The Inflationary Consequences of Fiscal Policy in Brazil: An Empirical Investigation with Regime Switches and Time-Varying Probabilities

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Abstract. Before the Real plan was launched, five major stabilization plans failed to control Brazil’s chronic inflationary process. A loose-stance fiscal policy, associated with widespread price indexation and a passive-stance monetary policy, was thought to drive the ever-growing rate of prices as well as the acceleration of inflation. This direct connection between fiscal imbalances and inflation appeared to cease, however, in the post-Real period. The end of the inflation tax and the lack of new fiscal measures to restore fiscal sustainability caused the government’s fiscal imbalance to deteriorate even further after 1994, but intriguingly enough, inflation remained at bay. Trying to shed some light on this matter, I estimate a set of regime-switching models with time-varying transition probability matrices, using Brazilian inflation data from the sample period comprising the six major plans (1981 through 1998). My objective is to investigate the existence of a nonlinear connection between fiscal and monetary policy variables and inflation. The empirical findings presented here indicate that after 1994, the connection between inflation and fiscal/monetary policy is best explained along the lines of Drazen and Helpman’s (1990) and Sargent and Wallace’s (1981) “unpleasant monetarist arithmetic.” A faster growth rate of real debt to GDP is unambiguously bad news for inflation stabilization because it increases both the chances of remaining in the high-inflation state as well as that of switching from the low- to the high-inflation regime. Following the same argument, high real interest rates have a perverse and unorthodox effect on inflation expectations by boosting the likelihood of a switch away from the low-inflation regime.

Keywords. regime switching, Brazilian inflation stabilization, fiscal policy

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1 Introduction

The debate around the inflationary consequences of fiscal policy has returned to center stage in both developed and developing economies. In the former group, in which independent central banks have already adopted some variation of inflation targeting as their main policy goal (Mishkin 1999; Bernanke et al. 1999), steps toward preventing fiscal pressures from affecting the conduct of monetary policy are already emerging. The fiscal targets embedded in the Maastricht Treaty are probably some of the best known examples of such actions. Meanwhile, in developing countries and specifically among those striving to maintain their newly
gained price stability, full-fledged fiscal reforms are still to be consolidated. Fears that unstable paths of fiscal outcomes may call for the return of inflationary financing continue to haunt both policymakers and market participants alike.

Brazil’s recent experience appears to be a rich case study of how fiscal and monetary policy coordination may have a direct impact on inflation. Over the past 20 years, the Brazilian economy has undergone six major inflation stabilization attempts, involving a wide variety of prescriptions that encompassed both orthodox and heterodox measures. Up until the Real plan (1994)—the only successful plan—inflation was in large part caused by the combination of three basic factors (Pastore and Pinotti 1999): (1) high fiscal deficits usually financed by seigniorage, (2) generalized price indexation, and (3) passive-stance monetary policy. Together, these three elements guaranteed that a relatively stable stock of real debt coexisted with an ever-rising rate of inflation (see Figure 1). Although passive monetary policy and price indexation ensured that shocks to relative prices were permanently incorporated into the overall price level, monetization of the deficit maintained a cap on the stock of real debt.

The graveness of the government’s fiscal imbalance became even more evident with the end of the chronic inflation period in 1994. Higher government spending in compliance with the constitutional reform of 1988 coupled with the abrupt end of inflation tax revenues placed the stock of debt on an explosive path. At the same time, rising interest rates, much needed to roll over the ever-rising stock of debt, provided for an ever more dramatic deterioration of the government’s fiscal accounts. Such explosive evolution of debt was halted only by the beginning of the Russian default in late 1998, when international capital stopped flowing into the country. At this point the Brazilian government, trying to prevent a hard landing, implemented a severe package of contractionary fiscal measures.
One of the most striking developments of the post-Real period has been the lack of inflation amidst such intense fiscal deterioration. Despite the unsustainable path of fiscal policy and the absence of definite measures to ensure the government’s solvency, inflation has remained at bay.

Has the link connecting fiscal policy and inflation observed before 1994 disappeared with the launch of the Real plan? Are the inflationary effects of loose fiscal policy linear across different inflationary regimes observed in Brazil since the late 1980s? Addressing these two questions should help shed some light on the dynamics of the inflation process in Brazil.

To tackle these issues, I fit a regime-switching model to Brazilian inflation during the period comprising the six major stabilization plans: 1981–1998. The main feature of this methodology is to account for the nonlinear effects that fiscal and monetary outcomes may have on the expected duration of different inflation regimes. If, for example, a loose-stance fiscal policy is expected to unequivocally boost inflation, it should do so under all existing regimes. Worsening fiscal fundamentals would increase the expected duration of the high-inflation regime as well as the chances of switching from the low- to the high-inflation state. An explosive path of debt or deficit might still exist under a low-inflation regime—as appears to be the case in Brazil—but destabilizing forces would be likely to mount. Whereas the observed level of inflation might fail to react immediately, its expected value might promptly respond to worsening fiscal conditions. This, in turn, would raise interest rates and renew the cycle, feeding the further deterioration of the government’s fiscal accounts. Such an increase in expected inflation could become self-fulfilling and eventually revive the vicious circle of fiscal deterioration and ramping inflation.

Departing from Salomon (forthcoming), I relax the fixed-transition probability matrix assumption and allow the probability to vary over time as a function of fiscal and monetary variables. The evolution of such policy variables will help determine the expected duration of the different inflation regimes. In these terms, a stabilization plan can be interpreted as an attempt to switch the economy from a high-inflation to a low-inflation regime. Agents perceive the plan as credible not merely based on the observation of lower inflation rates, but also on how consistent subsequent outcomes of fiscal and monetary policies are with the objective of price stability (Kaminsky and Leiderman 1996).

My empirical findings explain the connection between fiscal/monetary policy and inflation along the lines of Drazen and Helpman 1990 and Sargent and Wallace 1981. Independent of the underlying inflation regime, price stability in Brazil is negatively correlated to the pace of fiscal deterioration. A stronger growth rate of the real debt-to-GDP ratio favors the occurrence of the high-inflation regime by increasing both the chances of remaining in the high-inflation state and those of switching from the low-inflation to the high-inflation regime as well. Whereas the observed deficit appears to have little effect on the dynamics of inflation, unexpected negative shocks to the deficit decrease the expected duration of the low-inflation regime.

