

The Monetary and Fiscal History of Brazil: 1960–2016*

Marcio Garcia[‡] Joao Ayres[§] Diogo Guillen[¶] Patrick Kehoe^{||}

November 27, 2018

Abstract

Brazil had a long period of high inflation. It peaked around 100% per year in 1964, decreased until the first oil shock (1973), but accelerated again afterwards, reaching levels above 100% on average between 1980 and 1994. This last period coincided with severe balance of payments problems and economic stagnation that followed the external debt crisis in the early 1980s. We show that the high-inflation period (1960–1994) was characterized by a combination of fiscal deficits, passive monetary policy, and constraints to debt financing. The transition to the low-inflation period (1995–2016) was characterized by improvements in all of these features, but it did not lead to significant improvements in economic growth. In addition, we document a strong positive correlation between inflation rates and seigniorage revenues, although the inflation rates are relatively high for the modest levels of seigniorage revenues. Finally, we discuss the role of the weak institutional framework surrounding the fiscal and monetary authorities and the role of monetary passiveness and inflation indexation in accounting for the unique features of the inflation dynamics in Brazil.

*We would like to thank Marcelo Abreu, Pésio Arida, Edmar Bacha, Marco Basseto, Tiago Berriel, Afonso Bevilaqua, Amaury Bier, Claudio Considera, Gustavo Franco, Fabio Giambiagi, Claudio Jaloretto, Joaquim Levy, Eduardo Loyo, Timothy Kehoe, Ana Maria Jul, Randy Kroszner, Pedro Malan, Rodolfo Manuelli, Andy Neumeier, Juan Pablo Nicolini, Affonso Pastore, Murilo Portugal, Thomas Sargent, Teresa Ter-Minassian, José Scheinkman, Rogério Werneck, and participants of the workshops on The Monetary and Fiscal History of Latin America held in the University of Chicago, LACEA-LAMES in Buenos Aires, PUC-Rio, Central Bank of Chile, and Inter-American Development Bank. This project was coordinated by Marcio Garcia.

[†]The order of authors was selected randomly.

[‡]Pontifical Catholic University of Rio de Janeiro (PUC-Rio), CNPq, and FAPERJ.

[§]Inter-American Development Bank (IADB).

[¶]Itau-Unibanco Asset Management.

^{||}Stanford University, Federal Reserve Bank of Minneapolis, and University College London.

1 Introduction

This chapter presents the monetary and fiscal history of Brazil between 1960 and 2016, with emphasis on the hyperinflation episodes. It describes the evolution of the Brazilian monetary and fiscal policy institutions and how they relate to episodes of macroeconomic instability and growth experience, focusing on the high-inflation period (pre-1994) and two stabilization plans: the Government Economic Action Plan (PAEG) and the Real Plan. The PAEG, in 1964, stabilized an inflation of around 100% per year, whereas the Real Plan, in 1994, stabilized an inflation of around 90% per month after six failed attempts in over a decade. The analysis follows the conceptual framework in Chapter 2, by focusing on the government budget constraint.

A summary of the period is illustrated in Figure 1, in which we show the evolution of real GDP per capita, inflation, and government deficits for the 1960–2016 period.¹ Three sub-periods are identified: (1) 1960–1980: fast economic growth with high inflation and moderate deficits; (2) 1981–1994: slow growth with hyperinflation and high deficits; and (3) 1995–2016: moderate growth with low inflation and low deficits.² The 1981–1994 sub-period stands out not only by its poor growth performance and hyperinflation, but also by severe balance of payments problems, a common feature among highly indebted Latin American countries affected by the increase in international interest rates and the slowdown in international economic growth.

When relating the episodes of macroeconomic instability to the government fiscal and monetary policies, we observe the following: (a) both stabilization plans, PAEG in 1964 and Real Plan in 1994, included measures to improve fiscal balances and were followed by increased access to debt financing; (b) the government policy to increase public investment in the wake of the first oil shock in 1973 explains the rapid increase in external debt that preceded the external debt crisis of 1983 seen in Figure 2; and (c) the high-inflation periods (pre-1994) were characterized by the combination of fiscal deficits, passive monetary policy, and constraints to debt financing, while the transition to the low inflation period (1995-2016) was associated with improvements in government fiscal balances, higher de facto independence of the monetary authority (as of this writing, Brazil still lacks a formally independent central bank), as well as much larger access to debt financing.

In comparison to other Latin American countries, the following two characteristics make the Brazilian experience rather unique: (i) long period of high inflation, with annual inflation rates above 100% between 1980 and 1994, and (ii) modest levels of deficits for very high underlying inflation rates. We discuss two features that may explain these

¹Appendix C discusses the data and methodology. Our definition of deficit is the primary deficit plus real interest payments on debt discounting for real GDP growth (see Chapter 2), and throughout the paper we use the general price index from Getulio Vargas Foundation, IGP-DI, as our benchmark.

²One must bear in mind that the quality of fiscal statistics decreases as we move back in time.

unique characteristics of the Brazilian hyperinflation. First, a poor institutional framework in which other public entities besides the monetary authority had indirect control over money issuance. We discuss that in Section 4.1. Second, the combination of a high degree of indexation in the economy to past inflation with a passive monetary policy.³ Together, they created what was called at the time *inflation inertia*, which could explain why the Brazilian hyperinflation was a much more protracted process than elsewhere, and gave many the illusion that it could be cured without major improvements in the fiscal stance. We discuss that in Section 4.2.

This chapter is organized as follows: in Section 2, we present a summary of the government budget constraint; in Section 3, we provide a historical description of each of the sub-periods 1960–1980, 1981–1994, and 1995–2016; in Section 4 we discuss the evolution of the institutional framework involving both fiscal and monetary authorities and the genesis of inflation inertia; in Section 5, we present our final remarks and conclusion.

2 The government budget constraint

We are interested in analyzing the evolution of the government budget constraint for Brazil in 1960–2016. We attempt to match the variation in stocks (debt figures) with flows (fiscal deficits), duly accounting for valuation effects.⁴ Table 1 presents a summary of the results. In order to finance interest payments and primary deficits, the government can either issue domestic and external debt, or issue money and receive seigniorage revenues. Transfers account for the residual.⁵

We divide the 1960–1980 sub-period into three parts: 1960–1964, 1965–1972, and 1973–1980. In 1960–1964, markets for government debt securities were still underdeveloped, and the government faced restrictions to both domestic and external debt financing. Interest payments were low, but primary deficits were on the rise, and had to be financed with seigniorage revenues. In 1964–1967, the stabilization plan PAEG implemented both fiscal and financial reforms, which reduced primary deficits and allowed the government to issue domestic debt securities. That accounts for the increase in domestic debt financing and reduction in seigniorage revenues that we observe in the 1965–1972 period. In 1973–1980, on the other hand, we observe a rise in both debt financing in external markets and seigniorage revenues, which were associated with higher interest payments on external debt and a significant rise in transfers, the residual.⁶ Fortunately, in this

³Most prices, wages, taxes, and the exchange rate were indexed to past inflation.

⁴Mainly the effect of devaluations on foreign-currency denominated or indexed debt.

⁵The sum of primary deficit and transfers is close to the measure of primary deficit reported by the Central Bank of Brazil starting in 1985, which is based on the public sector borrowing requirements and that is usually referred to as the primary deficit *below the line*. See Appendix C.

⁶Interest payments might be negative because we are discounting for growth rates in real GDP and for the monetary correction of the debt.

case, we can explain what most of these transfers are. In the wake of the first oil crisis of 1973, the government implemented policies that aimed at boosting investment through external borrowing, and that was done mainly through state-owned enterprises (SOEs). The debt series that was used to compute the government budget constraint includes SOEs, but the primary deficit series does not. The increase in investment by SOEs, documented in Table 2, accounts for a large fraction of the increase in transfers.⁷ Therefore, we argue that deficits at the time are better represented by adding the transfers to the reported primary deficits, which is reported in row 9 of Table 1, under *primary deficits + transfers*.⁸

In 1981–1994, debt financing in external markets decreased sharply and interest payments on external debt increased as a reflection of the debt crisis that followed the increase in international interest rates. In that period, seigniorage revenues were used to finance the payments of both principal and interest of the external debt as well as the primary deficits.

The 1995–2002 period followed the agreement on the external debt renegotiations and the end of the hyperinflation in 1994. It showed a significant reduction in seigniorage revenues and a large improvement in primary and fiscal balances. Interest payments on external debt decreased, whereas interest payments on domestic debt increased. The 2003–2011 period continued to show primary and fiscal surpluses and low seigniorage revenues, and the external debt was replaced by domestic debt. As we will discuss, the pattern that we observe in 1994–2011 reflects changes in both monetary and fiscal policy institutions, with higher de facto independence of the Central Bank and greater control over the government budget. However, in the most recent period, 2012–2016, we observe a deterioration in fiscal balances that have been financed by a rapid increase in domestic debt.

In the next sections we provide a detailed historical background that describes the fiscal and monetary policies adopted in the 1960–2016 period and that accounts for the evolution of the government budget constraint.

3 Historical description

3.1 1960–1980: fast growth with macroeconomic instability

Brazil went through important transformations during the first sub-period of our analysis. It moved from being a rural society, in which 55% of the population lived in

⁷According to Werneck (1991), the average capital expenditures of SOEs for the 1973–1980 period was 7.4% of GDP, so our figures might be underestimating its importance. Nevertheless, both data indicate a rapid increase in investments by SOEs in that period.

⁸By doing so, we approximate what the Central Bank of Brazil has done in its fiscal statistics starting in 1985. See Appendix C.

rural areas, to a urban society, with 68% of the population living in cities. Its production structure shifted towards the manufacturing sector, which increased its fraction in GDP from 32% to 41%, while the agricultural sector saw its fraction of GDP reduced from 18% to 10%.⁹ It was a period of fast economic growth, with real GDP per capita increasing 4.6% per year on average (Figure 1a). However, it was also a period of macroeconomic instability, with a deep recession in the early 1960s, increasing external indebtedness following the first oil crisis in 1973, and nominal instability. Inflation rates rose in the beginning and reached levels around 100% in 1964, when the stabilization plan PAEG was implemented after a military coup.¹⁰ Inflation rates fell significantly, but started to accelerate again around the first oil crisis, in 1973, returning to three-digit levels in 1980.¹¹

To understand the fiscal and monetary policy institutions that were in place during these years, one should note that it was a period of heated debate regarding the role of the state in promoting economic development, in which the government undertook major national development plans, such as the Targets Plan in 1956–1961, the National Development Plan I in 1972–1974, and the National Development Plan II in 1975–1979. That process also led to a surge in the number of public banks, with nine out of twenty-three states creating their own banks between 1960 and 1964 to finance their fiscal deficits, and to the creation of some of the largest Brazilian SOEs, such as Eletrobras in 1962 and Telebras in 1972.¹² As we discuss below, they would all play an important role in explaining the dynamics of the government budget constraint.

3.1.1 1960–1964

Before 1964, the government treasury had direct control over money issuance through the Bank of Brazil (BB), which was both the bank of the government and a commercial bank.¹³ The main monetary policy instruments in use were the control over the monetary base, subsidized credit to the industrial and agricultural sectors, and interventions in the foreign exchange market. Some of those interventions aimed to protect the local industry by imposing restrictions on the imports of products which were also produced locally, that is, they were used to implement import-substitution policies.¹⁴ There was no centralized market in which one could trade government debt securities in Brazil. Debt contracts were very heterogeneous and faced legal limits on the nominal interest rates that could

⁹Data from the Brazilian Institute of Geography and Statistics (IBGE).

¹⁰The military dictatorship would last until 1985.

¹¹For thorough analyses of that period, we refer to Orenstein and Sochaczewski (2014), Mesquita (2014), Lago (2014), and Carneiro (2014).

¹²The other well-known Brazilian SOEs Companhia Siderúrgica Nacional (CSN), Companhia Vale do Rio Doce, and Petrobras had been created in 1941, 1942, and 1953, respectively.

¹³Section 4.1 discusses the institutional framework in which the central bank operated at length.

¹⁴That was done through both quantity (restricted access to foreign currency) and price restrictions.

be charged (12% per year).¹⁵ With rising inflation and primary deficits, that led to a decrease in the stock of domestic debt before 1964 (Figure 3) and seigniorage revenues became the main source of funds for the government to cover its fiscal deficits, as Table 1 shows. Access to external debt was restricted in that period. Brazil had a balance of payments crisis in 1952, and faced balance of payments problems again in the late 1950s.¹⁶

On the fiscal side, Brazil already had a diverse set of tax instruments, such as income, import, and consumption taxes, and they amounted to around 17% of GDP (Figure 4). Taxes on production were cumulative instead of value-added tax, that is, they taxed the revenues and not the value-added. There were no fiscal rules such as limits to fiscal deficits, and the government could adopt expansionary policies without explicitly indicating how to finance them.

In 1956–1961, President Juscelino Kubitschek launched the first major national development plan, the Targets Plan, that had ambitious goals to create the necessary infrastructure to facilitate the industrialization process in Brazil. The transportation and energy sectors were the main targets, and the country exhibited a rapid expansion of its highway and electric energy systems. That plan also became famous for the creation of the new capital city, Brasilia. Besides relying on government funds, that plan also relied on large foreign direct investment, especially in the automotive industry. During its implementation, Brazil experienced high growth rates in real GDP per capita, but entered a recession in the following years, 1962 and 1963, accompanied by rising fiscal deficits and inflation. That crisis was followed by a military coup in 1964, and by the implementation of an economic stabilization program in 1964–67, PAEG, that aimed to stop the inflationary process and resume growth through fiscal and financial reforms.

PAEG was launched in November 1964. At that time, there was a clear relationship between inflation and the expansion of the monetary base (Figure 5a), and the government understood that it should find alternative ways to finance its expenditures and investment projects other than through seigniorage revenues. The government tackled that problem on two fronts: a fiscal reform to decrease government deficits, and a financial reform to create other financing options. On the fiscal side, the government increased its tax revenues to around 23% of GDP (Figure 4) and managed to reduce its fiscal deficits, as documented in Table 1 sub-period 1965–1972. That was achieved through the creation of new taxes, increases in existing tax rates, and modernization of the tax system with the introduction of a value-added tax. On the financial side, the main changes were the introduction of monetary correction (indexation) to circumvent the legal limits on nominal interest rates, the creation of the Central Bank of Brazil (CBB), and the adoption

¹⁵See Silva (2009) and Pedras (2009) for the history of the Brazilian government debt.

¹⁶Brazil started negotiations with the International Monetary Fund (IMF) in the late 1950s, but the negotiations were suspended as Brazil did not accept its conditions.

of a banking system with a clear-cut separation among commercial banks and nonbank institutions. These changes would have important implications for the inflationary process.

Regarding the Central Bank of Brazil, it is important to mention that upon its creation, the government established an account between the central bank and the Bank of Brazil, *Conta de Movimento*, that ended up providing Bank of Brazil with the power to issue money. The Bank of Brazil could withdraw funds from that account whenever prompted to further extend financing to sectors or firms targeted by economic policy, and the Central Bank would automatically provide those funds through an expansion of the monetary base.¹⁷ In addition, the government created the National Monetary Council, which would rule over the central bank. Both of these changes served to impose constraints on the control of the monetary base expansion by the monetary authority, as Section 4 explains in detail. With respect to the monetary correction, the existence of indexed public debt held by private savers on a voluntary basis was critical for the development of financial markets in Brazil in the following years.

3.1.2 1965–1972

Figure 6 illustrates how successful PAEG was in controlling the inflation process. After 1964, primary deficits decreased and the government was able to reduce its seigniorage revenues, which explains the reduction in inflation and money growth rates that followed. The reforms also led to an increase in debt financing. The 1968–1973 period became known as the years of *economic miracle* in Brazil, with annual GDP growth rates in excess of 10%. That led to the optimistic view that the Brazilian state had created a wholesome mechanism to capture private savings and channel them to public investment. The idea that public and private investment were complementary led many to argue that, by borrowing to pay for large public projects, the government could spur private investment. During those years the government implemented the National Development Plan I (1972–1974), focused on improving the country’s infrastructure. It included large projects such as the Itaipu Dam, Trans-Amazonian Highway, and Rio-Niterói Bridge. The country also experienced higher investment by SOEs and increasing supply of credit by public banks, such as the Bank of Brazil and the National Bank for Economic Development (BNDE).¹⁸

3.1.3 1973–1980

When the first oil crisis in 1973 presented challenges to the feasibility of the high-growth path, the Brazilian government kept its long-run strategy in the President General

¹⁷We added the variations in *Conta de Movimento* to the original primary deficit series to account for the transfers between the Central Bank of Brazil and the Bank of Brazil. See Appendix C.

¹⁸BNDE was established in 1952, and it was renamed the National Bank for Economic and Social Development (BNDES) in 1982. See Costa Neto (2004) for the history of public banks in Brazil.

Geisel years (1974–79) to grow its way out of the first oil crisis, even if it had to rely on further increasing public indebtedness by borrowing from abroad. That explains the rapid increase in external debt in Figure 2, and accounts for the rise in external debt financing in the 1973–1980 period in Table 1. One of its main goals was to reduce the country’s dependence on oil imports through higher investment in domestic oil production and in the exploration of other sources of energy such as ethanol and nuclear power. As part of this strategy, the government launched the National Development Plan II in 1975–1979, which focused on the manufacturing, energy, transportation, and communication sectors (Table 2). It had the SOEs as its main implementation vehicle, and that accounts for their increasing investment and debt accumulation.

The external debt series does not allow us to distinguish SOEs from the rest of the public sector before 1981, but in that year external debt of SOEs represented 72% of the total, which indicates that they accounted for a large fraction of the increase in public external debt after 1973 (Figures 2 and 7a). The same holds for the domestic debt, although in that case the concentration of SOEs was less pronounced. They accounted for 35% of the total domestic debt in 1981, while 25% was from states and municipalities, and 40% from the federal government (Figure 7b). These figures also show how the deficits at the subnational level accounted for a large fraction of the increase in public domestic debt.

The change in economic policy that took place after the first oil crisis is clearly illustrated in Figure 6. After 1973, Brazil was back to a scenario of rising deficits, rising seigniorage revenues, and rising inflation and money growth rates. That period was also characterized by the poor management of the government budget, so it is important to take into account the off-budget transactions when analyzing the dynamics of the government budget constraint. As an example, at that time the government operated at least three budgets. One that was discussed in the Congress and presented in the official statistics, the *monetary budget* that was controlled by the National Monetary Council (see Section 4), and the budget of the SOEs.

