, the steady increase in inflation, and the poor performance of output growth.

APPENDIX 1. DEFINITION OF MACROECONOMIC AGGREGATES

- Nominal GDP (in pesos, normalized by the money stock):

$$Y_t = e_t p_t^T y_t^T + p_t^N y_t^N.$$

- GDP in foreign currency (USD):

$$Y_t^{USD} = p_t^T y_t^T + \frac{1}{e_t} p_t^N y_t^N.$$

- GDP deflator (in pesos, normalized by the money stock):

$$P_t^y = \left(\frac{ep^T y^T}{Y}\right) e_t p_t^T + \left(\frac{p^N y^N}{Y}\right) p_t^N.$$

- Real GDP:

$$Y_t^R = \frac{Y_t}{P_t^y}.$$

- Consumption expenditure (in pesos, normalized by the money stock):

$$C_t = e_t c_t^T + p_t^N c_t^N.$$

- Consumption price index (in pesos, normalized by the money stock):

$$P_t^c = \left(\frac{ec^T}{C}\right) e_t + \left(\frac{p^N c^N}{C}\right) p_t^N.$$

- Inflation, measured as the change in the consumption price index:

$$\pi_t = \frac{P_t^C}{P_{t-1}^C}(1 + \mu_{t-1}) - 1.$$

- Currency depreciation:

$$\Delta_t = \frac{e_t}{e_{t-1}}(1 + \mu_{t-1}) - 1.$$

Note that inflation and currency depreciation are corrected by the money growth rate since prices are normalized by the money stock.

APPENDIX 2. DATA SOURCES

This section lists the sources for all the variables used in the main body of the article.

Variables in Table 2:

- "Inflation" is inflation, consumer prices (annual %) from the World Bank. Indicator code FP.CPI.TOTL.ZG.
- "Transfers/GDP" is constructed as the product of two series from the World Bank. Subsidies and other transfers (percentage of expense) with indicator code GC.XPN.TRFT.ZS and expense (percentage of GDP) with indicator code GC.XPN.TOTL.GD.ZS.
- "Exports/GDP" is exports of goods and services (percentage of GDP) from the World Bank. Indicator code NE.EXP.GNFS.ZS.
- "Employment/Population" is the employment-to-population ratio, 15+, total (percentage) (modeled International Labour Organization estimate). Indicator code SL.EMP.TOTL.SP.ZS.
- "Gov. Purchases/GDP" is general government final consumption expenditure (percentage of GDP) from the World Bank. Indicator code NE.CON.GOVT.ZS.
- "Debt/GDP" is public external debt (percentage of GDP) computed using the ratio of the following two variables from the World Bank: external debt stocks and public and publicly guaranteed (PPG) (debt outstanding and dispersed, current US$) with indicator code DT.DOD.DPPG.CD and GDP (current US$) with indicator code NY.GDP.MKTP.CD.
- "Haircut, Share of Debt" is the median "SZ haircut, HSZ" in Table 2 of Dvorkin et al., 2021.

- "Default" is obtained from Tomz and Wright, 2013. They construct a database of 176 sovereign entities spanning 1820 to 2012. The frequency of default is sensitive to the sample being analyzed. They mention that their findings are "similar to the 2% default probability that is a target for many calibrated versions of the standard model," which is the number we use as well. The unconditional probability of a country with positive debt (a borrower) defaulting on debts owed to commercial creditors is 1.7percentage per year. Nevertheless, this probability is higher in developing countries. Note also in Figure 2 of Tomz and Wright, 2013 that in a typical year, there are no defaults or there is one country in default. We considered this fact when calibrating a significantly lower default rate in the model with only ε shocks.

The data sources for Figures 1 and 2 that came from the World Bank were already described. The other sources are the following:

- Transfers/GDP labeled "Mecon" is taken from the Ministry of Economics of Argentina information about "Gasto Publico Consolidado 1980–2017 por finalidad" as a share of GDP, and it corresponds to the sum of "II.2.2. Obras sociales - Atención de la salud," "II.2.3. INSSJyP - Atención de la salud," "II.6. Previsión social," and "II.7. Trabajo." The data can be found in https://www.argentina.gob.ar/economia/politicaeconomica/macroeconomica/gastopublicoconsolidado.
- Gov. Purchases/GDP labeled "Mecon" is taken from the Ministry of Economics of Argentina information about "Gasto Publico Consolidado 1980–2017 por finalidad" as a share of GDP, and it corresponds to the "Gasto Publico sin Servicios de la Deuda Publica (IV)" minus transfers as defined above.
- "Revenue/GDP" labeled as "NyS" corresponds to data from the "Fundacion Norte y Sur," file C7.2, tab "Ingresos, Gastos y Resultado del Sector Público Argentino," column "Ingresos totales % PIB." The data can be found in https://dossiglos.fundacionnorteysur.org.ar/series.
- "Debt/GDP" labeled as "NyS" corresponds to data from the "Fundacion Norte y Sur," file C7.2, tab "Deuda publica nacional interna y externa consolidada," column "Deuda Publica Externa."
- "Currency Depreciation % Data" corresponds to data from the "Fundacion Norte y Sur," file C8.2, tab "Tipo de Cambio," column "Dolar Libre."

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