Faster growth rates of real revenues (primarily taxes) have a striking destabilizing effect on the low-inflation regime. Meanwhile, the continuity of the low-inflation state is only marginally (low t-test statistics) favored by negative growth rates of real expenditure. Whereas this last result reflects more the absence of expenditure cuts in the sample than its effective contribution to price stability, the association of higher fiscal revenues with shorter duration of the low-inflation regime is indicative of the low quality of the fiscal adjustments implemented in the sample period. These adjustments were generally based on fiscal quick fixes that were usually implemented by raising taxes.

Real interest rates also proved to have perverse and unorthodox effects on the stability of the low-inflation state. Although they have a marginal impact under the high-inflation state, higher real interest rates may backfire in controlling inflation by fueling inflationary expectations. This result indicates, in the vein of Pakko

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1In that work, I show that the dynamics of inflation in Brazil are better characterized by a heteroskedastic, two-state, Markov-switching model in mean with fixed transition probability matrix than by standard linear specifications.
This paper draws upon two main areas of research. The first describes inflation as a nonlinear process and models it with Markov-switching models along the lines of Hamilton (1989a). Applications considering at least two inflation regimes were developed for G-7 economies by Evans and Lewis (1994) and Ricketts and Rose (1995), while Simon (1996) and Ayuso et al. (1998) applied the regime-switching model of inflation to the Australian and Spanish cases, respectively.

Still in the same group, but closer to my research, are Ruge-Murcia (1999) and Kaminsky and Leiderman (1996). Kaminsky and Leiderman fit a regime-switching model with time-varying transition probabilities to three exchange rate–based stabilization plans of the 1980s (those of Argentina, Israel, and Mexico). They show that adverse fiscal and monetary policy shocks hamper the credibility of a newly launched stabilization plan. The uncertainty of having switched to the low-inflation regime creates a distortion in agents’ expectations, which ultimately drives real interest rates up. Ruge-Murcia develops a rational-expectations model in which the government’s expenditure is subject to regime switches (low and high spending). Such switches in regimes appear to be the driving force behind the cycles of inflation in Brazil. His empirical results suggest that there was evidence favoring a shift to a high-spending regime in Brazil in 1985.

My research is also related to a broader group of papers in which the government’s deficit is fully financed by the monetary authority and inflation is subject to multiple equilibria. Among the most prominent of these papers are Drazen and Helpman (1990), Sargent and Wallace (1981), Kiguel (1989), and Bruno and Fisher (1990).

In what follows, I first briefly describe the monetary and fiscal elements of the six major stabilization plans implemented in Brazil from 1986 to 1998. The description of the statistical model is provided in Section 3, and the discussion of the main empirical findings follows in Section 4. Section 5 provides some concluding remarks.

2 The Brazilian Stabilization Experience: 1986–1994

Over the past 15 years, Brazilian economic history has been marked by recurrent episodes of high inflation. Five of the six major stabilization attempts undertaken in this period failed to deliver a long-lasting period of price stability, and it was only after July 1994, with the Real plan, that inflation was finally brought down to and maintained at single-digit levels. In this section I will briefly describe the main fiscal and monetary ingredients of each of these stabilization plans.3

The first attempt of the period, the Cruzado plan, launched in February 1986, was the first comprehensive heterodox plan launched in Brazil. It relied mostly on income policies to eliminate the inertial component of inflation, given the belief at the time that orthodox measures alone were not enough to control the escalation of prices. The core measures of the plan were temporary price, wage, and exchange rate freezes, prohibition of indexation rules (both private and public), and the introduction of a new currency, the cruzado, at an exchange rate of 1 cruzado for each 1,000 cruzeiros (old currency). Prices were frozen at their existing levels, and wages were first recomposed (based on their real average value over the previous 6 months plus a bonus) and then frozen for a period of 1 year. The idea behind such a wage correction mechanism reflected the unsynchronized characteristic of wage contracts in Brazil, and the mechanism tried to promote, at least to some extent, some redistribution of income toward wage earners. The basic underlying ideal of the plan was to eliminate inflation while maintaining a strong pace of economic growth.

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2 Although not directly applied to inflation, Pakko 2000 shows the existence of a laffer curve relation between interest rates and capital flows.

Following the heterodox school, no major fiscal or monetary policy measures were introduced in the Cruzado plan. Monetary policy during the initial months of the plan was geared to the remonitization of the economy, and as a reflection of the lack of fiscal control, the budget deficit began to rise rapidly after the plan was launched. This increase was largely a result of a higher government wage bill, significant losses posted by state-owned companies (reflecting cost/price misalignments), and rising government spending to subsidize the price freeze.

The higher purchasing power of wages coupled with loose monetary policy laid the ground for the overheating of the economy, which in turn began to impose significant pressure on the external accounts. Because of the political costs of a recession and of a revival of the inflation process, the government tried twice (July 1986 and November 1986) to implement contractionary fiscal measures. In the latter effort, a hike of public service prices sowed the seeds for an inflationary shock that would culminate with the formal lifting of the price controls in February 1987 and inflation gushing above the 20% mom level.

On June 12, 1987, a second attempt to reign over inflation was launched and became known as the Bresser plan, in honor of the new finance minister at the time, Bresser Pereira. The plan aimed at promoting a disinflationary shock through the use of heterodox measures and then following up with tighter fiscal policy to keep inflation at lower levels. New price and wage freezes were implemented, but only for 3 months. To avoid the problems observed during the Cruzado plan, wages were frozen at their prevailing rates on June 12 and were to be readjusted every 3 months thereafter, whereas public tariffs were first realigned and subsequently frozen. On the monetary front, an active policy to maintain real interest rates in positive territory was deployed in an attempt to control domestic demand. Meanwhile, the exchange rate was devalued by approximately 9.5% when the plan was launched, and a policy of daily mini-devaluation was set in place.

The Bresser plan was short lived. Inflation did fall during the first month of the plan, but the lack of public support, especially after the failure of the Cruzado plan, and the re-emerging inflationary pressures observed as early as August 1987 forced the government to adjust some public prices. By the third month of the plan, public servants had been given substantial wage increases, and the wage-price inflation spiral was again set to move.