The main off-budget transactions we identified were the transfers from the central bank to the Bank of Brazil and the operations of SOEs. The transfers between the central bank and the Bank of Brazil are approximated by variations in the *Conta de Movimento*, the dashed red line in Figure 8 referred to as *variations in the balance of BB accounts*.¹⁹ The figure shows the rise in those transfers in the 1973–1980 sub-period, which reflects the rise in subsidies and subsidized credit provided by public banks to state and local authorities and to the private sector. The deficits of SOEs are partially captured by the *transfers* in the government budget constraint, since their debt is included in the external debt series since 1973 and in the domestic debt series since 1981 (see Appendix

¹⁹It can also be considered a proxy for the deficit of the *monetary budget*.

C).²⁰ Figure 9 compares the fiscal deficit series with and without transfers, and it shows that transfers increased significantly during that period.

The strategy to sustain growth through external borrowing was successful in the first few years, as the accumulation of public debt was compatible with the maintenance of economic growth at high rates. Continuity of this process, however, relied on other factors: on the growth of private wealth, on the wealth holders confidence in the capability of the public sector to service its debt, and on the use that was ultimately being made of the savings captured by the government. In the second half of the decade, GDP growth declined sharply, inflation doubled, and there were increasing difficulties in controlling the growth of the public sector financial needs. The average maturity of the federal government domestic debt securities reached its peak in 1975 (Figure 10), but the share of nominal bonds kept growing (Figure 11) until the end of the decade, as interest rates began to rise in 1976 following the abandonment of the interest rate ceilings, which had prevailed until September 1976.

The first year of President General Figueiredo's term, 1979, started with a reduction in the real value of public bond debt due to two effects. First, the decline in real interest rates due to the decline in nominal interest rates promoted by Planning Minister Delfim Netto in an attempt to stimulate economic activity, which reduced the attractiveness of the debt.²¹ Second, the increase in exchange rate uncertainty related to the second oil crisis. Figure 12 shows how interest rates were kept consistently below inflation rates between 1979 and 1981. Both factors led to a decrease in the stock of public domestic debt (Figure 3) and an increase in the fraction of government debt securities that are indexed to inflation (Figure 11). The policies implemented by Delfim Netto, mainly low nominal interest rates and the corresponding increase in the growth rate of the monetary base, had the effect of significantly increasing inflation, from around 50% in 1979 to over 100% in 1980.

3.2 1980–1994: no growth with high macroeconomic instability

If the previous sub-period was characterized by the number of national development plans that were implemented, the sub-period 1980–1994 is famous for its number of stabilization plans, some of them indicated in Figure 13, and by severe balance of payments problems.²² In this section, we discuss Brazil's balance of payments crisis and provide a description of its stabilization plans during the 1980s and early 1990s, focusing on their

²⁰The government did not have control over the budget of its SOEs. Given the deterioration of their accounts and trying to control that process, the government created the Secretary of Coordination and Governance of State-Owned Enterprises (SEST) in 1979.

²¹Delfim Netto replaced Mario Henrique Simonsen in August 1979 as the *de facto* manager of the economy, less than six months in the new government of President General Figueiredo.

²²For thorough analyses of that period, we refer to Carneiro and Modiano (2014), Modiano (2014), and Abreu and Werneck (2014).

main points and reasons for their failures, and trying to find out the most important differences between them and the ultimately successful plan, the Real Plan.

Even though inflation was increasing to rates above 100% per year, in the first half of the 1980s there were larger concerns to reduce external imbalances than to reduce inflation. In 1981 and 1982, the main objective of Brazil's macroeconomic policy was to reduce the need of foreign capital. Figure 14 shows the current account balance, trade balance, and net interest income, and we can observe the increasing cost of interest payments on external debt and the trade balance reversal (from deficit to surplus) in those years. There was a large devaluation of the real exchange rate (Figure 15), and real GDP per capita contracted sharply.²³ In 1982, Brazil entered a sequence of episodes in which it accumulated arrears on interest payments of its external debt, illustrated in Figure 16, that would end only in 1994.²⁴ These facts account for the drop in external debt financing and rise in interest payments on external debt reported in Table 1, sub-period 1981–1994. During that period we also observed the nationalization of the external debt. Foreign debtors would pay the Central Bank of Brazil in domestic currency and the central bank would retain those funds in name of the creditors. Any gains or losses resulting from the debt negotiations regarding write-offs and so on would be captured by the central bank. In addition, new foreign debt would be deposited at the central bank, who would then lend those funds to local debtors in local currency. As a result, a large fraction of the external debt became concentrated in the central bank's balance sheet up to 1994, as Figure 17 illustrates.

While the government's attention was focused on the balance of payments crisis, inflation kept increasing. It was only in 1986 that the sequence of stabilization plans began. But before moving to the discussion about each stabilization plan in detail, it is important to put into perspective what the cause of high inflation at that time was considered to be. The first plans were based on the idea that inflation inertia due to the highly indexed economy was the essence of the inflationary process, and breaking that inertia should be the main focus of the stabilization plan. These plans had a *neutral shock* of freezing prices as one of their main characteristics. However, the staggering of wages and other prices under very high inflation was an extra obstacle to that strategy. At the moment that a price freeze to stop inflation was introduced, agents with similar average real wages would have different real wages depending on when the last adjustment was set. Since inflation was supposed to decrease substantially after the plan, the differences in real wages at the moment of the plan would prompt losers to claim rights to be compensated, while the winners would not complain. If the losers were compensated, that would reignite the inflation spiral. To avoid that problem, a conversion table was always mandated at the

²³Under our convention for the real exchange rate, a real depreciation happens when the real exchange rate increases.

²⁴See Cerqueira (2003) for a detailed description of the external debt negotiations during that period.

beginning of each plan, aiming at keeping, in the new low inflationary environment, the same average real wage that had prevailed under the previous high inflationary period.²⁵

An alternative and more standard orthodox theory considers the persistent and large fiscal deficits as the main cause of the inflationary process, since the government had to increase the growth rate of the monetary base to raise seigniorage revenues to finance those deficits. We discuss both theories in Section 4. As we will see, from the first to the last plan there was a decrease on the emphasis on the heterodox part of the plan, which comprised price freezes, and more emphasis on the orthodox part. Fiscal and monetary policies became a major component of the latter plans, while maintaining a device to synchronize the adjustment of nominal variables to avoid threatening the new low inflation level.

Cruzado Plan: In February 1986, the government implemented the Cruzado Plan. As it became standard in most Brazilian stabilization plans, the first rule was to change the currency, in that case from cruzeiro to cruzado, which meant cutting three zeros. Prices were frozen and any indexation clauses for periods shorter than one year were forbidden.²⁶ Wages were converted into cruzados based on the average purchasing power of the last six months, but could be readjusted every time inflation hit 20% or during the annual readjustment cycle. Moreover, unemployment benefits were introduced and the minimum wage was raised by 8% in real terms. The exchange rate regime also changed, with the domestic currency now pegged to the US dollar. Fiscal and monetary policies were put under the discretion of the policymakers, but there was an important change, the end of the *Conta de Movimento* between the central bank and the Bank of Brazil. In practice, however, that only took place after 1988, because another account between the central bank and Bank of Brazil, *Conta de Suprimentos Especiais*, replaced *Conta de Movimento* until its extinction in 1988 (see Section 4). Another important measure was the creation of the National Treasury Secretariat, which would take control over both the administration of the domestic public debt and the government budget.²⁷

At first, the Cruzado Plan was very successful in reducing inflation. The average monthly inflation from March to July of 1986 was 0.9% (11% per year). Moreover, the claim to freeze prices had a civic impact since the population felt like they were *auditing*

²⁵The change of currency allowed for reductions of those wages that had been recently adjusted, in order to keep the same average real wage. Without the change of currency, the reduction in nominal wages would not be possible, since nominal wage reductions are not allowed by Brazilian Law.

²⁶For fixed rate contracts, a schedule for interest rate conversion was set. It was assumed that all nominal interest rates were based on the inflation expectation of 0.45% a day (210% a year), which had been the average daily inflation in 1985/86. The real rate was, then, the (new) nominal rate in the new currency (cruzado), since the new expected inflation (at least for the government) was zero. For the variable interest rate contracts, which prescribed a nominal rate equal to the sum of the monetary correction and a variable (real) interest rates, the new nominal rates in cruzados were set to be the ones above the monetary correction before the plan.

²⁷Before that, the Central Bank of Brazil managed both the domestic and external public debt, which included issuances, amortizations, and interest payments.

prices: but that led to overheating. Sales increased 23% in the first six months of 1986 compared to the first six months of 1985, and real wages increased 14% from March to September of 1986 (Figure 18). One story that is consistent with such evidence is that even though prices were not allowed to change, the *equilibrium prices* were increasing, which was producing overheating since posted prices were too low. Therefore, production increased to meet the higher demand in the beginning, but then production decreased and stores started to run out of stock. Meanwhile, the Central Bank of Brazil tried to keep interest rates low to induce low expectations. One huge imbalance was the inconsistency of the plan for inflation and the monetary base: the monetary base was increasing much faster than inflation itself.

In July 1986, the government did a timid fiscal package, *Cruzadinho*, focusing on increasing government revenues. But in reality *Cruzadinho* had the opposite result of what policy makers expected. Expecting prices to defreeze, demand increased and the overheating problem became even more dramatic. Inflation remained low, but it was not really representative, because products were scarce. Due to the high demand, imports kept increasing while exports declined (Figure 19), thereby aggravating the trade deficit. A rumor of a large devaluation in the near future reinforced that pattern. This expectation led to a postponement of exports and acceleration of imports, which increased the problems with the balance of payments.²⁸ Facing all these challenges, in November 1986, the government opted for a fiscal plan, Cruzado II, trying to increase the revenues through the readjustment of some public prices and some indirect taxes, which led to a high inflationary shock. It was again an environment of high inflation (17% per month in January 1987). Meanwhile, the external crisis was just getting worse. In February 1987 the government suspended the interest payments on the external debt for indeterminate time (Figure 16). The idea was to stop the losses of international reserves and to start a new phase of the renegotiation of the debt with the support of the population.

Bresser Plan: In July 1987, the government implemented the Bresser Plan. It was presented as a hybrid plan, with fiscal and monetary policies as well as aspects to deal with inflation inertia. As in the Cruzado Plan, prices were frozen. As usual, the moment in which the price freeze took place was important, because the relative prices would remain stuck and possibly off-equilibrium. Trying to get a better result than the Cruzado Plan on this aspect, after the price freeze there was an increase in the prices of public services and some administered prices to correct for misalignments in relative prices. The extinction of the automatic trigger in wage resetting if inflation surpassed a 20% threshold was also perceived as another improvement. But the economic team created another kind of wage indexation, the URP (Price Reference Unit) in which in each quarter the government would specify the readjustment for the next three months

²⁸The government kept the mini-devaluations based on an indicator of the ratio exchange rate / wage (crawling peg). However, this same indicator was suggesting that the exchange rate was appreciated.

based on the average inflation of the period. This would keep a monthly readjustment, but there would be a gap between the readjustment and current inflation. In contrast to the Cruzado Plan, monetary and fiscal policies were active. Real interest rates remained positive in the short term. In the fiscal policy arena, the government aimed to reduce the operational deficit from the expected 6.7% to 3.5% of GDP.²⁹ The plan did not address (or seek to deal with) the consequences of the previous default with creditors. Another interesting aspect of this plan is that it did not target zero inflation, it was meant to be just a deflationary shock.

The main purpose of Bresser-Pereira, the Finance Minister, was to have a fiscal reform to reduce inflation. However, it was not successful. In 1987, the deficit was much higher than promised. Differently from the Cruzado Plan, that had popular support, the Bresser Plan lacked popular support and, in February 1988, there was some liberalization of prices, reducing the effectiveness of the price freeze. A third problem of the plan was that it led to a fall in gross fixed capital formation.

After Minister Bresser left, Maílson da Nóbrega, the second in command, took his position. In January 1988, the government adopted an economic policy referred to as *Feijão-com-Arroz Policy*, which can be translated to English as *Black-Beans-and-Rice Policy*.³⁰ Instead of freezing prices, its target was merely to keep inflation at 15% per month. The deficit was expected to reach 7-8% of GDP in 1988, and there was a temporary freeze of public sector wages to reduce it.

At first, this policy succeeded in avoiding an inflationary explosion and the fiscal stance improved. The default on external debt was suspended and the government started negotiations with external creditors. However, inflation started rising again and the target of 15% per month was not achieved in the second quarter of 1988.

In October 1988, a new constitution was enacted. The new constitution increased fiscal expenditures, reduced the flexibility of expenditure switching between fiscal accounts, and increased labor costs substantially. It did so by increasing expenditures and by increasing the transfers from the central government to states without transferring the corresponding responsibilities, inducing an increase in the deficit of the central government. Just to put into perspective, 92% of the revenues were earmarked, that is, revenues from different sources were dedicated to specific programs and/or purposes, reducing the flexibility of fiscal policies. In addition, the new constitution reduced the standard weekly working time from 48 to 44 hours and increased the cost of overtime.

Summer Plan: The government implemented the Summer Plan in January 1989.

²⁹At the time the government used the public sector borrowing requirement as a measure of the nominal deficit. However, nominal deficits were very high due to the monetary correction of the value of the debt. In order to overcome that, the operational deficit was adopted as the main deficit measure, which included only the nominal value of real interest payments. See Appendix C.

³⁰Its name reflects the meaning of black beans and rice in the Brazilian culture. It is the dish that Brazilians eat every day. It is not considered to be very interesting, neither very difficult, but it does the job of providing a healthy meal.

Again, it was a hybrid plan, but the debate on the need of changes in fiscal and monetary policies was increasing. Like the previous plans, there was a component of price freezing as well as the adoption of a nominal anchor. In this case, a fixed exchange rate (1 Cruzado Novo = 1,000 Cruzados = US\$1) was implemented for an indefinite time. Moreover, there was an attempt to end inflation indexation. On the fiscal and monetary side, the plan was to adopt a tight monetary policy and to fight inflation by controlling the public deficit. It intended to control expenditures and increase revenues through the privatization of public-owned assets and a reduction in the wage bill of the public sector.

Overall, the plan seemed to incorporate everything that lacked in the previous plans. Although it kept a heterodox flavor, it was mostly an orthodox plan aiming to reduce subsidies, close public firms, fire public employees, with a deindexation plan that was sort of a small default. However, the government did not have the political power to carry it through. Without the Congress, privatizations and other unpopular measures, such as the closing of public firms, were canceled. In the end, the reforms were not implemented. Moreover, the tight monetary policy put interest rates in high levels and increased the fiscal deficit of the government. With low credibility and a reform that did not go through, inflation accelerated and the Summer plan also failed.

The 1980s ended with inflation rates of about 70% a month and with almost 100% of the federal bond debt being rolled-over in the form of zero-duration bonds.³¹ This state of affairs reflected not only the extremely high uncertainty regarding inflation and interest rates, but also the fear of an explicit default of the public debt by the incoming administration, President Fernando Collor de Mello. At the time, there was a widespread suspicion regarding the credit risk of the public securities, which were indeed validated by the new administration's actions. Fernando Collor de Mello was elected President of Brasil after 29 years of indirect elections or undemocratic ones. The very day he took office, he launched the Collor Plan.

Collor Plan I: In March 1990, the government launched the Collor Plan I. Prices and wages were frozen. The plan recognized that a reduction in deficits was necessary to end the hyperinflation, and it implemented both temporary and permanent fiscal policies. Among the temporary measures were the establishment of a tax on financial intermediation and the suspension of tax incentives. But the permanent policies were more important. There was an effort to reduce fiscal evasion (one of his “trademarks” during the presidential campaign) and to increase taxes. Other major components included privatizations and an administrative reform. However, that plan became famous for its (controversial) monetary policy. In an attempt to reduce the money supply, the government confiscated deposits in both transaction and savings accounts for a period

³¹Zero-duration bonds are bonds that pay ex-post the accrual of daily overnight interest rates. Therefore, the price of these bonds are insensitive to interest rate changes. It was a way to separate interest rate risk from maturity risk, thereby lengthening a bit the very short-term public debt.

of eighteen months.³² Those resources amounted to 80% of bank deposits and financial investments, and they would be held at the Central Bank of Brazil and invested in federal government bonds. These resources were remunerated while they were kept at the central bank, but their rates of return were decided by the government itself, and therefore subject to partial defaults.

Following its implementation, monetary aggregates fell sharply, especially the higher ones (Figure 20), and real GDP per capita contracted by 5.7% in 1990. This reduction of liquidity, however, was not sufficient to control inflation. Regarding the fiscal reform, the threatening behavior of the government towards the public sector employees made the reform very unpopular. There was a lot of resistance and, in the end, it could not deliver on what it had promised. While some privatizations succeeded, most of its reforms were short-lived.

Collor Plan II: In January 1991, the same government implemented the Collor Plan II. Just like the previous one, it planned to reduce government expenditures by firing civil servants and closing public services. It also proposed the privatization of state-owned enterprises. As usual, the plan included some price freezes. Wages were converted by a twelve-month average, a new *tablita* was adopted based on the assumption that the inflation would fall to zero, and it put an end to indexation.³³ Not entirely related to the fight against inflation, this plan had a motif that Brazil had to improve the quality of its products. In the words of the President, “Brazil was producing horse-drawn coaches instead of cars.” To achieve that, the government opened the Brazilian economy to foreign competition and privatized state-owned firms.

Following its implementation, the country experienced a recession. But it recovered afterwards, and this is usually attributed to enhanced competition in the economy. Inflation ended up rising again, but this plan made two important permanent changes. First, it opened up the Brazilian economy and trade expanded, reversing the previous trend (Figure 19). Second, productivity increased. In the beginning of 1992, when expectations of accelerated inflation did not materialize, the effects of recovered investors’ confidence started to show up in public debt markets. Those expectations had been based on the combination of price liberalization, corrections of public tariffs, and on the devaluation that followed the floating of the exchange rate in October 1991 in face of the strong monetization of the hijacked assets during Collor Plan I.³⁴ The return of investors’ confidence is also confirmed by the recovery of foreign exchange reserves after 1992.

³²The government confiscated the amounts exceeding \$50,000.00 cruzados novos. The resources actually became available before the eighteen-months period, as Figure 20 shows.

³³*Tablita* was the name for the interest rate conversion table when the currency changed.

³⁴The recovery of the stock of public debt in the portfolio of the private sector was a clear demonstration that asset-holders were willing to return to business as usual in spite of the violence of repeated interventions which had been made in the rules of indexation and liquidity of public securities in the previous twelve years. One should bear in mind that the majority of economic analysts at the time were forecasting that the government would never be able to place new debt again.