The next major stabilization attempt was the Summer plan (January 1989), also based on a mixture of heterodox and orthodox measures. Price and wage freezes were announced along with the introduction of a new currency, the cruzado novo, which traded at par against the U.S. dollar—implying almost 18% devaluation of the cruzado. Meanwhile, high real interest rates and contractionary fiscal measures also figured among the core of the plan. Once again the fiscal measures were frustrated by lack of congressional support, and the lack of credibility and popular support on the announced measures revived inflationary pressures. By January 1990, Brazil was once again flirting with hyperinflation.

In November 1989 Brazilians chose Fernando Collor de Melo as their first elected president since the military coup of 1964. During his campaign, he promised to annihilate inflation with a single magic bullet (Nazmi 1996). His first attempt at stabilizing inflation was announced in March 1990: the Collor I plan, which was one of the most extreme plans yet implemented in Brazil. The plan rested on a drastic liquidity crunch implemented through a freeze of approximately two-thirds of all financial assets. Liquidity was reduced from 30% to 8% of GDP (Bonomo and Terra 1998), and all banking accounts were frozen for a period of 18 months. There was also a monetary reform that created a new currency, the cruzeiro, replacing the cruzado novo at par. The plan lacked any explicit exchange rate peg, as it was expected that the liquidity crunch would be enough to dampen inflation expectations. And in terms of heterodox elements, the plan also featured measures such as price and wage freezes, which were then adjusted according to an expected inflation index periodically released by the government.

The plan had limited fiscal content, and the fiscal measures that were announced were largely concentrated on higher taxes on financial transactions and removal of some tax benefits. It is interesting to note that, although this was not an explicit component of the plan, the government effectively halved the value of the
total stock of its real domestic liabilities, which corresponded to less fiscal pressure in the beginning of the plan. The government authorized only a 40% monetary correction to the stock of public debt during the first month of the plan, when the actual rate of inflation had reached 80% (Pastore and Pinotti 1999).

Despite the collapse in liquidity, the strong indexation schemes pervading the Brazilian economy prevented deflation from occurring. Hence, real economic activity was forced to bear the brunt of the liquidity crunch. Industrial activity contracted violently over the first 2 months of the plan, whereas the strong downward rigidity of both wages and prices maintained them at the prevailing rates. Already in April the government had to take the first steps to loosen monetary conditions, as the recession appeared to be deepening further. In July 1990, the government lifted price controls, which promoted the re-emergence of inflation, along with the erosion of real wages. The latter caused the outburst of strikes, which eventually triggered the revival of the wage-price spiral.

President Collor announced his second attempt to control inflation (the Collor II plan) in January 1991. It was another heterodox plan based on a price and wage freeze along with new re-indexation schemes that were supposed to eliminate the inertial component of inflation. The plan was doomed at birth, as it was perceived as a mere quick fix to reassert control over the economy. In 1992 President Collor was impeached on charges of corruption.

Only in 1993–1994, with the Real plan, was inflation finally tamed in Brazil. Collor's vice president, Itamar Franco—the legal successor to the presidency of Brazil—along with his finance minister, Fernando Henrique Cardoso, announced a stabilization plan that without the help of price and wage freezes was able to bring inflation down to single-digit levels.

The Franco government identified two main causes of inflation in Brazil: the government's fiscal crisis and inertial inflation. While creating the necessary conditions to attain fiscal equilibrium, they announced the necessary steps to eliminate once and for all the inertial component of inflation. In a nutshell, the latter was attained by fully indexing the economy using a common and stable unit of value (the URV) and then fully de-indexing the economy by replacing the URV with a strong currency (the real). This would be enough to eliminate the inertial component of inflation. The plan was split into three distinct phases, each aimed at achieving a different goal: (1) recover fiscal stability, (2) fully index the economy, and (3) implement a monetary reform.

In phase 1 the government proposed the creation of the Social Emergency Fund (FSE). The fund freed 20% of the federal tax receipts that had been earmarked by the 1988 constitutional reform for discretionary use. This step allowed cuts in expenditures and the creation of a “fiscal stability bridge” while structural reforms were being negotiated in the congress. Expenditure cuts and federal tax hikes were also embedded in the plan.

Phase 2 comprised the full indexation of the economy and was implemented to create a unit of account with stable purchasing power. In March 1994 the government introduced an alternative unit of account, the URV, which was fully indexed to inflation. All prices and wages were quoted in URVs, although the medium of exchange continued to be the cruzeiros reais.

Finally, phase 3 was the actual monetary reform—July 1994—that created the new currency (real), trading at par with the URV. At this point the government introduced a freeze only on public-sector prices and prohibited any kind of indexation clauses on wages, prices, or contracts across the economy.

Summing up, the majority of the stabilization plans implemented in Brazil since 1986 were based on income policies and frustrated attempts to boost public savings. Before the Real plan, the fiscal needs of the government dictated the conduct of monetary policy (Pastore and Pinotti 1999). In a clear case of fiscal dominance, the monetary authority ensured that the government's intertemporal budget constraints were met. Having no other way to close the fiscal accounts, it relied heavily on seigniorage, which in turn enabled the stock of real government debt to remain on a stable and nonexplosive path.

In 1994, as inflation finally succumbed to the sixth stabilization plan launched in less than 10 years, the government lost an important source of revenue: the inflation tax. The fiscal deficit deteriorated dramatically,
as the full-blown fiscal reform necessary to halt the imbalance did not roll out and revenues fell short of the ever-growing expenditures. At this time the only financing alternative compatible with price stability was the issuance of new debt, and it was this choice that placed the real debt-to-GDP ratio on an explosive path. The strategy was feasible for as long as investors—both domestic and international—were willing to hold Brazilian debt. But with the advent of the Asian crisis (1997) and later the Russian default (1998), international funds stopped flowing to emerging markets, which in turn forced the Brazilian government to implement strong fiscal restraining measures to stabilize its debt-to-GDP ratio.

3 Estimating the Time-Varying Transition Matrix Model

To estimate the inflationary effects of fiscal and monetary policy in Brazil, I fit a regime-switching model along the lines of Filardo (1994), Kaminsky and Leiderman (1996), and Kim and Nelson (1999). Building on Hamilton (1989a), I relax the fixed-transition probability matrix assumption, allowing the probability to vary with economic fundamentals.