Following the high political turbulence that characterized the months preceding the impeachment of President Collor de Mello (October 2nd, 1992), the beginning of Itamar Franco's presidency was marked by high uncertainty concerning economic policy. Proposals of another moratorium, and even repudiation of the public debt, were constantly in the press. It was only after the President nominated his fourth Minister of Finance in less than six months, Fernando Henrique Cardoso, that the recovered confidence materialized in higher external reserves.

Real Plan: In February 1994, the government launched its last stabilization plan, the Real Plan, that would finally put an end to the hyperinflation. The plan that conquered the Brazilian inflation did not have the blessing of the International Monetary Fund (IMF), an always troubled relationship in the previous decades. It had different concepts from the previous ones, aiming to reduce deficits, to modernize firms, and to reduce the distortions that arose from previous price freezes. An important difference from previous plans is that it was planned in advance, with several measures being taken before its official announcement.

Its first stage started in June 1993, when the government launched the *Programa de Ação Imediata* (Program for Immediate Action), designed to focus on fiscal imbalances that would arise when the seigniorage revenues fell.³⁵ It included the increase of existing tax rates, such as income tax, the creation of new taxes, such as the tax on financial intermediation, and the renegotiation of subnational government debt in an attempt to control the deficits of subnational governments.³⁶ Another fiscal adjustment came in the beginning of 1994, with the *Fundo Social de Emergência* (Emergency Social Fund), a way to suspend part of the earmarked revenues of states and municipalities, providing more flexibility to the government budget. On the monetary side, a clearly stated intention to limit issuances of the new currency led to the adoption of high interest rate policy and of high reserve requirement ratios (100% reserve requirement on new deposits after July 1st 1994). Besides that, the plan included changes in the institutional framework in which the central bank operated, such as the transfer of management of the external debt to the National Treasury Secretariat and the reduction of the National Monetary Council. Section 4 discusses those changes in more detail. On top of all these measures, the government also reached an agreement on its external debt renegotiations under the Brady Plan, and in March 1994 its defaulted debt was securitized and the country regained access to international capital markets.³⁷

The Real Plan did not involve price freezes itself, but it was able to solve the problems of staggered wages and prices. Actually, this was considered the most controversial aspect of the plan, but ended up being very successful. The creation of a new unit of account

³⁵The program was announced in June 1993, but many of the reforms were implemented later in that year or even in 1994.

³⁶See Portugal (2017) for a discussion of the fiscal adjustments that were adopted in that period.

³⁷The agreement was signed in November 1993.

URV—*Unidade Real de Valor* (Unit of Real Value)—aimed at establishing a parallel unit of value to the cruzeiro real, the inflated currency. The idea was to make it temporary. Prices were quoted both in URVs and cruzeiros reais, but payments had to be made exclusively in cruzeiros reais. The way the URV worked was like a shadow currency that had its parity to cruzeiro real constantly adjusted, since it was one-to-one with dollar. Therefore, a conversion rate of the URV/cruzeiro novo (the old currency) was set every day, and many conversions were left to free negotiation between economic agents, with the government having more interference in oligopolized prices. That would allow agents to observe the low inflation of the parallel currency, therefore breaking the expectations of high inflation once the currency was changed. The URV was created in February 1994, when the Real Plan was officially launched, and in May 1994 the government announced that the Real would become the new currency in July 1994. The government kept its plan and the URV was extinguished on July 1st, 1994, when it was converted to the new currency, Real, with the parity being 1 dollar = 1 real = 1 URV = 2750 cruzeiros reais, and the adoption of a crawling peg regime followed.

After the currency conversion was implemented, inflation rates fell significantly and it was the end of the hyperinflation period in Brazil. Figure 21 illustrates how the increasing primary surplus since 1993 allowed the government to reduce its seigniorage revenues after the Real Plan was implemented. The drop in seigniorage revenues were associated with the reduction in both inflation and money growth rates. In Table 3 we use the monthly data to compute the government budget constraint around the time the Real Plan was implemented. Note that while the primary surplus increased in May/93–May/94, the government was able to accumulate foreign reserves by 6.3% of GDP (that explains the negative 6.3% of GDP relative to net external debt in Table 3). Then, between May/93–May/94 and May/94–May/95, seigniorage revenues fell from an average of 2.7% to only 0.7% of GDP, and that was possible because of the increase in primary surplus, from 2.8% to 4.0% of GDP, as a result of the fiscal measures described above. However, in May/95–May/96, after inflation was under control and seigniorage revenues fell, the government showed a deterioration in its primary balance that would be reversed in the subsequent years. That fiscal deterioration was financed through domestic debt issuance, which shows that the credibility of the reforms played an important role, as it allowed the government to keep seigniorage revenues at low levels. In addition, the increase in real money balances following the Real Plan also contributed to increase the financing options of the government (Figure 22). Lastly, Brazil started to accumulate external debt again after 1994, but that was done by the private sector (or by public entities that are not included in the fiscal and debt statistics), which borrowed from abroad and, concurrently, financed the government. That accounts for the current account deficits after 1994 (Figure 14), explained by lower trade balances as a result of increasing imports (Figure 19).

Here, it is important to mention that the analysis above used the official *primary*

deficits plus transfers as the benchmark measure of government primary deficits. The reason we did so is that there are large discrepancies in fiscal statistics around the time the Real Plan was implemented.³⁸ If instead, we considered only the primary deficits from government accounts, without the *transfers*, we would observe a transition from large primary deficits to large primary surplus upon the implementation of the Real Plan, without the subsequent deterioration in primary balances mentioned above. We discuss that in Appendix C. We were not able to explain the differences between both series. We chose the *primary deficits plus transfers* as our benchmark measure, because it is closer to the primary deficit series reported by the Central Bank of Brazil, and it has been the preferred measure by economists that analyzed the fiscal policy in Brazil at that time (e.g., Giambiagi and Alem 2011, and Portugal 2017).

Under our benchmark measure of primary deficits, the fiscal deterioration from May/94–May/95 to May/95–May/96 is usually explained by the increase in wages that resulted from wage negotiations in 1994, and by the Bacha effect, which worked as the reverse of the Olivera-Tanzi effect.³⁹ The reason is that fiscal revenues in Brazil were very well indexed to inflation, but fiscal expenditures were not.⁴⁰ So the executive branch could, and indeed did so, cut the real value of expenditures just by disbursing the originally planned nominal amounts with some delay, as higher inflation rates would rapidly erode the real value of those expenditures. Of course, this had the collateral effect of creating large problems, since public hospitals would run out of money at the end of the year, several bridges or roads would stay unfinished for many years, and so on. Guardia (1992) studied the budget for 1990 and 1991 in detail, and reported significant differences between total expenditures in the (federal) budget and the actual expenditures. In 1990 and 1991, total expenditures hovered around 63% and 60% of the voted expenditures, respectively. Therefore, after inflation was under control, the government had to deal with the large discrepancies between nominal expenditures and revenues in the budget, which could explain the temporary deterioration in fiscal balances in the subsequent years.

The success of the Real Plan in conquering the hyperinflation is indisputable, but there are many discussions regarding which the most important points in accounting for it were. As we could see, there were many important changes around the implementation of the Real Plan, so it is hard to answer that question. One important condition was the availability of foreign finance, as foreign capital inflows resumed after the government reached an agreement with its foreign creditors under the Brady Plan.⁴¹ That was the

³⁸One advantage is that it allows us to make the analysis using monthly data, because the official fiscal statistics covering the national public sector are reported at annual frequency.

³⁹See Bacha (2003) and Tanzi (1977).

⁴⁰A daily index, the UFIR (Fiscal Reference Unit), was computed based on inflation, and taxes would be denominated in this indexed unit of account, and then translated to the nominal hyperinflated currency on the very day taxes were paid at the banking system.

⁴¹The capital inflows were a main factor in the expansion of the interest-bearing public debt, as the Central Bank of Brazil conducted massive sterilized purchases of foreign exchange. In 1993, so much

end of a long process of foreign debt rescheduling. Another important factor was the fiscal reform that increased primary surpluses (Figure 21). That also included other important fiscal measures that, most likely, did not have an immediate impact on government fiscal statistics. Among those measures was the imposition of fiscal constraints to subnational governments, seen as a big achievement of the Real Plan. The deficits of the subnational governments became a big issue in the 1980s and 1990s, and there were many attempts to solve it, which often included bailouts. In 1989, for example, there was a debt renegotiation with the state governments, and only two years before the government had renegotiated the debt of ten state banks. The state banks, in particular, were constantly used to finance subnational government deficits. Many of them actually operated with negative reserves, which ultimately pressured the central bank to expand the monetary base (see Section 4.1). In 1993, the reforms enabled the federal government to use the fiscal revenues of subnational governments as debt guarantees, and also forbid the state banks to make new loans to their respective state governments. That was the beginning of a sequence of reforms that would culminate in the implementation of the Fiscal Responsibility Law in 2000. Finally, the tightness of monetary policy was an important characteristic of the Real Plan and it still characterizes the monetary policy nowadays.

3.3 1995–2016: moderate growth with higher stability

The last sub-period of our analysis represents the period of lowest inflation in the Brazilian history. Inflation rates averaged only 8% per year, and that was accompanied by the adoption of active fiscal and monetary policy rules. Economic growth resumed, but at moderate rates. Real GDP per capita grew 1.2% per year on average. We also observed the process of fiscal consolidation, with primary surpluses in 1995–2002 and 2003–2011 averaging 2.2% and 2.8% of GDP, respectively (row 9, Table 1). Despite all those advancements, the country experienced a big shift in its economic policy on the onset of the international financial crisis in 2008–2009, which eventually culminated in a rapid deterioration of its fiscal balances and in a deep recession in recent years. This has raised concerns about the capability of the government to keep the low inflation regime in the future.⁴²

3.3.1 1995–2002

The years following the implementation of the Real Plan represented a consolidation of the reforms that had begun in the previous sub-period. The government kept the privatization process and promoted both fiscal and banking reforms. Part of these reforms

capital was flowing into Brazil that the government implemented controls on capital inflows (Carvalho and Garcia, 2008).

⁴²For thorough analyses of that period, we refer to Werneck (2014a,b).

were possible only because of the success of the Real Plan in conquering the hyperinflation, which gave the government the political support to push its agenda of reforms. The value the population gave to the new low inflation scenario became clear in the following presidential elections. Fernando Henrique Cardoso, the Finance Minister during the elaboration of the Real Plan, was elected the President of Brazil in the first round not only in the presidential elections of 1994, but again in the 1998 elections.⁴³

However, the low inflation regime also brought some challenges. For example, a banking crisis followed the Real Plan, in which some private and state-owned banks failed. One of the reasons was that the fall in inflation led to the fall in seigniorage-like revenues (the float) that were partially captured by these banks. Here is an example of how this mechanism works. The Central Bank of Brazil increases the monetary base by \$1,000 reais by depositing that amount in the account that holds the bank reserves. Assuming that the banks have no incentives to hold any voluntary reserves, the banking system lends the \$1,000 reais to the public. The public borrows that amount and, after spending it, the \$1,000 reais return to the banks as deposits. Assuming that the reserve requirement ratio is, for example, 10%, the banks keep \$100 reais as reserves and now have \$900 reais left to lend to the public again. Then the public borrow that amount, and after spending it, the \$900 reais return to the banking system as deposits again. The banking system holds \$90 reais as reserves and lend the rest. That process continues indefinitely, and the increase in the amount of deposits converges to \$10,000 reais ($= \$1,000 + (1 - 10\%) \times \$1,000 + (1 - 10\%)^2 \times \$1,000 + \dots$), which represents ten times (the inverse of the reserve requirement ratio) the initial increase in the monetary base. The ratio of deposits to bank reserves in Brazil is illustrated in Figure 23. Finally, given that banks charge interests when lending money to the public, and that deposits are usually not remunerated, that process represents an increase in the revenues of the banking system. So, overall, in order for inflation to fall, the Central Bank of Brazil must make fewer such increases to the monetary base, and, thus must collect less revenues as we have just described. That decrease in revenues hurt the balance sheet of banks, and all else equal, contributed to the banking crisis.

Besides the banking crisis, the government also faced turbulence in international capital markets. The first one was the 1997 Asian Financial Crisis, which was immediately followed by the 1998 Russian Financial Crisis. After the latter, there was a speculative attack on the Real and the Central Bank of Brazil experienced a fast deterioration of its international reserves (Figure 24). The IMF stepped in, but the situation was such that the central bank could no longer hold the crawling peg regime and, in January

⁴³According to the Constitution of 1988, the president is elected by a majority voting in a two-round system. If a presidential candidate receives more than 50% of the valid votes in the first round, that is, after the exclusion of blank and null votes, then the candidate is elected the President without a second round. So far, no other presidential candidate besides Fernando Henrique Cardoso has been elected in the first round after the Constitution of 1988 was enacted. Voting is mandatory in Brazil.

1999, a floating exchange rate regime was adopted. This change also culminated in the replacement of the governor of the central bank, but not of the finance minister.⁴⁴

In March 1999, following the adoption of the floating exchange regime, Brazil adopted an inflation targeting regime, and that is the arrangement that holds until nowadays. Concurrently, the government started to announce fiscal policy targets and took important measures to improve the conduction of its fiscal policy. One important step in that process was the Law of Fiscal Responsibility, enacted in 2000, that imposed rigid fiscal constraints to both federal and subnational governments. Those measures led to fiscal surpluses, as illustrated in Figure 9.

However, the government faced another deterioration in the external scenario in 2001, with the recession in the United States and the fall of the Argentine peso. To make matters worse, the country also experienced a major energy crisis. It resulted from the poor management of its infrastructure and the government ended up imposing mandatory rationing of electricity. The government lost its popularity and, during the presidential campaigns of the 2002 elections, the stability of Brazil's macroeconomic policy was put to test. The polls indicated that Luiz Inacio Lula da Silva, Lula, would be the new president and that led to an episode of current account reversal (Figure 14), with a large devaluation of the real exchange rate (Figure 15) and sharp increase in the interest rates of government debt securities, both in the domestic and external debt markets. The reason is that the leading candidate had advocated for a debt renegotiation of both domestic and external debt in the past, indicating the possibility of an outright default. Under the adverse scenario, the IMF stepped in again, and that was its last intervention in Brazil. Luiz Inacio Lula da Silva ended up announcing that he would keep the main macroeconomic policies that the previous government implemented. Once elected, he kept with his promise and financial markets returned to normality.

3.3.2 2003–2011

The years following the election of the new president Lula were characterized by a favorable external scenario, with a worldwide boom in commodity prices. In particular, the period between 2004 and 2008 had the best economic outcomes of the 1960–2016 period. It was characterized by fiscal surpluses, high growth rates of real GDP per capita, current account surpluses, expansion of international trade, reduction of the public external debt and accumulation of international reserves, and the consolidation of the inflation targeting regime that was adopted in 1999. In addition, the government implemented large conditional cash transfer programs, such as the social welfare program *Bolsa Família*, that led to big improvements in income inequality in a fight against poverty.

Nevertheless, following Lula's re-election in 2006, the government shifted its macroe-

⁴⁴The central bank had 18 different governors between 1985 and 2016.

conomic policy towards a larger intervention of the state in the economy, which would eventually lead to a deterioration in fiscal balances. In 2007, for example, the government launched the Growth Acceleration Program (PAC), a major infrastructure program consisting of investment projects and policies that aimed at boosting economic growth. Through BNDES, Brazil's development bank, the government began to invest heavily on large national companies in an attempt to increase their competitiveness in the global market. And through the now state-controlled mixed-capital oil company Petrobras, the government promoted large investments in the exploration of oil in the pre-salt layer, which had been recently discovered. As expected, some of these policies represented the expansion of fiscal deficits, but as neither BNDES or Petrobras are included in the public sector fiscal statistics in that time, they did not show up in the official statistics. In fact, in those years the government started to implement budget maneuvers to artificially inflate its primary surplus to meet the fiscal policy targets, which makes the assessment of the actual fiscal deficit figures even harder for that period. That became popularly known as *contabilidade criativa* (creative accounting).

With the global financial crisis in 2008–2009, the government started to push those policies even further, seeking to implement a countercyclical policy that would prevent the country of going through a major recession. Initially, the policy seemed to be very successful, as real GDP per capita grew 6.2% in 2010. However, it did not last for long.

3.3.3 2012–2016

In 2012, the economy was already showing signs of exhaustion, with annual growth rates of real GDP per capita decelerating to only 1%. The drop in commodity prices made the situation even worse. The fiscal deterioration accelerated, and the use of *contabilidade criativa* to hide deficit figures became even more pronounced. The government was now also intervening in SOEs in an attempt to control inflation through the control of administered prices, that is, the government kept low prices of goods and services (e.g. fuel and electricity) that were sold by SOEs, even though the other prices in the economy were increasing. The main reason is that the government did not want to bear the political burden of reporting higher inflation rates, since it was the government itself that pressured the central bank to reduce the nominal interest rates in the first place.

On top of that, the government also used its public banks (and private banks as well) to hide its deficits. Here is one way that it did so. The government instructed the public banks to pay social security pensions to the public, but then the government never reimbursed the public banks for the full value of these payments. Hence, the public banks registered losses that should have been counted as deficits of the government.

Brazil was now back to a scenario in which the government used public banks and SOEs to hide its deficits, while economic growth kept decreasing. These fiscal maneuvers

became popularly known as *pedaladas fiscais*, and eventually led to the impeachment of former President Dilma Rouseff in 2015, who had replaced Lula in 2010 and was re-elected in 2014.

In 2015 and 2016, real GDP per capita decreased by 4.6% and 2.7%, respectively, and fiscal deficits reached levels around 7% of GDP in 2016. The fiscal situation proved to be worse than previously expected. The previous government avoided tackling the reforms that would lead to a fiscal consolidation, such as the reforms to the pension system, and, at the time of our writing, the outstanding question is whether the next president can resolve the current precarious fiscal situation. As Figure 3 shows, public domestic debt levels are now at record levels, and previous fiscal adjustments were implemented through higher public expenditures and even higher public revenues. But the tax burden is already very high in Brazil, so that imposes an extra constraint to the capability of the government to raise more revenues.

With this history in mind, we now turn to discussing why inflation rates were so persistently high before the implementation of the Real Plan.

4 Weak institutions, deficits, and inflation inertia

4.1 Weak institutions that provided indirect access to the printing press

One of the most striking features of the Brazilian monetary and fiscal history is its long period of high inflation pre-1994. Figure 5 shows that inflation rates were closely related to the growth rates of the monetary base and to seigniorage revenues. We argue that the high degree of passiveness in monetary policy due to a weak institutional arrangement, together with persistent and large fiscal deficits during that period, delivers a type of inflation persistence that goes a long way in accounting for these facts. In this section, we present a summary of the history of the Central Bank of Brazil starting from the discussions surrounding its creation, and a description of how the government accessed the seigniorage revenues. As will become clear, the Central Bank of Brazil was used many times to perform operations that are not consistent with the current notion of an autonomous monetary authority.