Salomon (forthcoming) showed that Brazilian inflation is best characterized by a two-state AR(2), heteroskedastic, Markov-switching model in mean. In Equations (3.1) and (3.2), I modify this model to incorporate the time-varying transition matrix (TVTM) assumption:

\[ \pi_t - \mu_k = \sum_{j=1}^{2} \phi_j (\pi_{t-j} - \mu_{k-j}) + \varepsilon_t, \quad \text{with } \varepsilon_t \sim N(0, \sigma^2_k) \]  

\[ P(t) = \begin{bmatrix} p_{11} & (1 - p_{22}) \\ (1 - p_{11}) & p_{22} \end{bmatrix} \]  

Here, \( \pi_t \) is the observed rate of inflation, \( \mu_k \) and \( \sigma^2_k \) are the state-dependent mean and variance of \( \pi_t \), respectively, \( p^{ij} \) is the transition probability of remaining in state \( i \) (i.e., \( p^{ij} = \text{Prob}(\pi_t = i|\pi_{t-1} = i) \)) for \( i = 1, 2 \), and \( \phi_j (j = 1, 2) \) is the time-invariant AR coefficients. Equation (3.1) represents the inflation process as in Salomon (forthcoming), and the TVTM \( P(t) \) in Equation (3.2) determines how the two different regimes will evolve over time. The probability of a switch in regime—from either high-to-low or low-to-high inflation states—is assumed to vary with the evolution of fiscal and monetary policy variables. Equation (3.3) makes this relationship explicit:

\[ p_{11}^{ij} = \frac{\exp \left\{ \alpha_0 + \sum_{k=1}^{n} \alpha_k \pi_{t-k} \right\}}{1 + \exp \left\{ \alpha_0 + \sum_{k=1}^{n} \alpha_k \pi_{t-k} \right\}} \quad \text{and} \quad p_{22}^{ij} = \frac{\exp \left\{ \beta_0 + \sum_{k=1}^{m} \beta_k \pi_{t-k} \right\}}{1 + \exp \left\{ \beta_0 + \sum_{k=1}^{m} \beta_k \pi_{t-k} \right\}} \]  

Equation (3.3) describes how exogenous variables, represented here by \( \pi_t \), affect the path of \( p_{11}^{ij} \). This is a general specification that comprises the fixed-transition probability matrix (FTM) model as a particular case by setting \( \alpha_k = \beta_k = 0 \) for all \( k > 1 \). Associating the high-inflation regime with state 1, \( p_{11}^{ij} \) becomes the probability of no switch or that of remaining under the high-inflation state, whereas \( (1 - p_{11}^{ij}) \) represents that of switching to the low-inflation regime. In these terms, exogenous variables that incite inflation are expected to boost the probability of remaining in the high-inflation regime \( (p_{11}^{ij}) \) as well as that of switching from the

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\*In that paper, I apply a bootstrap-based evaluation technique based on Psaradakis (1998) to show that the proposed nonlinear model characterizes the Brazilian inflation process better than a simple linear model. In order to overcome problems related to the existence of a nuisance parameter under the null and that of computational tractability of deriving the asymptotic distribution of the test statistics for each different specification (see Hansen [1992] and Garcia [1998]) I resort to a test that gauges the ability to reproduce the main characteristics of the observed data. More details can be obtained in the above-mentioned papers.

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low- to the high-inflation regime \((1 - p_t^2)\). In other words, the estimated \(a_k\) and \(\beta_k\) associated with this variable should be greater than and less than zero, respectively.

Besides estimating the parameters of Equations (3.1), (3.2), and (3.3), I also calculate an inference measure of the unobserved state of the economy for each period of time. All results presented in the following sections were estimated by means of “maximum likelihood” using a modified version of Hamilton’s Gauss codes. 

4 Results

The main findings of this paper are summarized in Tables 1 through 3. The first column of Table 1 reproduces the results of the fixed-transition matrix model, which are included for ease of comparison. All other columns represent different choices of \(z_1\) in Equation (3.3).

4.1 The data

The measure of inflation adopted here was the monthly percentage change of the National Consumer Price Index (INPC) released by the Brazilian Institute of Geography and Statistics (IBGE). The monthly monetary and fiscal variables were first deflated by the INPC and then, with the exception of the real interest rate, expressed as a percentage of real GDP using a 12-month trailing GDP series released by the Brazilian Central Bank (BACEN). As to the period of analysis—which applies to all estimations presented here—the sample runs from October 1981 to October 1998.

4.1.1 Monetary Variables

- **Selic interest rate**: The government’s official overnight interest rate, expressed on a monthly basis and calculated as the difference between the nominal Selic and the monthly INPC. Source: Datastream.
- **Monetary base (Base/GDP)**: Traditional measure of monetary base (reserves plus the total stock of money held by the public) as a percentage of GDP. Source: BACEN monthly report, various issues.

4.1.2 Fiscal Variables

- **Total revenue (Revenue/GDP)**: The National Treasury’s total revenue calculated on a cash basis and expressed as a percentage of GDP. Source: BACEN monthly report, various issues.
- **Total expenditure (Expenditure/GDP)**: The National Treasury’s total outlays, net of interest expenditure. Also calculated on a cash basis and expressed as a percentage of GDP. Source: BACEN monthly report, various issues.
- **Primary deficit (Deficit/GDP)**: The National Treasury’s primary surplus on a cash basis. Calculated by subtracting Expenditure/GDP from Revenue/GDP.
- **Debt (Debt/GDP)**: Total federal domestic debt outside the central bank, expressed as a percentage of GDP. Source: BACEN monthly report, various issues.

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5For a detailed exposition on the estimation of both TVTM and FTM models, the interested reader might refer to Hamilton (1989a) and (1989b), Filardo (1994), or Kim and Nelson (1999).

6This measure of monthly GDP is used to calculate the monthly fiscal and external balance account data as a percentage of GDP. To express the fiscal and monetary policy variables analyzed in the paper as a percentage of GDP, I use the rolling 12-month sum of the monthly real GDP data as a proxy for the Brazilian GDP of the desired month.

7The start of the sample coincides with the first data available for the monthly GDP series, which serves as common denominator to most of the explanatory variables. The end of our sample was chosen to exclude the strong contraction in international liquidity following the LTCM crisis in late 1998, which had a strong and extended influence over the conduct of domestic monetary policy.