Before 1945, there was not a clear separation between monetary and fiscal authorities, in the sense that the government treasury had total control over money issuance. That was done through the Bank of Brazil, which had the monopoly over money issuance and operated in many instances as the bank of the government, as a commercial bank, and as a development bank. The debate surrounding the establishment of a central bank started before 1945, but it was only in that year when the first measures took place. The government created the Superintendency of Money and Credit (SUMOC),

whose council had regulatory powers over the Central Bank of Brazil's monetary affairs and this SUMOC was supposed to serve as a stepping stone towards the creation of a central bank. However, the Bank of Brazil received the majority of seats in that council, which meant that, in practice, there was no disruption in the way monetary policy was conducted. Therefore, instead of establishing a central bank directly, Brazil opted for a two-step approach, in which the first step, SUMOC, lasted for twenty years. That process reflected a political impasse, with many interest groups reluctant to lose privileged access to subsidized credit, that is, their indirect access to money printing.

In 1964, the Central Bank of Brazil was finally established.⁴⁵ However, the SUMOC's council was restructured to form the National Monetary Council (CMN), which had regulatory powers over the central bank and operates until today. In the beginning, CMN had nine members: The Finance Minister, the president of the Bank of Brazil, the president of the National Bank for Economic Development, and other six members with fixed terms of six years each. Four of those six members would compose the board of the Central Bank of Brazil, one being its governor. Although the fixed terms provided some independence to the central bank, it did not last for long. In 1967, during the first transition of power within the military regime, the board of the central bank, including the governor, was forced to resign, and the fixed terms were officially abolished later on. The evolution of the number of members in the National Monetary Council and its composition provide an interesting perspective of the passiveness of monetary policy in Brazil, because, in practice, that council ended up operating a separate budget from the one approved in the Congress, usually referred to as the *monetary budget*. In the hyperinflation periods, the number of members in the National Monetary Council increased to twenty-six, and they came from very different sectors of the government and society, including representatives of labor unions and business leaders. That process reflected the increasing importance of the *monetary budget* for the implementation of economic policy. It was only in 1994 that the Real Plan reduced its number of members to the actual three (the governor of the Central Bank of Brazil, the Finance Minister, and the Minister of Planning), granting the board of the central bank greater control over monetary policy.⁴⁶ Figure 25 shows how the number of members in that council changed over time. The correlation between inflation rates and the number of members in the National Monetary Council is remarkable. In our reading of history, whenever the council was increased to allow additional groups to play a more prominent role, the desire of the council to pursue anti-inflationary measures with positive long-term consequences but negative short-term consequences, was weakened.

With respect to the central bank's operations, Figure 26 shows the evolution of its balance sheet between 1965 and 2016, separating assets from liabilities. The complexity

⁴⁵The Central Bank of Brazil was created on December 31, 1964, starting to operate in 1965.

⁴⁶See Franco (2017) for a complete description of that process.

of its balance sheet during the high inflation period shows that it was used many times to perform operations that normally do not fall to a central bank, and most of the time these operations were effectively dictated to the central bank by the government. For example, upon its creation, the share of the monetary base in the central bank's liabilities was only 50%, with the rest consisting mostly of government funds to implement economic policies. The reason is that, instead of focusing exclusively on monetary policy, the Central Bank of Brazil also played the role of a development bank. For example, the central bank was given the job of providing insurance to agriculture (PROAGRO).

Besides that, the Central Bank of Brazil took on some of the tasks normally reserved to the Treasury as it was made responsible for managing both the domestic and external public debt, which involved their issuances and payments of principal and interests. During the external debt crisis, for example, the central bank was one of the main players involved in the negotiations. When the external debt was nationalized, it was forced to take all of this debt onto its balance sheet, as described in Section 3.2. The Real Plan ended that policy in 1994 and transferred the administration of the external debt to the national treasury and, at the time, the government clearly stated that it was done to avoid monetary pressures. Regarding the domestic debt, the government created the National Treasury Secretariat in 1986, which became responsible for managing the domestic debt. However, the central bank was still authorized to purchase government debt securities directly from the treasury under special circumstances, such as in the case of failed auctions. That was forbidden in 1988, but evidence suggests that it kept doing so until the implementation of the Real Plan, which partially accounts for the concentration of federal government debt securities in the Central Bank of Brazil's balance sheet. Figure 27 shows that during the hyperinflation years the fraction of government domestic debt securities at the central bank reached levels above 80%.⁴⁷

Next, when we analyze the central bank's operations during the high-inflation period, we find evidence that the government had access to and was using the seigniorage revenues. Up to 1988, that was done mainly through its operations with the Bank of Brazil. As mentioned before, many of the government policies, such as subsidized credit, were initially conducted by the Bank of Brazil and they continued to be after the central bank was created. In order to facilitate the interaction between both institutions, the government created the *Conta de Movimento*, which was a Bank of Brazil's account that would show up in the central bank's balance sheet as a credit and whose balance should average zero. In practice, that provided the Bank of Brazil with the control over money issuance, since it could withdraw funds automatically from that account, and that would be automatically matched with an expansion of the monetary base, of equal value, in

⁴⁷The confiscation of savings during Collor I Plan and the fact that the external debt was being held at the Central Bank of Brazil also accounts for the increase in that share, since those resources were mostly invested in government debt securities.

the central bank's balance sheet. Not surprisingly, Figure 28 shows that the correlation between variations in that account's balance over GDP and the variation in the monetary base over GDP was very high, and that a large part of seignorage was, de facto, "spent" funding credit programs through the Bank of Brazil.⁴⁸ Since the Bank of Brazil worked in large measure as the government's banker (Pastore, 2014), this should not be a surprise. Note also that those transfers increased significantly around 1975, which coincides with the period in which government deficits and inflation rates started to rise again. The following quote from Mailson da Nobrega (2005), former Minister of Finance, suggests how little control the central bank had over the expansion of the monetary base, and how such seignorage was used to finance fiscal deficits, especially of subnational governments:

... in 1983, a troublesome fact occurred. Some newly elected state governors realized that their banks could overdraw cash from their accounts at Bank of Brazil (which held the reserves). It would take more than a month for the Central Bank of Brazil to realize that through its financial statements. There was no system that could provide that information in real time. The first one was the governor of Rio de Janeiro. The governors of Goiás, Santa Catarina, and Paraíba followed. The governor of Paraíba, Wilson Braga, was kind enough to let me know about his overdraft in the same day it took place, given that we are friends and from the same state. I warned him that it was very serious, but he replied to me saying that he needed to pay public employees and that the overdraft had already occurred.

The previous quote also indicates that one should analyze the operations of public banks, such as the Bank of Brazil and state banks, to understand how the seignorage revenues were ultimately used. These operations were mostly done off-budget, so they must be taken into account when computing public deficits in Brazil, especially during the high-inflation periods. We use the transfers from the central bank to the Bank of Brazil as an approximation of those deficits, and we add those transfers to the deficits data.⁴⁹ However, the evidence above suggests that Brazil effectively had multiple monetary authorities during the high-inflation period, so those transfers might not represent all the deficit that was financed through money issuance. The reason is that given the size of the public financial sector, part of the seignorage-like revenues (the float) described in Section 3.3.1 was captured by public banks, so the total revenue of the public financial sector was probably somewhere between the variation of the monetary base over

⁴⁸The funds transferred to Bank of Brazil from the central bank were technically a loan that in practice paid no interest. In a high inflation environment, these non-interest loans would fall quickly in value, and soon loose importance in both balance sheets. This is how a loan became akin to a government expenditure.

⁴⁹See Appendix C.

GDP and the variation of M1 over GDP, both illustrated in Figure 29.⁵⁰ However, we do not have enough information on those banks, so we restrict our analysis to the transfers between the central bank and the Bank of Brazil.

Initially, the Central Bank of Brazil did not transfer its profits to the government treasury, so the use of *Conta de Movimento* was a direct way in which the government could access the seigniorage revenues. Interestingly, when that account was frozen in 1986, the government started to use another similar account between the Bank of Brazil and the central bank, *Conta de Suprimentos Especiais*, until its extinction in 1988.⁵¹ When both accounts became unavailable, the government established the transfer of the profits of the central bank to the treasury.⁵² In fact, after 1988, there were two ways in which the government could access seigniorage revenues: through the transfer of profits, and through the remuneration of its deposits at the Central Bank of Brazil. The New Constitution in 1988 established that the government could not have accounts with commercial banks, only one account and that account should be at the central bank, the *Conta Única do Tesouro* (Single Government Account), which should be used for all its transactions. A particular feature of this account is that the Central Bank of Brazil became responsible for paying interests on its balances, which was based on the average remuneration of the government debt securities in its portfolio. Since deposits are usually not remunerated, those transfers can also be interpreted as part of the seigniorage revenues. Figure 28 demonstrates that they match well with the series of seigniorage revenues.

The discussion above shows that the persistence and magnitude of the inflation process in Brazil is closely related to the persistence and magnitude of the degree of passiveness of its monetary policy and to the government's fiscal deficits, and that there were important structural changes in both the institutional arrangements and fiscal balances in the transition to the low-inflation period. In addition, it also provides an explanation of why the government increased seigniorage revenues in the 1970s despite its access to debt financing. The direct access to central bank's funds through *Conta de Movimento* provided incentives for some groups to use that account instead of going through negotiations with the Congress. In this case, the "provinces" effect might have played an important role in accounting for the high and persistent inflation in Brazil. That was the term used by Calvo and Vegh (1999) as a possible explanation to chronic inflation episodes, in which different entities of the government choose their deficit level without taking into account its effect on the aggregate deficit, which would lead, in equilibrium, to higher deficits that are financed through higher seigniorage revenues, therefore leading

⁵⁰Salviano Junior (2004) also makes that point in his analysis of the process that led to the privatization of the public banks (PROES) that followed the Real Plan.

⁵¹Between 1965 and 1987, the average variation in the monetary base over GDP was 2.6%, while the average variation in the Bank of Brazil's accounts over GDP was 2.8%. Those figures show that seigniorage revenues were mostly used to finance the operations of Bank of Brazil.

⁵²See Carvalho Jr (2017) for a description of the evolution of the institutional framework regarding the relationship between the Central Bank of Brazil and the government treasury.

to higher inflation.⁵³

4.2 Inflation indexation and passive monetary policy

Another factor that contributed to the Brazilian inflation process is indexation, which was often mandatory and became a widespread phenomenon in Brazil after its introduction in the 1960s. Most prices, wages, taxes and the exchange rate, as well as asset prices, were indexed to past inflation. That, together with a peculiar form of monetary passiveness, would create the so-called inflation inertia. The main idea is that the widespread indexation would induce agents to expect even higher inflation rates in the future and to demand more money balances, which would then be satisfied by the (passive) monetary policy. So agents' expectations of higher inflation rates would be translated into higher growth rates of money balances and higher inflation rates, leading to a vicious circle.

In such an environment, inflationary shocks, like the maxi-devaluations undertaken during external crises, would permanently increase the inflation rate. As the monopsonist in the money market, the central bank could, in theory, opt not to validate such an increase in money demand by not increasing money supply, that is, by substantially increasing the interest rate. However, this was not the monetary policy that was followed during the pre-Real-Plan years. Monetary policy at the time was more geared to keeping the ex-ante real interest rate at a low positive level (Pastore, 1994, 1996). The adoption of a more active monetary policy by the Real Plan represented a major change in the way monetary policy was conducted, and that could explain part of its success.

This hypothesis regarding inflation inertia gave many economists the illusion that the hyperinflation could be cured without major improvements in the fiscal stance, as discussed in our description of the stabilization plans. This mechanism has been studied by many economists in Brazil (Pastore, 2014; Cati et al., 1999; Garcia, 1996), but it has not been completely formalized yet, so we still cannot fully evaluate its importance.⁵⁴

5 Final remarks and conclusion

This chapter has shown that a simple fiscal story goes a long way in accounting for the inflation dynamics in Brazil, in which inflation rates are highly correlated to both

⁵³That issue was formally analyzed in Chari and Kehoe (2007) in the context of a monetary union.

⁵⁴Garcia (1996) highlights a distinct aspect of the Brazilian hyperinflation with respect to the causation between seigniorage and inflation. He points out that although seigniorage revenues were used to finance fiscal deficits, the causation was not a direct one from higher deficits to higher inflation and higher seigniorage. According to his partial equilibrium model, seigniorage was endogenously generated by the interaction between indexation and money demand in the case when the government provided a currency substitute, that is, inflation-indexed accounts offered by the banks that invested in government bill with daily liquidity. To keep this system from collapsing, the central bank had to match the increase in nominal money demand, thereby generating seigniorage. The central bank, however, could not generate neither more or less. Garcia (1996) calls this the “non-controllability” of seigniorage revenues.

money growth rates and seigniorage revenues. In 1960–1973, debt financing was still very restricted and the government relied mostly on seigniorage revenues to finance its deficits. Then, in 1973–1988, even though the government had some access to debt financing, the institutional arrangement was such that seigniorage revenues were being channelled to finance deficits at Bank of Brazil. In the period of highest inflation rates, 1989–1994, the connection between government financing needs and seigniorage revenues became more complex. Government obtained higher seigniorage revenues, but that was done through the profit transfers from the central bank to the treasury and also through the remuneration of its deposits at the central bank, which are less direct mechanisms than before. The financial repression during the Collor I Plan also guaranteed that part of household savings was used to finance government deficits and allowed it to partially default on interest payments given that the remuneration of the confiscated savings were chosen by the government itself. Finally, in the low-inflation period (after 1994), Brazil showed primary surpluses and low seigniorage revenues.

The fiscal story is also consistent with the fiscal adjustments that were implemented by PAEG and the Real Plan, the two successful stabilization plans that managed to reduce inflation in Brazil. In both cases, the drop in seigniorage revenues that followed their implementation were compensated by higher primary surpluses. The credibility of these stabilization plans also played an important role, given that they paved the way for increased access to debt financing by the government, which allowed the adjustments to be implemented more gradually. In the case of the Real Plan, the increased access to debt financing even allowed for a temporary deterioration in fiscal balances in subsequent years, in which increased access to debt financing enabled the government to keep low seigniorage revenues.

On the other hand, the connection between government fiscal deficits and growth performance is much less clear. Even though many of Brazil's recessions were associated with government fiscal imbalances, such as in the early 1960s, early 1980s, and the most recent one, the large reduction in macroeconomic instability that was achieved after the Real Plan in 1994 did not result in much higher growth rates of real GDP per capita. Nevertheless, the periods of fast economic growth in 1968–1973 and most recently in 2004–2008 were associated with improvements in fiscal balances, so that leads us to conclude that fiscal stability is a necessary but not sufficient condition for sustained growth. That has shown to be a more difficult task, and would have to include, for example, reforms to Brazil's education, tax, political, and judicial systems.

Another lesson from the Brazilian case is that the government often used off-budget transactions, mostly through public banks and state-owned enterprises, to “hide” its fiscal deficits, especially in the high-inflation period (pre-1994). Some recent developments in Brazilian public finances, as the *pedaladas fiscais*, accounting maneuvers that eventually led to the impeachment of former President Dilma Roussef, remind us that we should

always be aware that there are constant attempts to “violate” the intertemporal budget constraint.

Finally, we observed that Brazil’s transition to its low inflation regime beginning in 1994 was associated with the institution of active monetary policy in a context where fiscal dominance has been avoided with several initiatives to improve the fiscal stance, most notably the Fiscal Responsibility Law. Unfortunately, after this great achievement, and the very substantial improvement in the fiscal stance, especially after the floating of the currency in 1999, Brazil’s primary surplus decreased rapidly in the last few years. To make matters worse, public debt to GDP ratio accelerated again and now hovers at record levels. With the tax burden at also very high levels, Brazil must finally confront the political challenges required to reign in public expenditure. This major challenge facing the next president of the country will have to be tackled, or the Real Plan will pass to history as a long non-inflationary interregnum.

References

- Abreu, M. d. P. and R. L. F. Werneck (2014). Estabilização, abertura e privatização, 1990–1994. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Bacha, E. L. (2003). Brazil’s Plano Real: a view from the inside. In *Development Economics and Structuralist Macroeconomics: Essays in Honor of Lance Taylor*. Cheltenham, United Kingdom: Edward Elgar.
- Calvo, G. A. and C. A. Vegh (1999). Inflation stabilization and bop crises in developing countries. In J. B. Taylor and M. D. Woodford (Eds.), *Handbook of Macroeconomics* (1 ed.), Volume 1. Elsevier.
- Carneiro, D. D. (2014). Crise e esperança, 1980-1984. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Carneiro, D. D. and E. M. Modiano (2014). Ajuste externo e desequilíbrio interno, 1980-1984. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Carvalho, B. S. d. M. and M. P. G. Garcia (2008). Ineffective controls on capital inflows under sophisticated financial markets: Brazil in the nineties. In S. Edwards and M. P. G. Garcia (Eds.), *Financial Markets Volatility and Performance in Emerging Markets*, National Bureau of Economic Research Books. University of Chicago Press.

- Carvalho Jr, A. D. (2017). BC e Tesouro: um estudo sobre a constituição, leis complementares, leis ordinárias e medidas provisórias. In E. L. Bacha (Ed.), *A Crise Fiscal e Monetária Brasileira* (2 ed.). Rio de Janeiro: Civilização Brasileira.
- Cati, R. C., M. P. G. Garcia, and P. Perron (1999). Unit roots in the presence of abrupt governmental interventions with an application to brazilian data. *Journal of Applied Econometrics* 14(1), 27–56.
- Cerqueira, C. A. (2003). *Dívida externa brasileira* (2 ed.). Banco Central do Brasil.
- Chari, V. V. and P. J. Kehoe (2007). On the need for fiscal constraints in a monetary union. *Journal of Monetary Economics* 54(8), 2399 – 2408.
- Costa Neto, Y. C. d. (2004). *Bancos oficiais no Brasil: origem e aspectos de seu desenvolvimento* (1 ed.). Banco Central do Brasil.
- Franco, G. H. B. (2017). O conselho monetário nacional como autoridade monetária: das origens aos dias atuais. In E. L. Bacha (Ed.), *A Crise Fiscal e Monetária Brasileira* (2 ed.). Rio de Janeiro: Civilização Brasileira.
- Garcia, M. P. G. (1996). Avoiding some costs of inflation and crawling toward hyperinflation: The case of the brazilian domestic currency substitute. *Journal of Development Economics* 51(1), 139–159.
- Giambiagi, F. and A. C. Alem (2011). *Finaças Públicas: Teoria e Prática no Brasil* (4 ed.). Elsevier.
- Guardia, E. R. (1992). Orçamento público e política fiscal: aspectos institucionais e a experiência recente - 1985/1991. Master's thesis, Universidade Estadual de Campinas, Instituto de Economia.
- Lago, L. A. C. d. (2014). A retomada do crescimento e as distorções do milagre, 1967–1974. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Mesquita, M. M. (2014). Inflação, estagnação e ruptura, 1961–1964. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Modiano, E. M. (2014). A Ópera dos três cruzados, 1985–1990. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Nobrega, M. (2005). *O futuro chegou: instituições e desenvolvimento no Brasil*. Globo.

- Orenstein, L. and A. C. Sochaczewski (2014). Democracia com desenvolvimento, 1956–1961. In M. d. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Pastore, A. C. (1994). Déficit público, a sustentabilidade do crescimento das dívidas interna e externa, senhoriação e inflação: Uma análise do regime monetário brasileiro. *Brazilian Review of Econometrics* 14(2), 177–234.
- Pastore, A. C. (1996). Por que a política monetária perde eficácia? *Revista Brasileira de Economia* 50(3), 281–311.
- Pastore, A. C. (2014). *Inflação e Crises - o Papel da Moeda*. Elsevier.
- Pedras, G. B. V. (2009). História da dívida pública no Brasil: de 1964 até os dias atuais. In L. O. Carvalho, O. L. Medeiros, and A. C. Silva (Eds.), *Dívida Pública : a experiência brasileira*. Brasília: Secretaria do Tesouro Nacional, Banco Mundial.
- Portugal, M. (2017). Política fiscal na primeira fase do Plano Real, 1993–1997. In E. L. Bacha (Ed.), *A Crise Fiscal e Monetária Brasileira* (2 ed.). Rio de Janeiro: Civilização Brasileira.
- Salviano Junior, C. (2004). *Bancos estaduais: dos problemas crônicos ao PROES*. Banco Central do Brasil.
- Silva, A. C. (2009). Origem e história da dívida pública no Brasil até 1963. In L. O. Carvalho, O. L. Medeiros, and A. C. Silva (Eds.), *Dívida Pública : a experiência brasileira*. Brasília: Secretaria do Tesouro Nacional, Banco Mundial.
- Tanzi, V. (1977). Inflation, lags in collection, and the real value of tax revenue. *IMF Economic Review* 24(1), 154–167.
- Werneck, R. L. F. (1991). Public sector adjustment to external shocks and domestic pressures, 1970-85. In F. Larrain and M. Selowsky (Eds.), *The Public Sector and the Latin American Crisis, 1970-1985*. San Francisco: International Center for Economic Growth.
- Werneck, R. L. F. (2014a). Alternância política, redistribuição e crescimento, 2003–2010. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.
- Werneck, R. L. F. (2014b). Consolidação da estabilização e reconstrução institucional, 1995–2002. In M. P. Abreu (Ed.), *A Ordem do Progresso: Dois Séculos de Política Econômica no Brasil* (2 ed.). Rio de Janeiro: Elsevier.

A Tables

Table 1: Government budget accounting (% of GDP)

	sub-period						
	60–64	65–72	73–80	81–94	95–02	03–11	12–16
Sources							
(1) domestic debt	0.0	0.8	-0.2	-0.3	-0.6	1.1	3.5
(2) external debt	0.0	0.0	1.7	-1.8	-0.3	-1.0	0.6
(3) real monetary base	-0.4	-0.2	-0.2	-0.1	0.1	0.1	-0.1
(4) seigniorage	4.1	1.9	2.4	3.2	0.4	0.4	0.3
Uses							
(5) interest on domestic debt	0.3	0.4	1.3	0.4	2.0	1.7	3.2
(6) interest on external debt	0.0	0.0	0.7	1.9	0.2	-0.7	0.7
(7) primary deficit	2.9	1.0	0.2	3.1	-3.0	-2.7	-1.1
(8) transfers (residual)	0.5	1.1	1.6	-4.5	0.5	2.2	1.6
Other measures							
(9) primary deficit + transfers	3.4	2.2	1.8	-1.4	-2.6	-0.5	0.4
(10) fiscal deficit	3.2	1.5	2.1	5.5	-0.8	-1.7	2.7
(11) fiscal deficit + transfers	3.7	2.6	3.7	1.0	-0.4	0.5	4.3

Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

Note: see Appendix C for a description of the budget constraint. Transfers are computed as follows,

(8)=(1)+(2)+(3)+(4)-(5)-(6)-(7). Fiscal deficit is computed as (10)=(5)+(6)+(7).

Table 2: Investment by state-owned enterprises (% of GDP)

	sub-period			
	60–72	73–80	81–94	95–00
All sectors	2.2	4.7	2.7	1.3
Manufacturing	1.0	1.5	0.6	0.3
Energy	0.4	1.0	0.8	0.2
Transportation	0.3	0.9	0.3	0.0
Communication	0.1	0.8	0.6	0.5

Source: Brazilian Institute of Geography and Statistics (IBGE) - *Estatísticas do Século XX*.

(<https://seculoxx.ibge.gov.br/economicas.html>)

Table 3: Government budget accounting - Real Plan (% of GDP)

	sub-period			
	May/92– May/93	May/93– May/94	May/94– May/95	May/95– May/96
Sources				
(1) domestic debt	-1.4	-2.6	-4.1	7.8
(2) external debt	-2.1	-6.3	0.6	-4.1
(3) real monetary base	-0.3	-0.1	1.4	0.1
(4) seigniorage	2.8	2.7	0.7	0.3
Uses				
(5) interest on domestic debt	0.8	-3.4	2.7	3.3
(6) interest on external debt	-0.1	-0.2	-0.1	0.2
(7) primary deficit + transfers	-1.8	-2.8	-4.0	0.5

Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

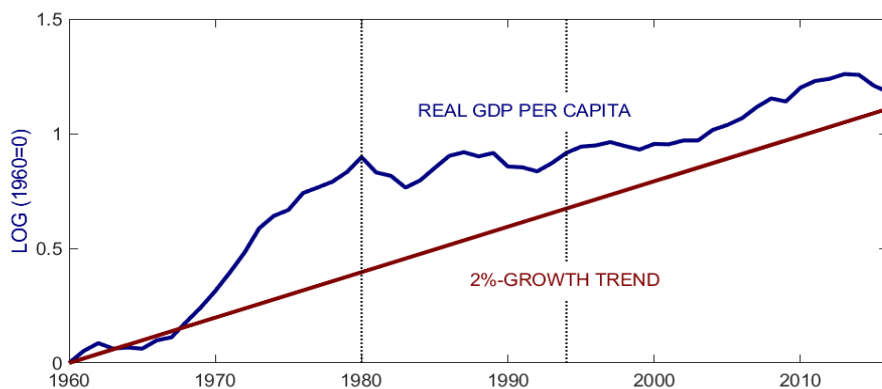
Note: see Appendix C for a description of the budget constraint. Transfers are computed as follows,

$$(8) = (1) + (2) + (3) + (4) - (5) - (6) - (7).$$

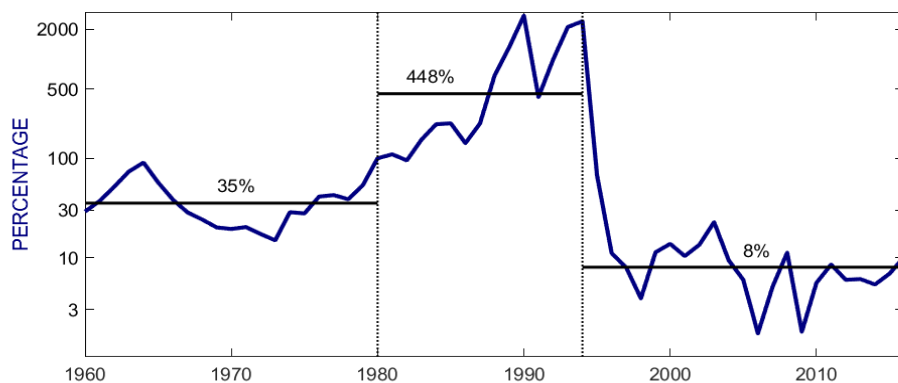
B Figures

Figure 1: Real GDP per capita, inflation, deficit: 1960–2016

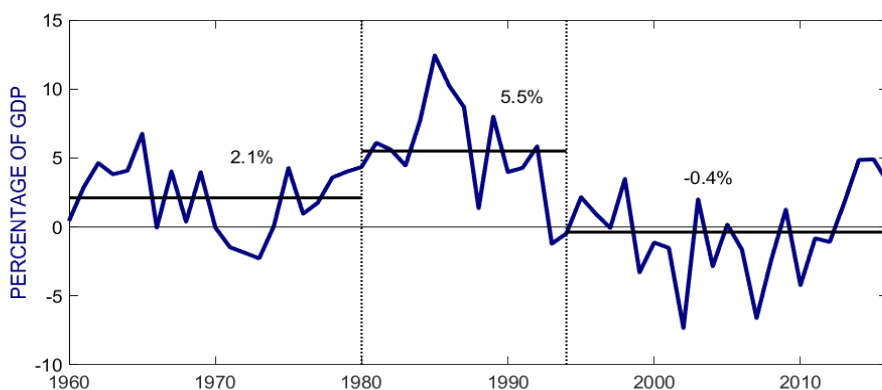
(a) Real GDP per capita



(b) Annual inflation rate (log scale)



(c) Deficit

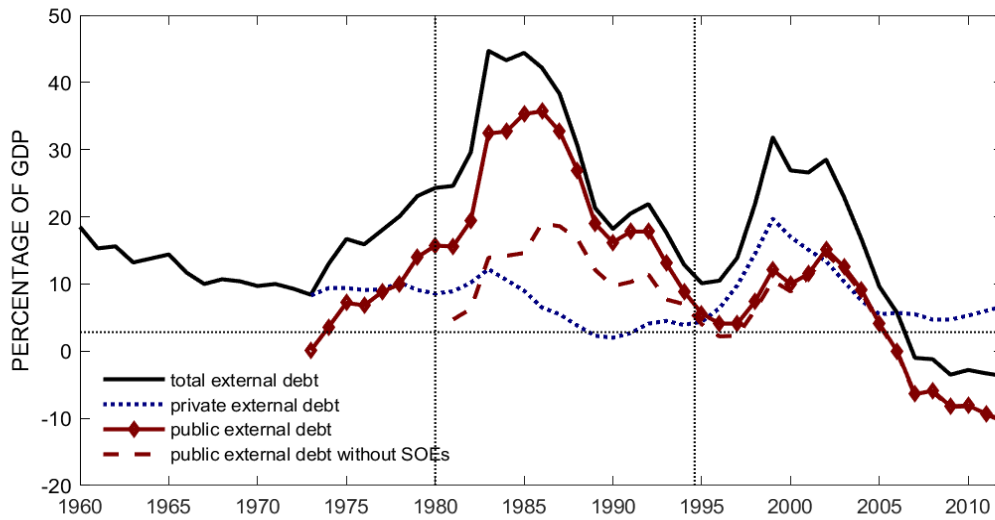


Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

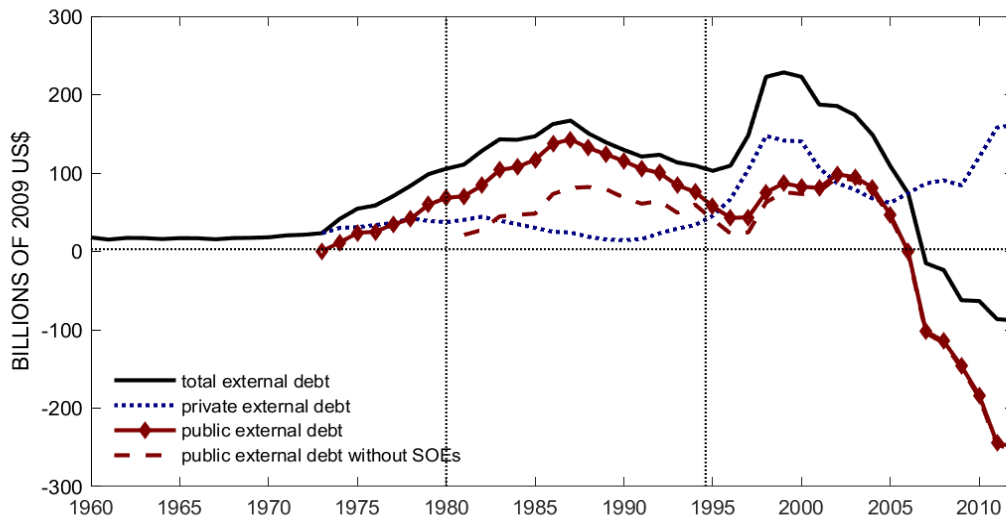
Note: inflation rates are computed using the general price index, IGP-DI, from Getulio Vargas Foundation. See Appendix C for a description of how we construct the deficit series and the series of nominal GDP. Numbers correspond to the (geometric) average of inflation rates in each sub-period in Figure 1b, and to the (arithmetic) average of the deficits as a percentage of GDP in each sub-period in Figure 1c.

Figure 2: Net external debt: 1960–2016

(a) Percentage of GDP



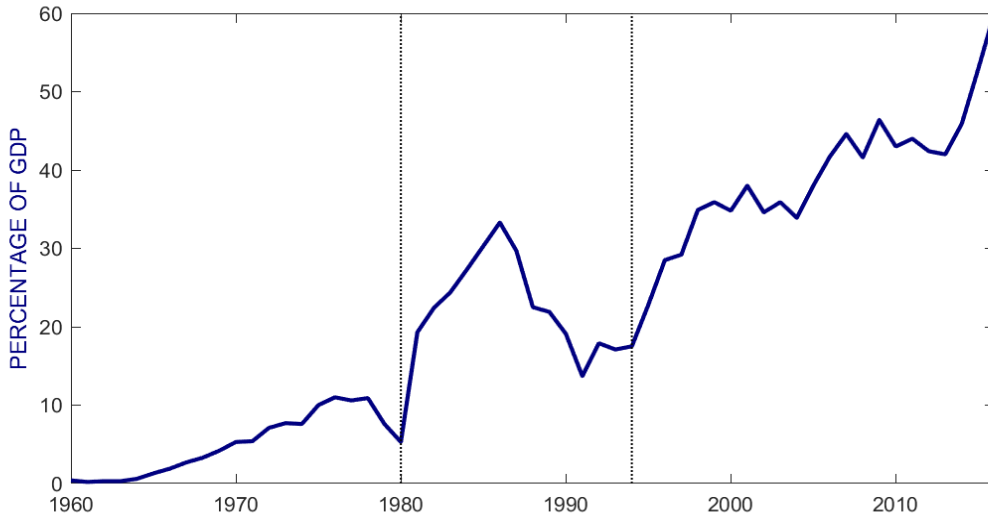
(b) Constant US dollars



Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

Note: net private external debt represents the series of registered private external debt (code 3566) from CBB. Public net external debt is computed as the registered public external debt (code 3564) minus the foreign reserves (code 3566), both from CBB. The external debt of state-owned enterprises (SOEs) represents the series of net debt of the public sector - state-owned companies from IPEADATA. The total external debt is computed as the sum of net public external debt and net private external debt after 1973, and by subtracting foreign reserves from the series of total registered external debt from IBGE before that. Exchange rates represent end-of-period values (code 3691). See Appendix C for a description of how we compute the nominal GDP series. The series codes correspond to the codes used in the website of the Central Bank of Brazil (<https://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries>). We use the US GDP deflator from the *Bureau of Economic Analysis* to compute constant US\$ values.

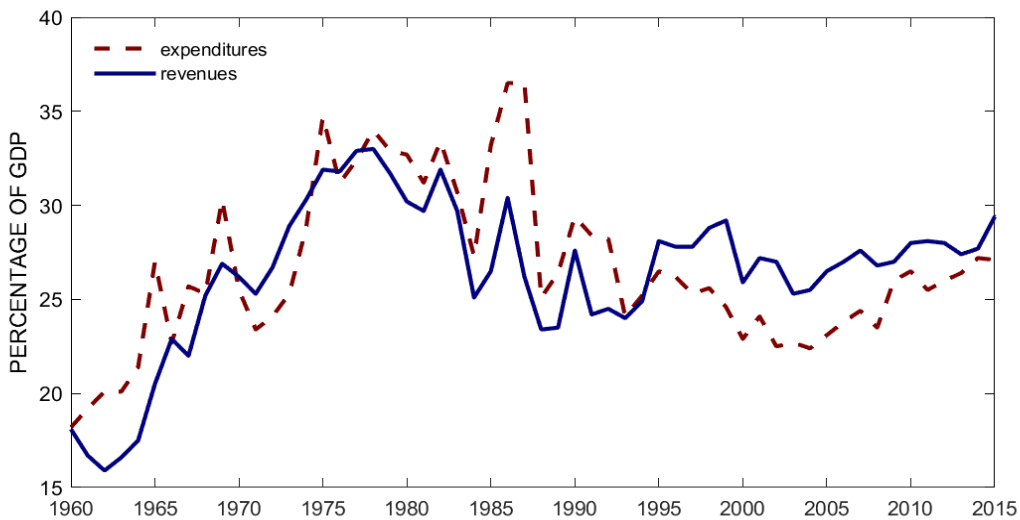
Figure 3: Domestic debt



Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

Note: before 1981, domestic debt consists of the federal and state governments debt securities, together with the *Dívida Pública Fundada*, available from *Estatísticas do Século XX* - IBGE. After 1981, it is the net debt of the public sector computed by the Central Bank of Brazil plus the balance of the Bank of Brazil accounts in the balance sheet of the central bank. See Appendix C for an explanation of why we adjust the debt series for the Bank of Brazil accounts at the central bank, and for a description of how we compute the series of nominal GDP.