I tested the explanatory variables for unit roots using both augmented Dickey Fuller and Phillips-Perron tests. The results indicate, with high confidence levels, that the monetary base and debt are nonstationary. Revenues and expenditures exhibit near-stationary behavior, and the Selic interest rate and the deficit variables proved to be \(I(0)\).
Below the name of each explanatory variable, I state the order of differencing and the optimal lag used for each of the variables. The optimal lag was obtained by means of likelihood ratio tests, examining lags on a decreasing order from six to two. The minimum lag was limited to two because of the agent’s information set. Most of these variables are usually released with a two-period lag in Brazil. As to the order of differencing, I considered only variables in stationary form (see note 7). Nonstationary and near-stationary variables were used in first difference and the stationary variables in levels.

### Table 1
Time-varying transition matrix estimations, real fiscal and monetary variables

<table>
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<tr>
<th>Parameter</th>
<th>FTM Model</th>
<th>Revenue/GDP</th>
<th>Expenditure/GDP</th>
<th>Deficit/GDP</th>
<th>Debt/GDP</th>
<th>Real Interest Rate</th>
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<td>4.7578</td>
</tr>
<tr>
<td></td>
<td>(0.0102)</td>
<td>(0.0091)</td>
<td>(0.0094)</td>
<td>(0.0097)</td>
<td>(0.0096)</td>
<td>(0.0096)</td>
<td>(0.0096)</td>
<td>(0.0096)</td>
</tr>
<tr>
<td>( \beta_1 ) (LL)</td>
<td>—</td>
<td>-6.5381</td>
<td>-0.1907</td>
<td>-1.2750</td>
<td>-9.9881</td>
<td>-0.6474</td>
<td>-1.4928</td>
<td>-3.0126</td>
</tr>
<tr>
<td></td>
<td>(1.4888)</td>
<td>(0.6273)</td>
<td>(2.3079)</td>
<td>(0.9572)</td>
<td>(0.1364)</td>
<td>(0.5209)</td>
<td>(1.4730)</td>
<td></td>
</tr>
<tr>
<td>( p_{11} )</td>
<td>0.9757</td>
<td>0.9752</td>
<td>0.9772</td>
<td>0.9769</td>
<td>0.9647</td>
<td>0.9724</td>
<td>0.9778</td>
<td>0.9707</td>
</tr>
<tr>
<td></td>
<td>0.9860</td>
<td>0.9911</td>
<td>0.9827</td>
<td>0.9829</td>
<td>0.9898</td>
<td>0.9952</td>
<td>0.9875</td>
<td>0.9915</td>
</tr>
</tbody>
</table>

**Note:** Standard errors in parentheses. FTM stands for fixed transition matrix. HH stands for the transition probability of remaining in the high-inflation state. The sign of the estimated parameter \( a_1 \) indicates the effect of the exogenous variable on the transition probability: (positive [negative]) \( a_1 \) (higher [lower] HH). LL stands for the transition probability of remaining in the low-inflation state. The sign of the estimated parameter \( \beta_1 \) indicates the effect of the exogenous variable on the transition probability: (positive [negative]) \( \beta_1 \) (higher [lower] LL).

### 4.2 Observed fiscal and monetary variables

The first four rows of Table 1 report estimates of the mean and variance of the two inflation regimes. As was previously defined, state 1 represents the high-inflation regime and state 2 the low-inflation regime. The estimated coefficients of the transition probabilities in Equation (3.3) and the estimates of the diagonal elements of the transition matrix are listed in the subsequent rows. The \( a_s \) represent the estimated coefficients of \( s \) in \( p_{11} \) (“HH” in the tables stands for high inflation followed by high inflation), the \( \beta_s \) measure the effects of these exogenous variables on the low-inflation regime, \( p_{22} \) (“LL” stands for low inflation followed by low inflation). The different estimated models—with different exogenous variables in Equation (3.3)—are presented in the columns of the tables.

Interpretation of these coefficients is straightforward. Positive \( a_j \) (for \( j > 0 \)) indicates a direct relation between the probability of remaining in a high-inflation regime (hereafter referred to as “probability of high”) and the exogenous variable \( z \). The same reasoning is extended to the values of \( \beta_j \) (for \( j > 0 \)), but considering the probability of remaining in a low-inflation regime (hereafter referred to as “probability of low”). Hence, unconditional good news for inflation stabilization is associated with both negative \( a_s \) and positive \( \beta_s \) (i.e., changes in \( z \) that boost both the probability of low \( [p_{22}] \) and that of switching from high to low \( [1 - p_{11}] \)).

Table 1 summarizes the estimated models using observed fiscal and monetary policy variables as explanatory variables. The estimates of the first moments (mean and variance) of the two inflation regimes and of the diagonal elements of the transition matrix remain fairly stable when compared to the FTM specification (first column), indicating the robustness of the regime-switching model.

---

8Below the name of each explanatory variable, I state the order of differencing and the optimal lag used for each of the variables. The optimal lag was obtained by means of likelihood ratio tests, examining lags on a decreasing order from six to two. The minimum lag was limited to two because of the agent’s information set. Most of these variables are usually released with a two-period lag in Brazil. As to the order of differencing, I considered only variables in stationary form (see note 7). Nonstationary and near-stationary variables were used in first difference and the stationary variables in levels.
Among the fiscal policy variables (columns 2–5 in Table 1), only the growth rate of debt to GDP and the growth of revenues have estimated coefficients that are significantly different from zero, and the latter only under the low-inflation regime. It is intriguing to observe that a stronger growth rate of total revenue has a significant destabilizing effect under the low-inflation regime and no significant impact in the high-inflation state. This finding highlights the fragility of the fiscal measures implemented in Brazil during the sample period. Such quick fixes, usually tied to temporary hikes in tax rates, only postponed the resurgence of inflation. Hence, the observed lack of causality between revenues and inflation—low statistical significance of the estimates of $\alpha_1$ and $\beta_1$ in column 3—is a reflection of the absence of concrete measures on the expenditure side. Pressures on the expenditure side eventually forced the government to return to inflation financing of the deficit.

The only fiscal variable that has an unequivocal destabilizing effect on inflation is the growth rate of real debt to GDP (Table 1, column 5). A faster growth rate of debt unambiguously represents bad news for the low-inflation regime and at significantly high confidence levels ($t$-statistics of the estimated $\alpha_1$ and $\beta_1$ are 2.023 and $-10.327$, respectively). Higher growth rates of debt increase the chances of remaining in the high-inflation state as well as those of switching from the low- to the high-inflation regime. This finding is in line with Drazen and Helpman (1990), which stated that excessive growth of the real stock of debt to GDP plays an important role in adjusting future inflation expectations. The stronger the growth rate of real debt, the more likely it is that agents will perceive its path as unsustainable, casting doubts on the government’s ability to refrain from monetization of the debt.