Figure 4: Government revenues and expenditures

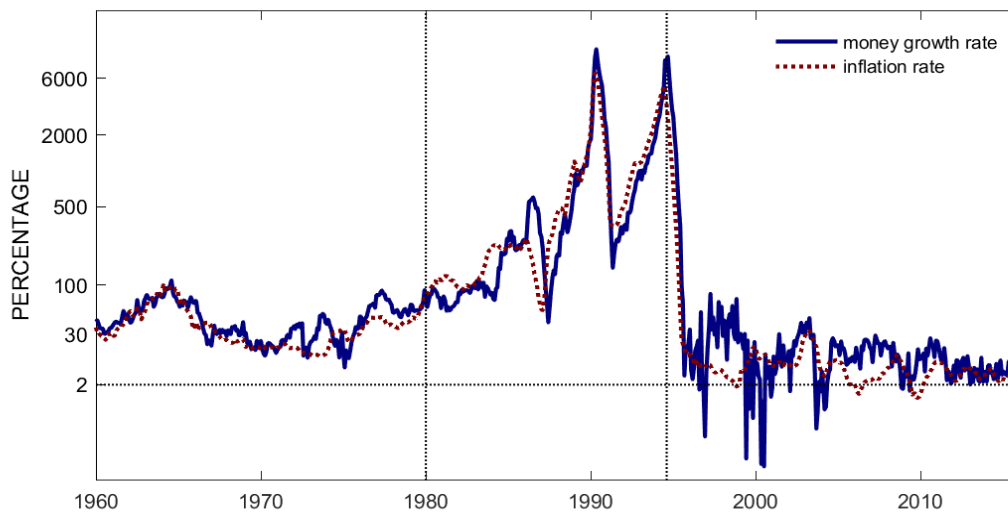


Source: Brazilian Institute of Geography and Statistics (IBGE), National Treasury Secretariat (STN), and Central Bank of Brazil (CBB).

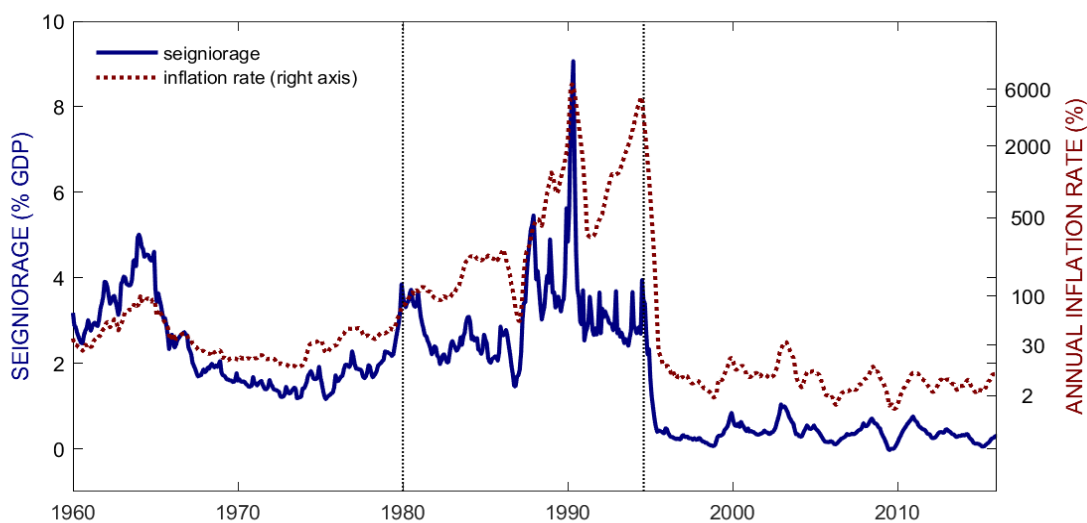
Note: revenues correspond to direct and indirect taxes. See Appendix C for a description of how we compute the revenues and expenditures of the public sector, and the nominal GDP series.

Figure 5: Inflation, seigniorage, and money growth: 1960–2016

(a) Money growth and inflation



(b) Seigniorage and inflation

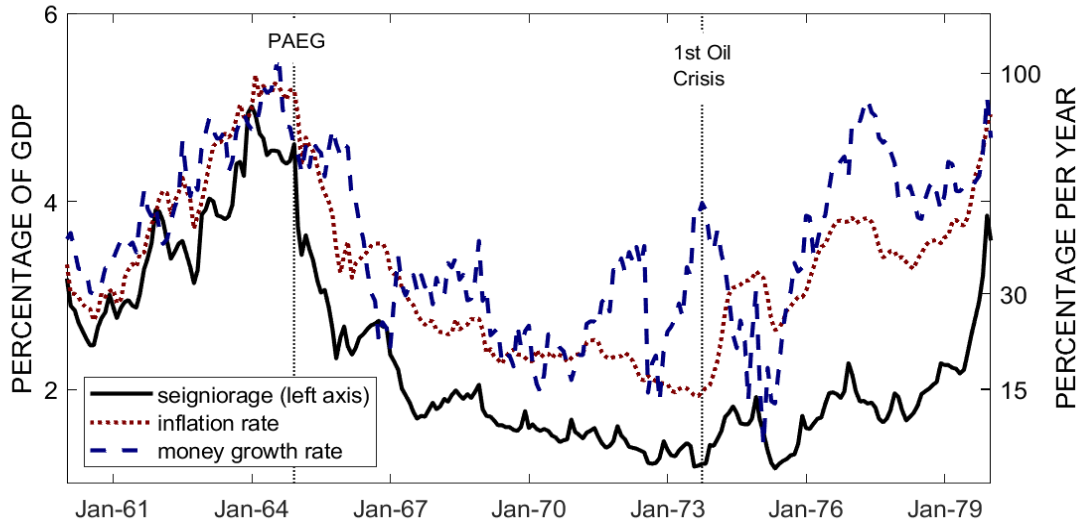


Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

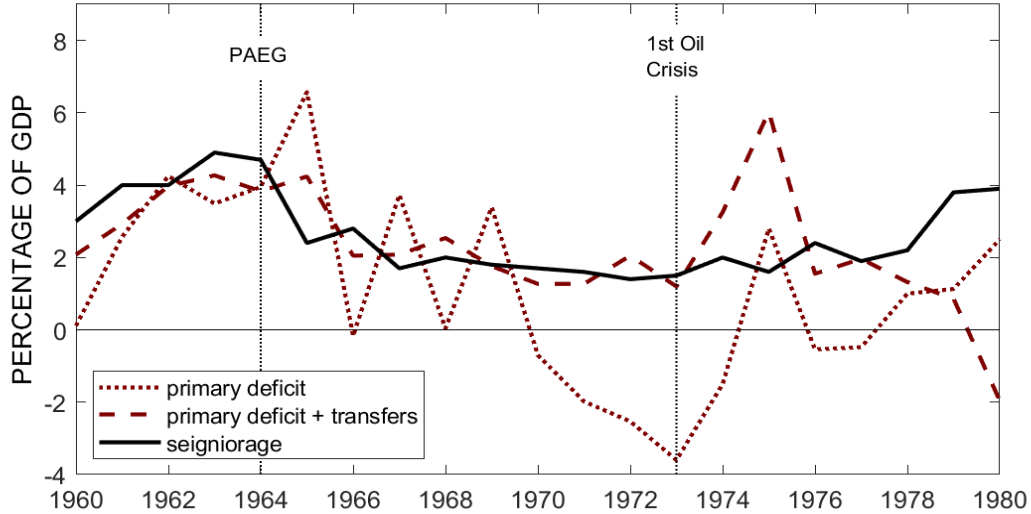
Note: for the inflation and money growth series, we plot the transformation $\log(15 + X)$, in which X denotes the annual percentage rate. We sum 15 to avoid taking logs of negative numbers. Inflation rates are computed using the general price index, IGP-DI, from Getulio Vargas Foundation. See Appendix C for a description of how we compute the seigniorage and nominal GDP series.

Figure 6: PAEG

(a) Money growth, inflation, and seigniorage



(b) Primary deficits and seigniorage

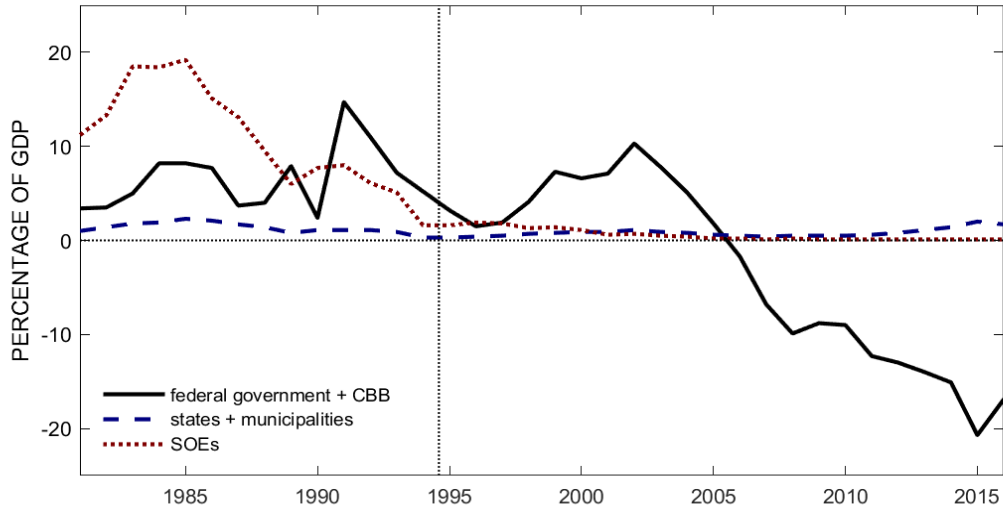


Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

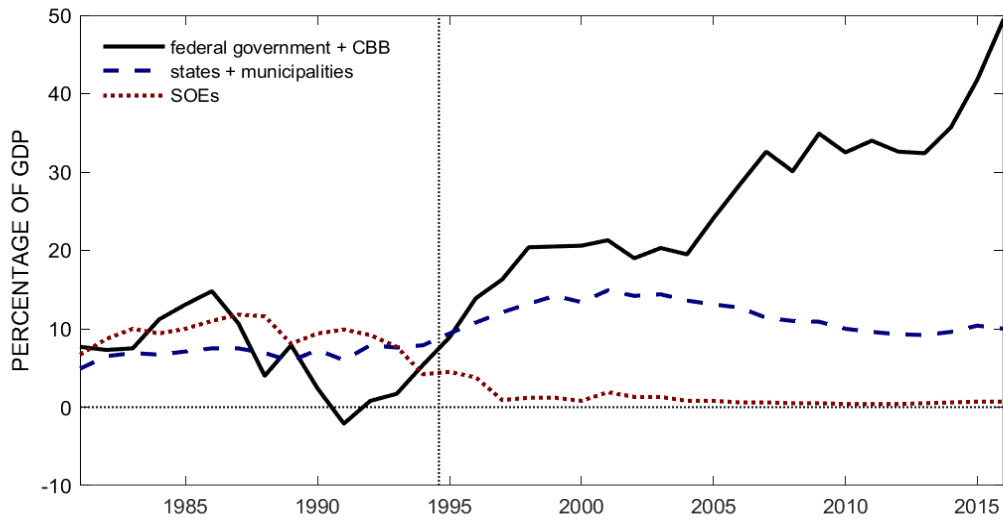
Note: for the inflation and money growth series, we plot the transformation $\log(15 + X)$, in which X denotes the annual percentage rate. We sum 15 to avoid taking logs of negative numbers. Inflation rates are computed using the general price index, IGP-DI, from Getulio Vargas Foundation. See Appendix C for a description of how we compute the seigniorage, deficit, and nominal GDP series.

Figure 7: Sectoral composition of the public debt: 1960–2016

(a) External debt



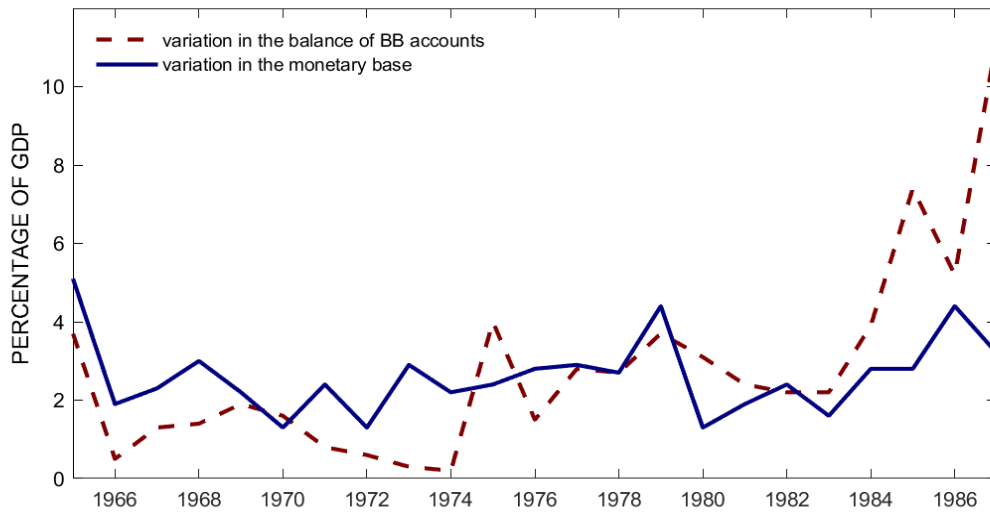
(b) Domestic debt



Source: IPEADATA, Central Bank of Brazil (CBB), and Brazilian Institute of Geography and Statistics.

Note: the series of net debt, both external and domestic, of the federal government, state governments, and SOEs are from IPEADATA. We add the balances of Bank of Brazil accounts at the balance sheet of the central bank to the series of net domestic debt of the federal government. See Appendix C for a description of how we compute the nominal GDP series.

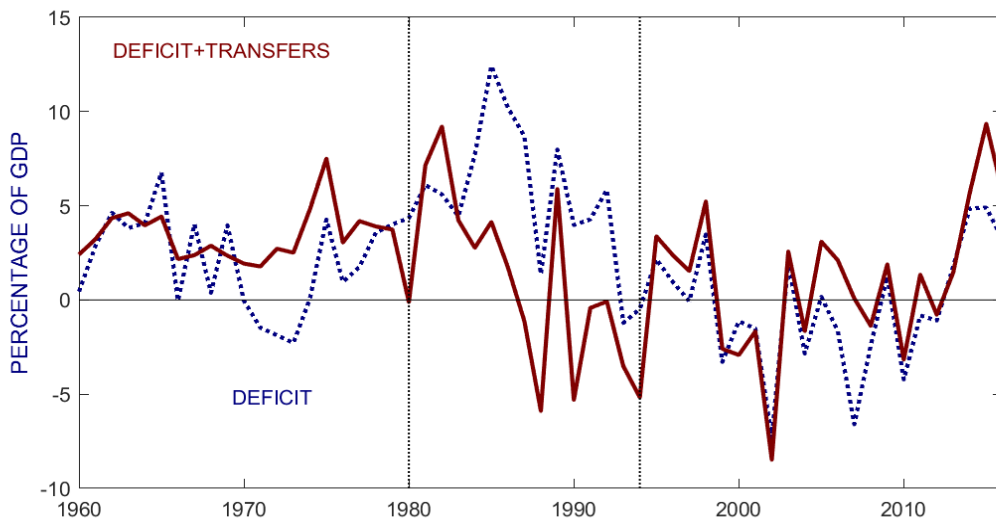
Figure 8: Bank of Brazil (BB) and the central bank



Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

Note: the variation in the balance of BB accounts denote the variation in the balance of the accounts of the Bank of Brazil that are reported in the balance sheet of the Central Bank of Brazil, which comprises the *Conta de Movimento* and the *Conta de Suprimentos Especiais*. See Appendix C for a description of how we compute the nominal GDP series.

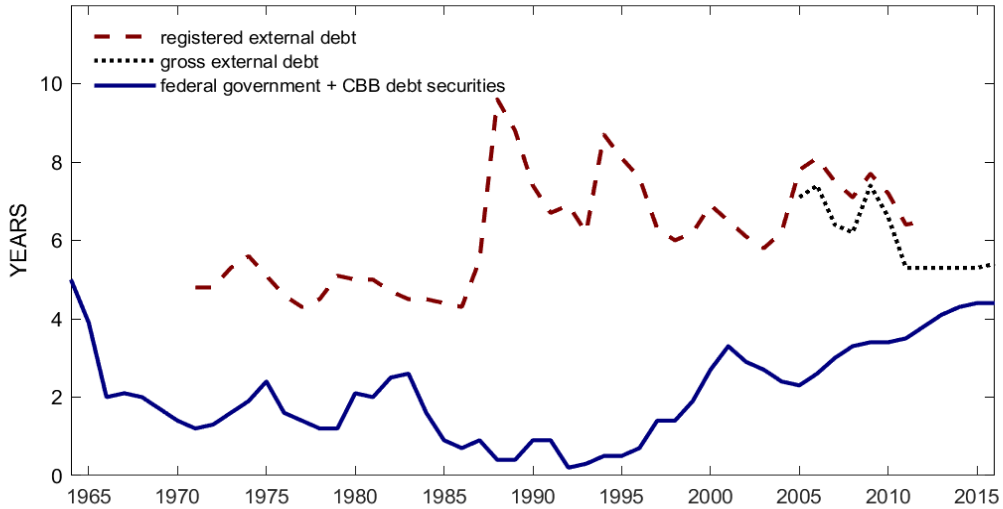
Figure 9: Deficit and transfers



Source: Brazilian Institute of Geography and Statistics (IBGE) and Central Bank of Brazil (CBB).

Note: our definition of deficit is the primary deficit plus real interest payments on debt discounting for real GDP growth, and transfers represent the residual (the variation in debt that cannot be explained by official deficit statistics). See Appendix C for a description of how we compute the series of deficits, transfers, and nominal GDP.

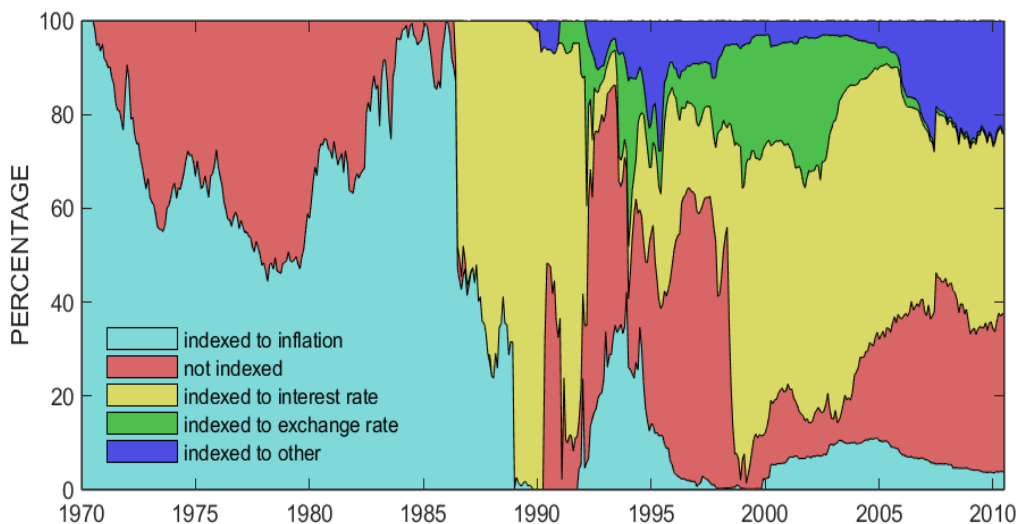
Figure 10: Average maturity of debt



Source: Central Bank of Brazil (CBB), and National Treasury Secretariat (STN).