As to the monetary policy variables, these also provide some striking results about the dynamics of inflation in Brazil, and in the same vein as Sargent and Wallace’s (1981) “unpleasant monetarist arithmetic.” Higher real interest rates raise the likelihood of a regime switch from low to high. Conditioned on the low-inflation regime, higher rates have the same destabilizing effect on inflation as a faster growth rate of debt-to-GDP ratio. Although higher rates also stimulate the continuation of the high-inflation state, this effect is at best marginal. The $t$-statistics are considerably lower in this case than under the low-inflation regime ($-4.746$ in low regime versus $1.202$ in high). Meanwhile, the expansion of the monetary base has the expected inflationary consequences only in the low-inflation state. Under the high-inflation state, the sign of the estimated coefficient favors the continuation of the high-inflation state, but with very low statistical significance ($t$-statistic of 0.805).

The last column of Table 1 (column 8) examines the effect of income policies on the dynamics of inflation. I constructed a dummy variable that would capture the existence of price and wage freezes in each stabilization plan and re-estimated the model using it as a regressor in Equation (3.3). As was seen in Section 2, price and wage freezes were present in all but one plan (Real plan) in the sample period. And, due to its pervasive use, it is important to investigate its empirical relevance. Although the results are quite provocative, as the presence of income measures boosts the probability of remaining in the high-inflation state as well as that of switching from the low- to the high-inflation regime, they confirm the ineffectiveness of such measures in the Brazilian experience. The presence of price freezes was always associated with failed stabilization attempts. The only plan that was able to fully reign over inflation (the Real plan) was not based on such heterodox measures. Hence, periods when such measures were enacted were periods in which the high-inflation regime was only briefly interrupted. Figure 2 highlights this issue. The gray areas on the graph represent periods in which price controls were put in place, and the line is the estimated probability of being in the low-inflation regime when the price control dummy variable was used as a regressor of Equation (3.3). The figure clearly shows that the income measures do very little in favor of the low-inflation state.

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9 The fitted probability of the low-inflation regime for all other models estimated in this paper is available upon request.

10 Alternative ways of analyzing how income policies affect the dynamics of inflation in Brazil would be (1) using the methodology applied in Ruge-Murcia (2000), in which the author creates two additional states in which price controls could be in effect or not, or (2) just by adding the dummy variable in Equation (1). I am indebted to an anonymous referee for pointing this out.
In summary, it is under the low-inflation regime that fiscal and monetary policies appear to have their most stringent effects. Although the persistence of inflation in the high regime overshadowed the effect of most policy measures, the expansion of base money, the tax ratio, and the real interest rate had significant effects under only the low-inflation regime. The growth rate of the debt-to-GDP ratio was the only variable to unambiguously boost inflation in either regime.

One caveat needs to be addressed before accepting these results. These findings were obtained under the assumption that the different fiscal and monetary variables are exogenous. Even though all variables are considered in lags—mitigating but not eliminating the problem—some causality could still be running in the opposite direction. Given the widespread price indexation and passive-stance monetary policy prevailing during the pre-Real period, monetary and fiscal variables are also expected to react to changes in inflation.\(^{11}\)

Another related issue refers to the assumption that real tax revenue to GDP and real budget deficit to GDP are exogenous. If the indexation system is nonexistent or imperfect, higher inflation will erode the value of tax revenues as well as that of the budget deficit (the well-known Oliveira-Tanzi effect [Oliveira 1967 and Tanzi 1977]). In the context of this paper, this could imply that the presented results could reflect the nonlinear effect of lagged inflation on current inflation via the budget deficit rather than the effect of the fiscal variables per se.\(^{12}\) In the context of the Brazilian experience, this effect is mitigated dramatically by the fact that tax liabilities were indexed to the rate of inflation during the period of collection lags. Brazil is usually cited as one of the most extreme cases of indexation of tax liabilities (Tanzi 2000). And even if such an

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\(^{11}\)Pastore (1997) describes the conduct of monetary policy in Brazil during the years of high inflation. He shows that the high persistence of inflation during that period was in part due to the passive stance of monetary policy, which, according to anecdotal evidence, operated pegging real interest rates or exchange rates.

Trying to identify the direction of causality, I ran Granger causality tests between inflation and each of the explanatory variables. Only expenditure Granger-caused inflation during the sample period. Whereas the monetary base was Granger-caused by inflation, all other variables showed no or two-way Granger causality with inflation.

\(^{12}\)I am indebted to an anonymous referee for pointing this out.
indexation scheme was not able to fully eliminate the adverse effect of inflation on real taxes, it significantly reduced its impact. It is also interesting to note that in Salomon (forthcoming), when I tested alternative specifications of the model adopted here, I rejected the hypothesis of time-variant coefficient of the lagged value of inflation in Equation (3.1), adding to the list of arguments against the case of a nonlinear connection between lagged and current inflation.

4.3 Unexpected fiscal and monetary policy shocks
To account for this endogeneity problem, I re-estimate the model using unexpected shocks to fiscal and monetary variables as in Kaminsky and Leiderman 1996. These shocks are estimated by assuming that both monetary and fiscal variables follow an AR process as laid out in Equations (4.1) and (4.2), respectively:

\[ \varepsilon^m_t = m_t - \hat{\gamma}_0 - \sum_{j=1}^{p} \hat{\delta}_j m_{t-j} - \sum_{l=1}^{k} \hat{\theta}_l i_{t-l} \]  (4.1)

\[ \varepsilon^f_t = d_t - \hat{\lambda}_0 - \sum_{j=1}^{p} \hat{\phi}_j d_{t-j} - \sum_{l=1}^{k} \hat{\gamma}_l i_{t-l} \]  (4.2)

Here \( m_t \) is the monetary base, \( d_t \) the primary deficit, \( i_t \) the nominal Selic rate (all defined above), \( \varepsilon^m_t \) the unexpected monetary shock, and \( \varepsilon^f_t \) the unexpected fiscal shock. Lagged nominal interest rates were included as exogenous variables in Equations (4.1) and (4.2) to make use of some available information about the expected path of prices.