Note: we use the series of average maturity of the registered external debt (code 3688) from 1971 to 2012, and the series of the average maturity of the gross external debt (code 3689) from 2005 to 2016, both from the central bank. Regarding the maturity of the domestic debt, from 1964 until 2008 we used the average maturity reported in the statistical appendix, table A.4.5, of the book *Dívida Pública: A Experiência Brasileira* published by the National Treasury Secretariat in 2009. After 2009, we use the series of average maturity of the federal government debt securities (code 10621) from the central bank. The series codes correspond to the codes used in the website of the Central Bank of Brazil.

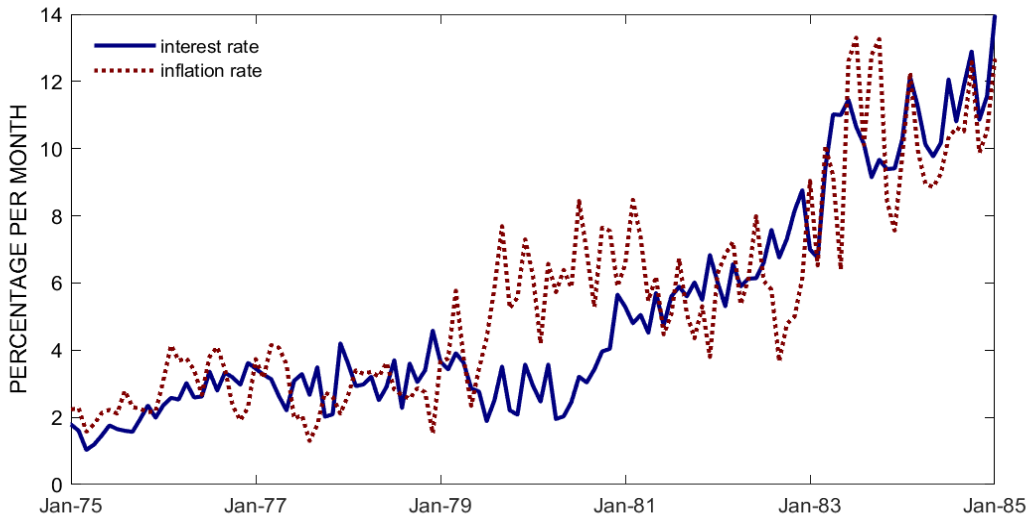
Figure 11: Indexation of federal government debt securities



Source: IPEADATA.

Note: debt securities indexed to inflation correspond to those indexed to either IGP-DI or IGP-M. Those indexed to IPCA or other price indices are included in others. Debt securities that are not indexed correspond to nominal bonds. Finally, debt securities indexed to the interest rate denote those that are indexed to the interest rate that is used by the central bank as its policy instrument, the SELIC. These securities are sometimes referred to as zero-duration bonds.

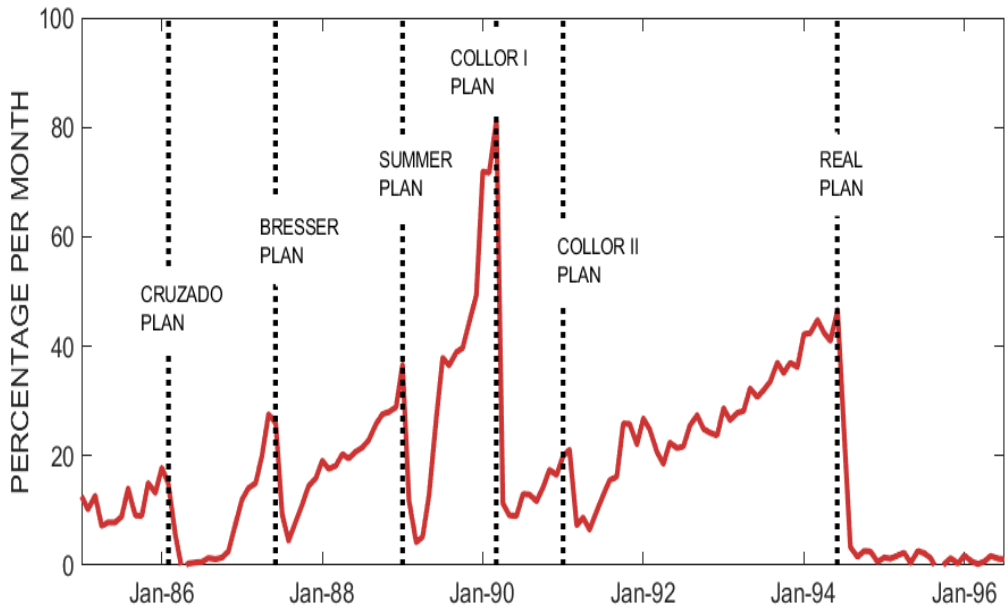
Figure 12: Nominal interest rate and inflation



Source: IPEADATA.

Note: interest rates correspond to the daily averages of the interest rates charged in the overnight operations between the central bank and other financial institutions. Inflation rates are computed using the general price index, IGP-DI, from Getulio Vargas Foundation.

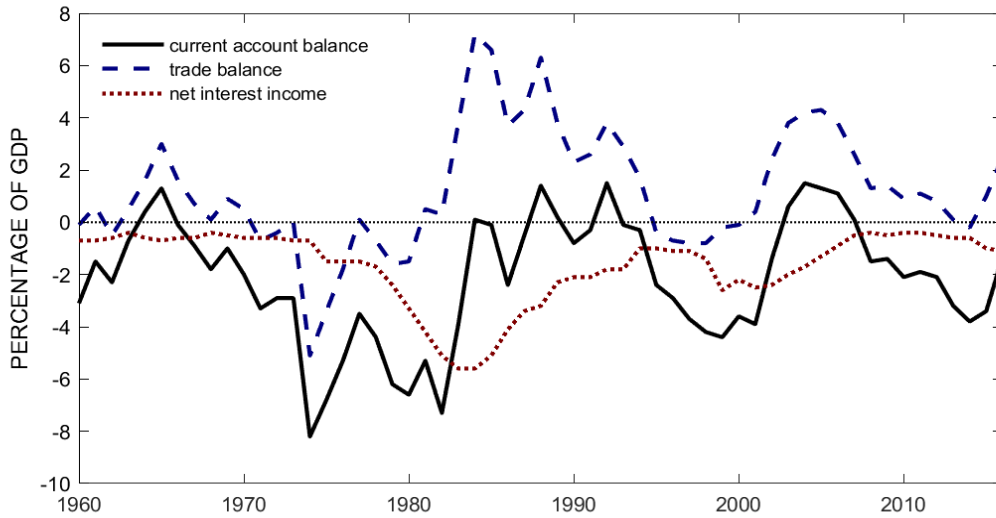
Figure 13: Inflation and stabilization plans



Source: IPEADATA.

Note: inflation rates are computed using the general price index, IGP-DI, from Getulio Vargas Foundation.

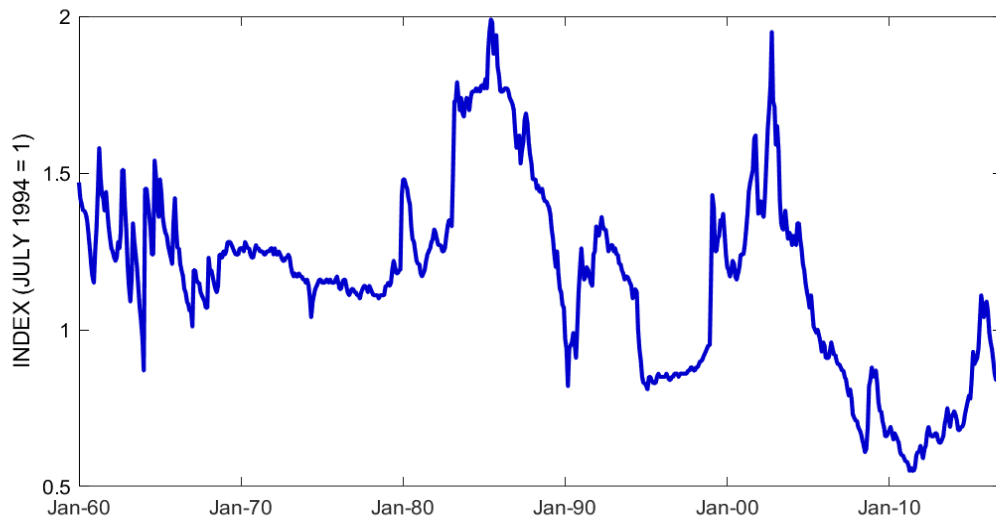
Figure 14: International accounts



Source: Central Bank of Brazil (CBB).

Note: we use the exchange rate series with average purchase values in the year (code 3693) from the central bank to convert dollar values to reais. The current account, trade balance, and net interest income values correspond to the series with codes 2301, 2301, 2398, respectively. The series codes correspond to the codes used in the website of the Central Bank of Brazil. See Appendix C for a description of how we compute the series of nominal GDP.

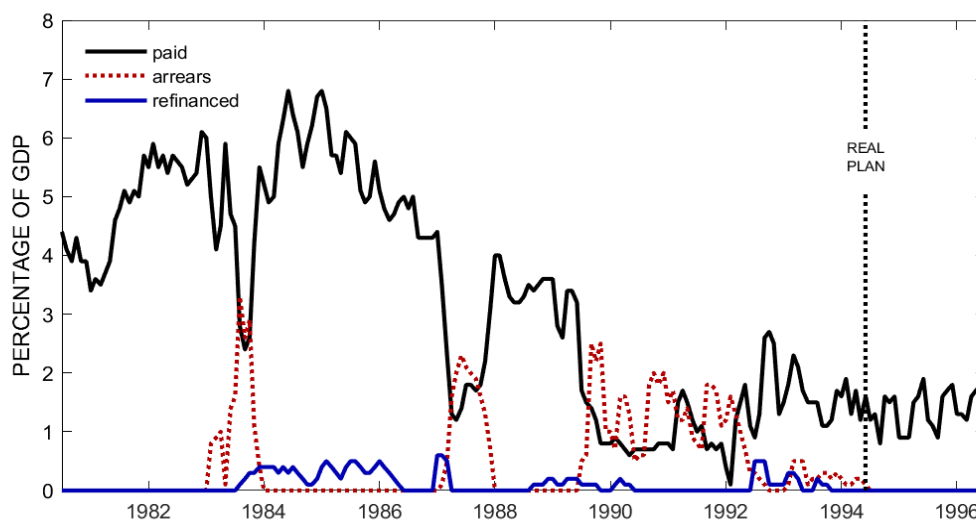
Figure 15: Real exchange rate



Source: Central Bank of Brazil (CBB), IPEADATA, and Bureau of Economic Analysis (BEA).

Note: we consider the bilateral real exchange rate between the United States and Brazil. The real exchange rate is computed as the US price index times the exchange rate divided by the price index in Brazil. We use the US CPI as the price index for the United States, the exchange rate series (R\$/US\$) with average purchase values from the central bank, and the General Price Index, IGP-DI, from Getulio Vargas Foundation as the price index for Brazil.

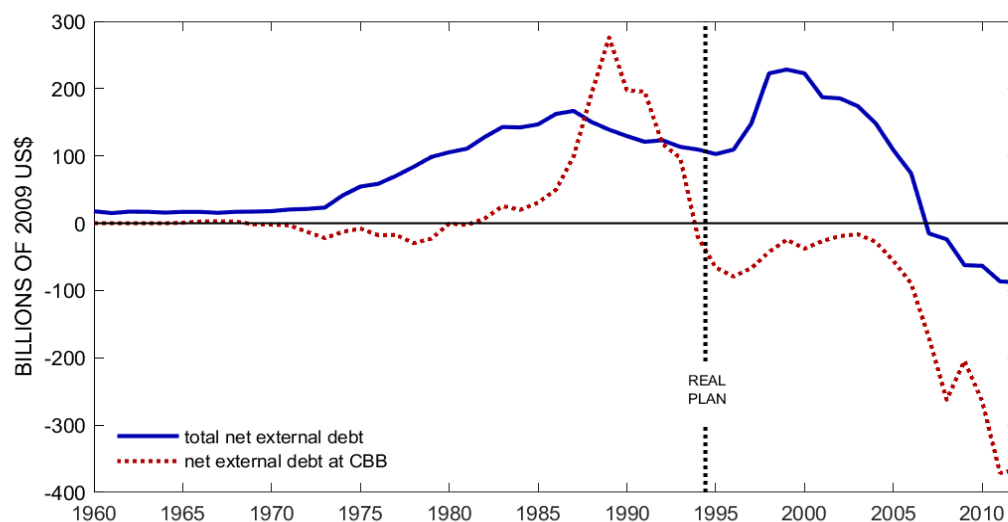
Figure 16: Interest payments refinanced and in arrears



Source: Central Bank of Brazil (CBB) and IPEADATA.

Note: we use the monthly series for interests actually paid (code 2833), in arrears (code 2835), and refinanced (code 2834) relative to the external debt from the central bank. We use the exchange rate series with average purchase values in the month from IPEADATA to convert dollar values to reais. We use accumulated values in three months to smooth the series and report annualized values by multiplying the series by four. The series codes correspond to the codes used in the website of the Central Bank of Brazil. See Appendix C for a description of how we compute the series of nominal GDP.

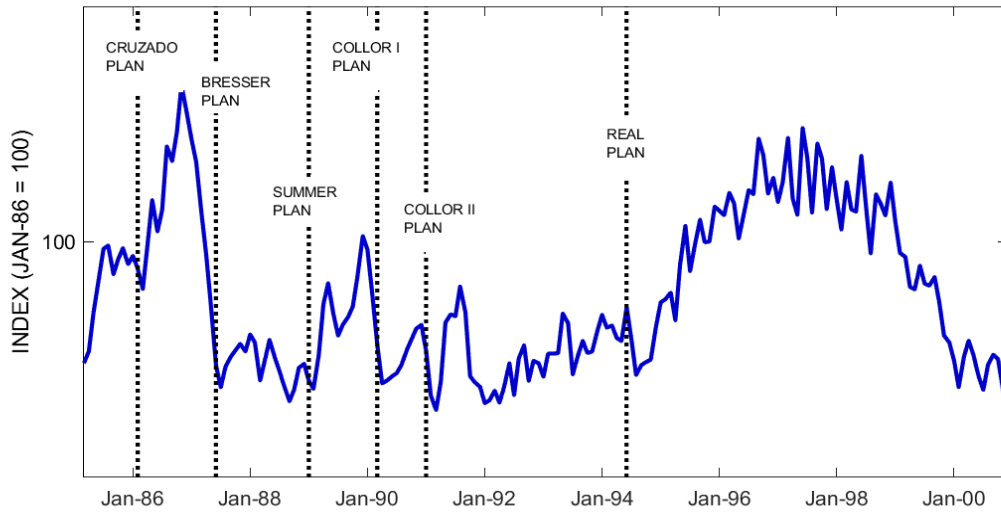
Figure 17: Net external debt of the Central Bank of Brazil



Source: Central Bank of Brazil (CBB).

Note: we use data on assets and liabilities denominated in foreign currency in the balance sheet of the central bank to compute the net external debt of CBB. We use end-of-period exchange rates (code 3691) to convert to dollars. See note in Figure 2b for how we computed the series of total external debt. We use the US GDP deflator from the *Bureau of Economic Analysis* to compute constant US\$ values. The series codes correspond to the codes used in the website of CBB.

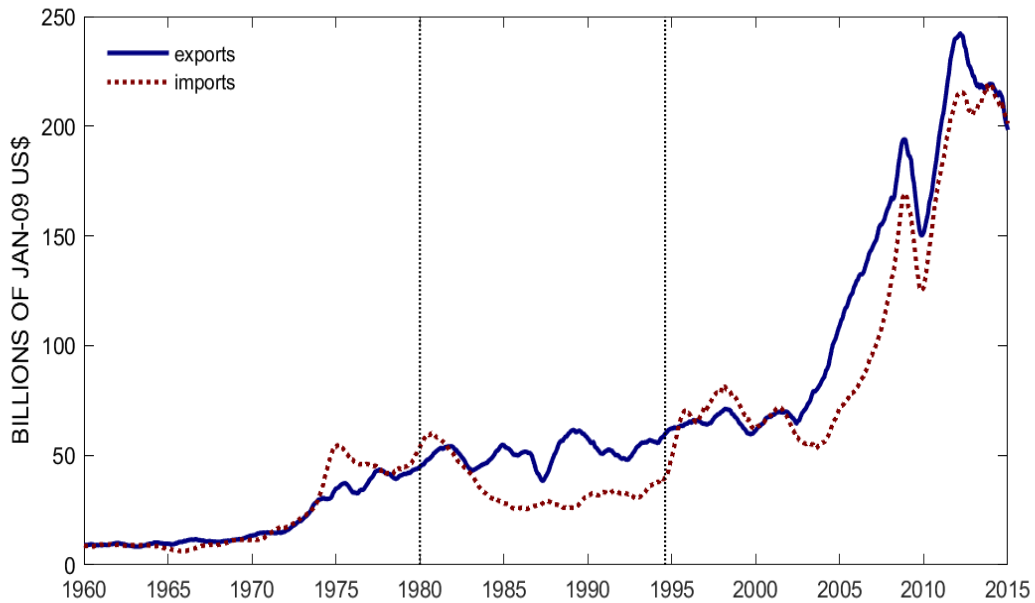
Figure 18: Real wages



Source: IPEADATA and Central Bank of Brazil (CBB).

Note: wages correspond to the average remuneration in the metropolitan region of Sao Paulo. Real values are computed using the General Price Index, IGP-DI, from Getulio Vargas Foundation. We use three-months average to smooth the series.