The estimated results are summarized in Table 2. Subscript 1 is associated with the coefficient of \( \varepsilon^f_t \) in each inflation regime (i.e., \( \alpha_1 \) and \( \beta_1 \) are the estimated coefficients of \( \varepsilon^f_t \) under the high- and low-inflation regimes, respectively). Subscript 2 has the same interpretation, but with respect to \( \varepsilon^m_t \).

Unexpected fiscal shocks represent bad news for the low-inflation regime, as expressed by the large, negative, and statistically significant \( \beta_1 \) (column 1 of Table 2). Meanwhile, under the high-inflation state, the effect is not as significant but favors a longer duration of the high-inflation regime. As with the growth rate of debt to GDP, unexpected fiscal shocks confirm the destabilizing effect of fiscal policy. Especially under the low-inflation regime, an unexpected deterioration of the fiscal deficit fuels doubts as to the longevity of the current low-inflation state.

Column 2 of Table 2 shows the effect of unexpected shocks to the stock of real money. As corroborated by the results presented in Table 1, unexpected shocks to money have a destabilizing effect on the low-inflation state.

Although these results validate the findings summarized in Table 1 and reinforce Sargent and Wallace’s (1981) model as a positive description of the dynamics of inflation in Brazil, the identification of the shocks can still be improved upon. Even though Kaminsky and Leiderman’s (1996) methodology helps clear the endogeneity between fiscal and monetary variables and inflation, the passive-stance monetary policy and the apparently strong fiscal dominance prevailing in the pre-Real period still pose problems for the identification of the correct fiscal and monetary shocks. One would expect that the past evolution of deficits would also be an important explanatory variable in the monetary-shock equation, as well as the latter in the fiscal-shock estimation. For this purpose I estimate two versions of the unrestricted bivariate VAR in Equation (4.3) below.

\[
\begin{bmatrix}
  d_t \\
  m_t
\end{bmatrix}
= \begin{bmatrix}
  \alpha_d \\
  \alpha_m
\end{bmatrix}
+ \begin{bmatrix}
  \phi_{11}(L) & \phi_{12}(L) \\
  \phi_{21}(L) & \phi_{22}(L)
\end{bmatrix}
\begin{bmatrix}
  d_{t-1} \\
  m_{t-1}
\end{bmatrix}
+ \begin{bmatrix}
  \eta^f_t \\
  \eta^m_t
\end{bmatrix}
\text{ with } \begin{bmatrix}
  \eta^f_t \\
  \eta^m_t
\end{bmatrix} \approx N(0, \Omega)
\]

(4.3)

13Both \( m_t \) and \( d_t \) are expressed in percentage of GDP, in line with the variables previously defined. My estimations differ from Kaminsky and Leiderman’s (1996) in that I do not include both shocks in the same equation because of multicollinearity problems.
### Table 2
Time-varying transition matrix estimations (Kaminsky and Leiderman): Unexpected fiscal and money shocks (levels)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Deficit/GDP ($t - 2$)</th>
<th>Base/GDP ($t - 2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\mu_1$</td>
<td>13.6131</td>
<td>13.4296</td>
</tr>
<tr>
<td></td>
<td>(3.7126)</td>
<td>(3.1173)</td>
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<td>$\mu_2$</td>
<td>4.6074</td>
<td>4.5776</td>
</tr>
<tr>
<td></td>
<td>(2.9061)</td>
<td>(2.7002)</td>
</tr>
<tr>
<td>$\sigma^2_1$</td>
<td>62.5121</td>
<td>62.3042</td>
</tr>
<tr>
<td></td>
<td>(9.3622)</td>
<td>(9.2391)</td>
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<tr>
<td>$\sigma^2_2$</td>
<td>1.1418</td>
<td>1.1436</td>
</tr>
<tr>
<td></td>
<td>(0.1723)</td>
<td>(0.1576)</td>
</tr>
<tr>
<td>$\alpha_0$ (HH)</td>
<td>3.8096</td>
<td>3.7134</td>
</tr>
<tr>
<td></td>
<td>(0.0318)</td>
<td>(0.0317)</td>
</tr>
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<td>$\alpha_1$ (HH) FS$^1$</td>
<td>1.0227</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>(0.8315)</td>
<td></td>
</tr>
<tr>
<td>$\alpha_2$ (HH) MS$^1$</td>
<td>—</td>
<td>-0.1305</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.3754)</td>
</tr>
<tr>
<td>$\beta_0$ (LL)</td>
<td>5.0561</td>
<td>5.1099</td>
</tr>
<tr>
<td></td>
<td>(0.0931)</td>
<td>(0.0930)</td>
</tr>
<tr>
<td>$\beta_1$ (LL) FS$^1$</td>
<td>-5.3086</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>(1.5140)</td>
<td></td>
</tr>
<tr>
<td>$\beta_2$ (LL) MS$^1$</td>
<td>—</td>
<td>-3.0962</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.6700)</td>
</tr>
<tr>
<td>$P^{11}$</td>
<td>0.9783</td>
<td>0.9762</td>
</tr>
<tr>
<td>$P^{22}$</td>
<td>0.9937</td>
<td>0.9940</td>
</tr>
</tbody>
</table>

**Note:** Standard errors are shown in parentheses. Superscript 1 is associated with fiscal shocks (FSs) and superscript 2 with money shocks (MSs). See footnotes to Table 1.

The first model (column 1 of Table 3) is the unrestricted VAR in Equation (4.3), and the second model (column 2) is a quasi-VAR that adds to the system in Equation (4.3) lagged values of nominal interest rates, much in the spirit of Kaminsky and Leiderman. The variables are defined as above, and the new fiscal and monetary shocks are $f_t$ and $m_t$, respectively. The ordering of Equation (4.3) was chosen to guarantee that contemporaneous fiscal shocks would affect the supply of money as in the dominant Brazilian fiscal experience during the pre-Real period.

The results presented in Table 3 confirm the conclusions of the previous two exercises and add another point to Sargent and Wallace’s scorecard in explaining the dynamics of inflation in Brazil. It is under the low-inflation state that unexpected fiscal shocks have their most stringent effects, as indicated by the large and significant values of $\beta_1$. Positive unexpected increases in the primary deficit boost the likelihood of a switch to the high-inflation state. The inclusion of lagged values of nominal interest rates affects the quantitative result only marginally (estimates of $\beta_1$ equal to $-5.26$ in the quasi-VAR[2] versus $-5.22$ in the VAR[2] model), whereas the qualitative result remains unchanged. Meanwhile, the strong persistence of inflation under the high-inflation state continues to dominate and overshadow the effects of unexpected fiscal shocks.

## 5 Conclusions

Before the Real plan was launched, five major stabilization plans failed to control Brazil’s chronic inflationary process. A loose-stance fiscal policy associated with widespread price indexation and passive monetary policy was believed to drive the ever-growing rate of inflation. Although the Real plan broke the backbone of

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14When estimating the VAR and the quasi-VAR models, AIC and SIC tests were used to find the optimal lag order of two. The estimated results of these models are not reported in this paper but can be obtained from the author upon request.
Table 3
Time-varying transition matrix estimations (unrestricted VAR(2)): Unexpected fiscal and money shocks (levels)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unrestricted VAR(2)</th>
<th>Quasi-VAR(2) including lagged nominal rates (t - 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(t - 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>( \mu_1 )</td>
<td>13.5976</td>
<td>13.6313</td>
</tr>
<tr>
<td></td>
<td>(3.4486)</td>
<td>(3.6993)</td>
</tr>
<tr>
<td>( \mu_2 )</td>
<td>4.5852</td>
<td>4.6295</td>
</tr>
<tr>
<td></td>
<td>(2.8872)</td>
<td>(2.9443)</td>
</tr>
<tr>
<td>( \sigma_1 )</td>
<td>62.5127</td>
<td>62.5270</td>
</tr>
<tr>
<td></td>
<td>(9.2266)</td>
<td>(9.3255)</td>
</tr>
<tr>
<td>( \sigma_2 )</td>
<td>1.1381</td>
<td>1.1445</td>
</tr>
<tr>
<td></td>
<td>(0.1782)</td>
<td>(0.1794)</td>
</tr>
<tr>
<td>( \alpha_0 ) (HH)</td>
<td>3.7926</td>
<td>3.8307</td>
</tr>
<tr>
<td></td>
<td>(0.0318)</td>
<td>(0.0318)</td>
</tr>
<tr>
<td>( \alpha_1 ) (HH) FS(^1)</td>
<td>0.2450</td>
<td>1.0170</td>
</tr>
<tr>
<td></td>
<td>(0.6588)</td>
<td>(0.8059)</td>
</tr>
<tr>
<td>( \alpha_2 ) (HH) MS(^1)</td>
<td>0.0792</td>
<td>-0.0977</td>
</tr>
<tr>
<td></td>
<td>(0.3386)</td>
<td>(0.8907)</td>
</tr>
<tr>
<td>( \beta_0 ) (LL)</td>
<td>5.1962</td>
<td>5.0966</td>
</tr>
<tr>
<td></td>
<td>(0.0994)</td>
<td>(0.0934)</td>
</tr>
<tr>
<td>( \beta_1 ) (LL) FS(^1)</td>
<td>-5.2158</td>
<td>-5.2688</td>
</tr>
<tr>
<td></td>
<td>(1.4422)</td>
<td>(1.5724)</td>
</tr>
<tr>
<td>( \beta_2 ) (LL) MS(^1)</td>
<td>1.1373</td>
<td>0.5135</td>
</tr>
<tr>
<td></td>
<td>(0.6176)</td>
<td>(0.4810)</td>
</tr>
<tr>
<td>( p_{11} )</td>
<td>0.9780</td>
<td>0.9788</td>
</tr>
<tr>
<td>( p_{22} )</td>
<td>0.9945</td>
<td>0.9939</td>
</tr>
</tbody>
</table>

Note: Standard errors are shown in parentheses. Superscript 1 is associated with fiscal shocks (FSs). See footnotes to Table 1.

Inflation inertia and finally placed the country on a stable inflationary path, very limited fiscal advances occurred during the first 5 years of the plan. On the contrary, the elimination of the inflation tax—an important source of revenue used by the government to close its financing gap before the Real plan—exposed an even more severe fiscal situation. The debt-to-GDP ratio skyrocketed, but intriguingly enough the inflation rate remained at bay.

Trying to shed some light on this empirical evidence, I estimated a set of regime-switching models with TVTMs using Brazilian inflation data in the sample period of 1981–1998. My objective was to investigate the existence of a nonlinear connection between fiscal as well as monetary policy outcomes and inflation.

My results indicate that a faster growth rate of the stock of real debt–to–GDP ratio is unambiguously bad news for the low-inflation regime. Conditioned on either a high- or low-inflation regime, a faster growth of debt increases the chances that the high-inflation state will emerge (or continue) in the period that follows. I also found evidence that higher tax rates destabilize the low-inflation regime but have no significant effect on the duration of the high-inflation state. The inflationary consequences of fiscal policy under the low-inflation state are also reiterated when unexpected shocks to the primary deficit are taken into account. Considering different methodologies to identify these shocks, all results indicate that the effect of unexpected fiscal deterioration is stronger when conditioned on the low-inflation state. The strong persistence of inflation in the high-inflation regime appears to overshadow the effect of most policy variables.

The analysis also highlighted the fact that higher real interest rates have the disturbing effect of promoting the high-inflation regime. Conditioned on the low-inflation state, higher real rates boost the chances of switching to the high-inflation state as well as the expected duration of the high-inflation regime, but with lower statistical significance (lower \( t \)-statistics).

These results side with Drazen and Helpman’s (1990) and Sargent and Wallace’s (1981) explanation of inflation by highlighting the importance of fiscal stability in determining the dynamics of inflation in Brazil.
Higher growth rates of the debt-to-GDP ratio might induce agents to expect a stronger reliance on future monetization to close the government's fiscal imbalances. Moreover, a tighter stance of monetary policy, attempting to control the rise of inflation expectations, might even make things worse by speeding up the growth rate of debt.

The regime-switching model specification also helps reconcile these empirical findings with the observed decoupling of fiscal policy and inflation after the launch of the Real plan. Even though the observed fiscal deterioration failed to generate inflation, it increased the uncertainty about the duration of the low-inflation regime. Hence, worsening economic fundamentals could first lead to higher expected inflation and only subsequently to higher observed inflation. In these terms, even though nominal interest rates followed the drop of inflation after 1994, they still fell short of reaching international levels (see Figure 3). The full convergence of interest rates was hampered by higher expected inflation, which in turn was fed by a positive probability of switching back to the high-inflation regime—a greater risk that the Real plan could backfire.

References