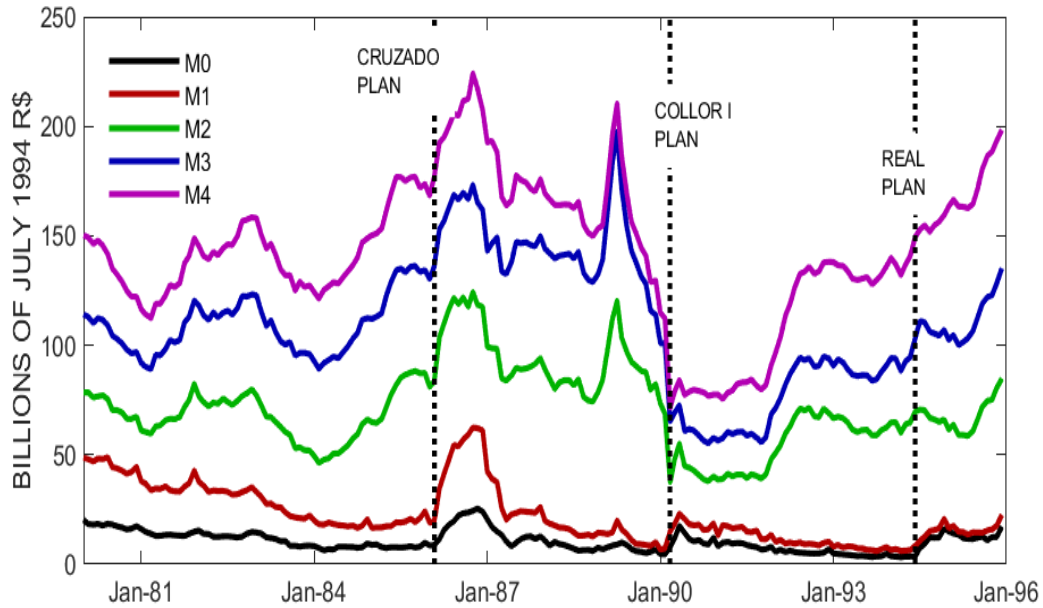
Figure 19: Exports and imports



Source: Central Bank of Brazil (CBB) and Bureau of Economic Analysis (BEA).

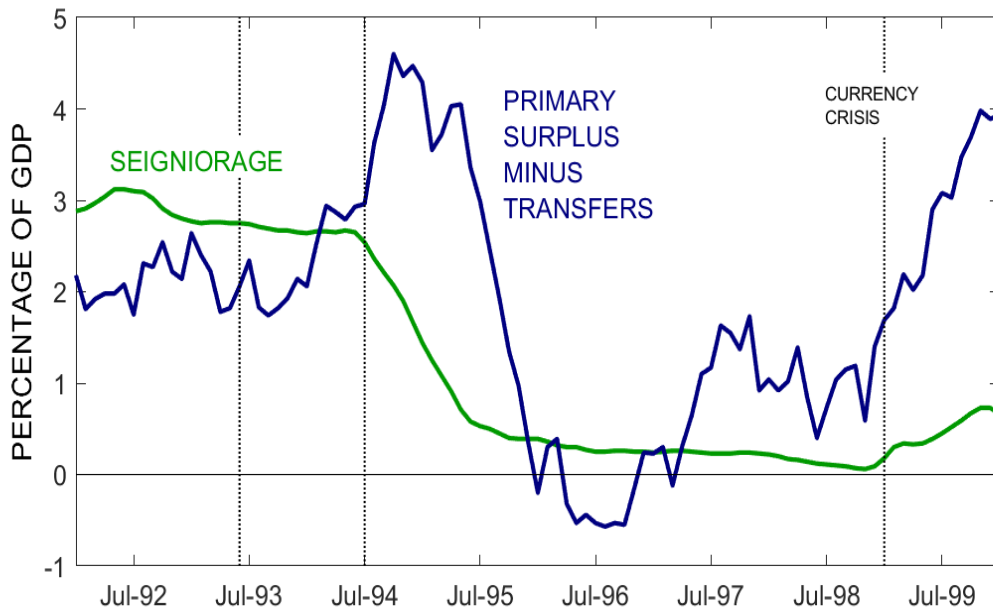
Note: We use the US CPI to compute constant dollar values.

Figure 20: Monetary aggregates



Source: Central Bank of Brazil (CBB).

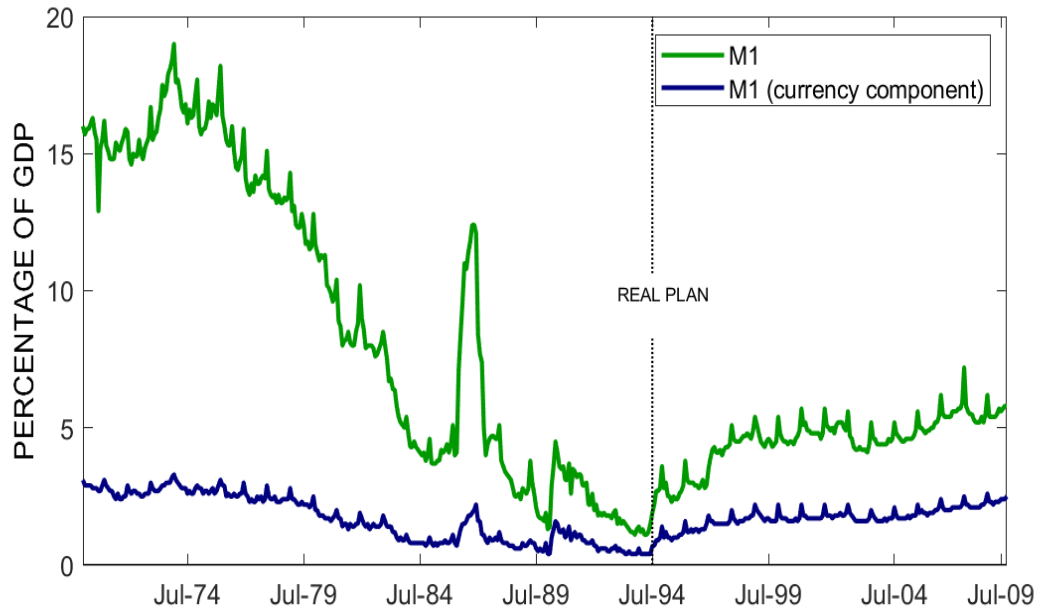
Figure 21: Real Plan



Source: Central Bank of Brazil (CBB) and Brazilian Institute of Geography and Statistics (IBGE).

Note: in this plot we are using the opposite of *primary deficits plus transfers*. See Appendix C for a description of how we constructed the seigniorage, deficit, and transfers series.

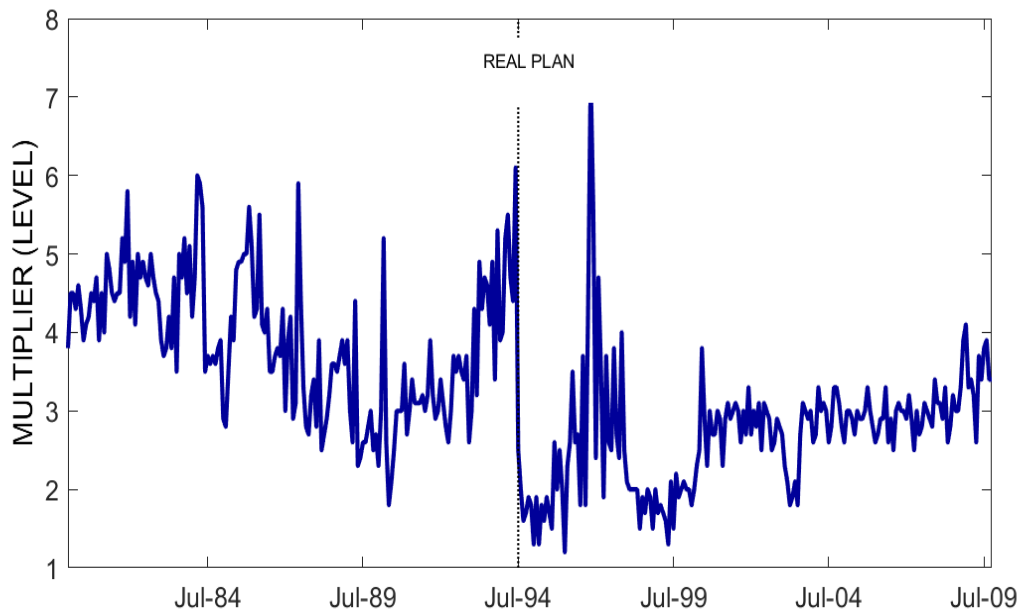
Figure 22: Real money balances



Source: Central Bank of Brazil (CBB) and Brazilian Institute of Geography and Statistics (IBGE).

Note: see Appendix C for a description of how we constructed the nominal GDP series.

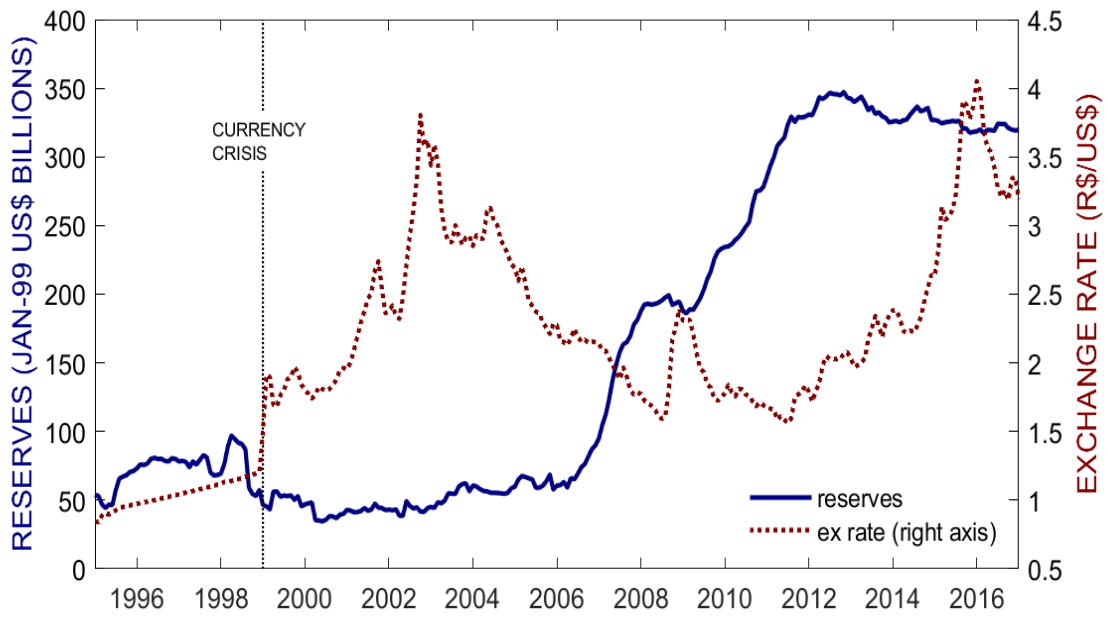
Figure 23: Money multiplier



Source: Central Bank of Brazil (CBB).

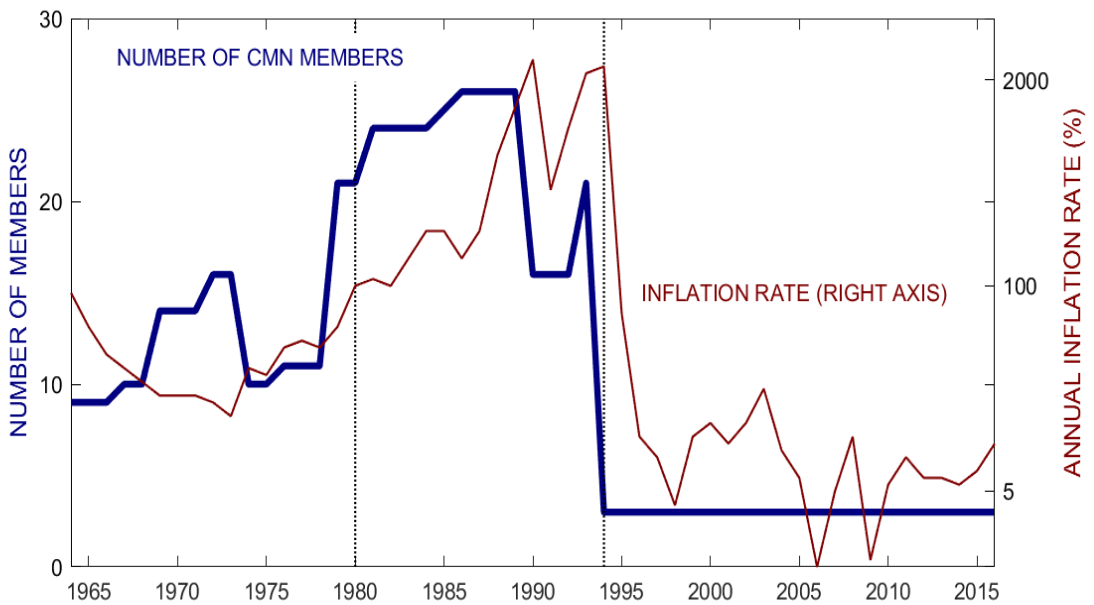
Note: the money multiplier is defined as the ratio of bank deposits over bank reserves.

Figure 24: Exchange rate and foreign reserves



Source: Central Bank of Brazil (CBB).

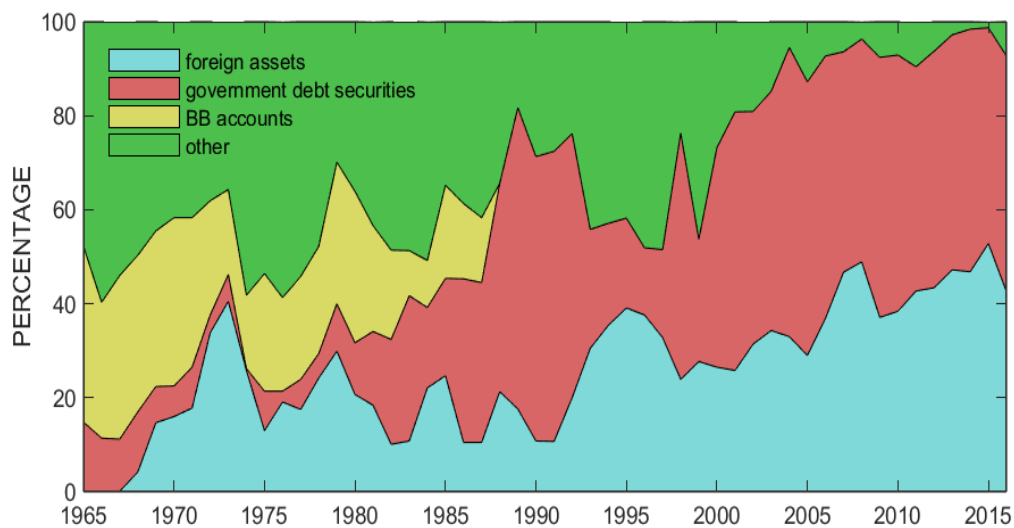
Figure 25: Size of National Monetary Council (CMN) and inflation



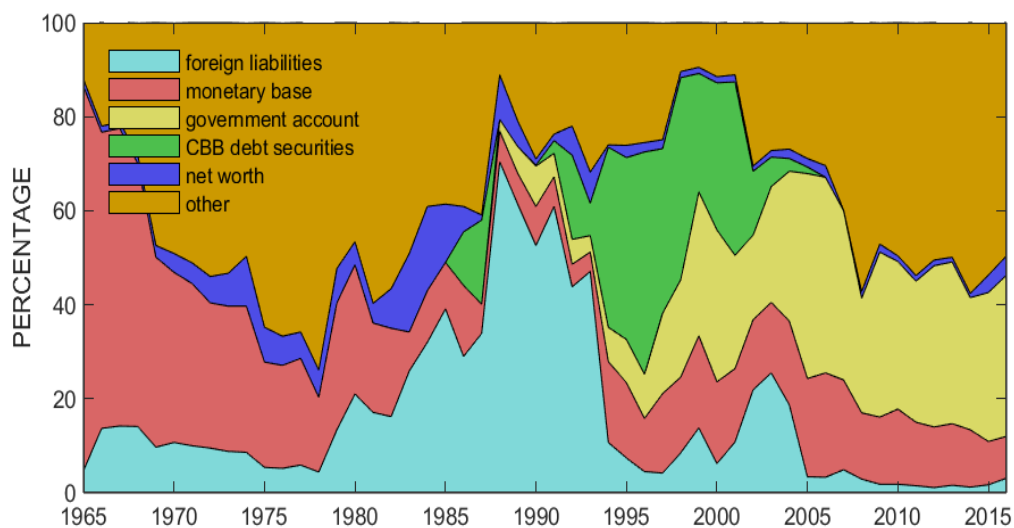
Source: IPEADATA and Franco (2017).

Figure 26: Composition of the balance sheet of the Central Bank of Brazil

(a) Assets

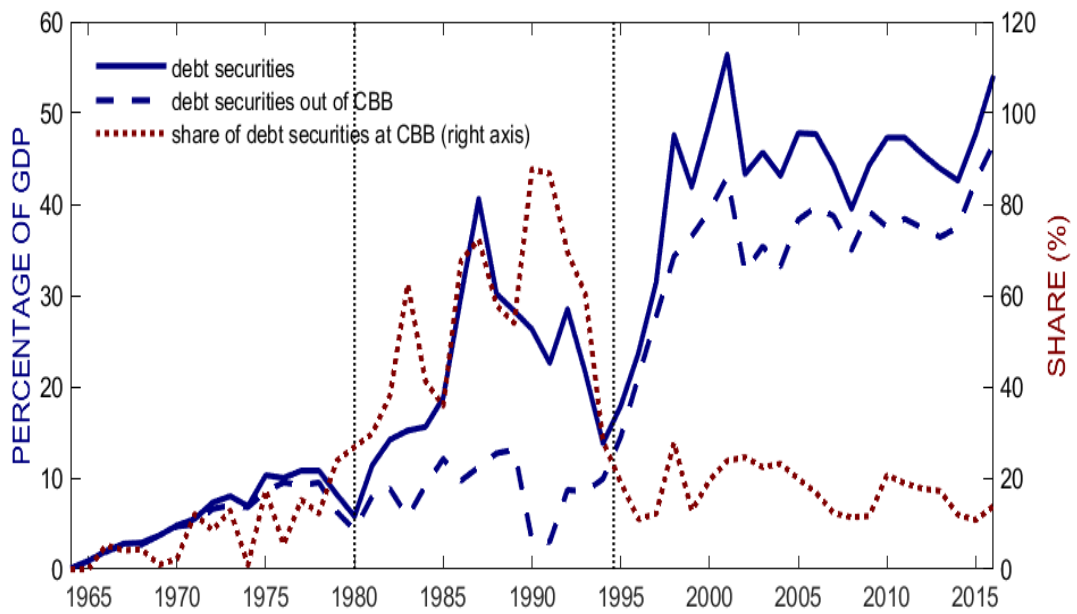


(b) Liabilities



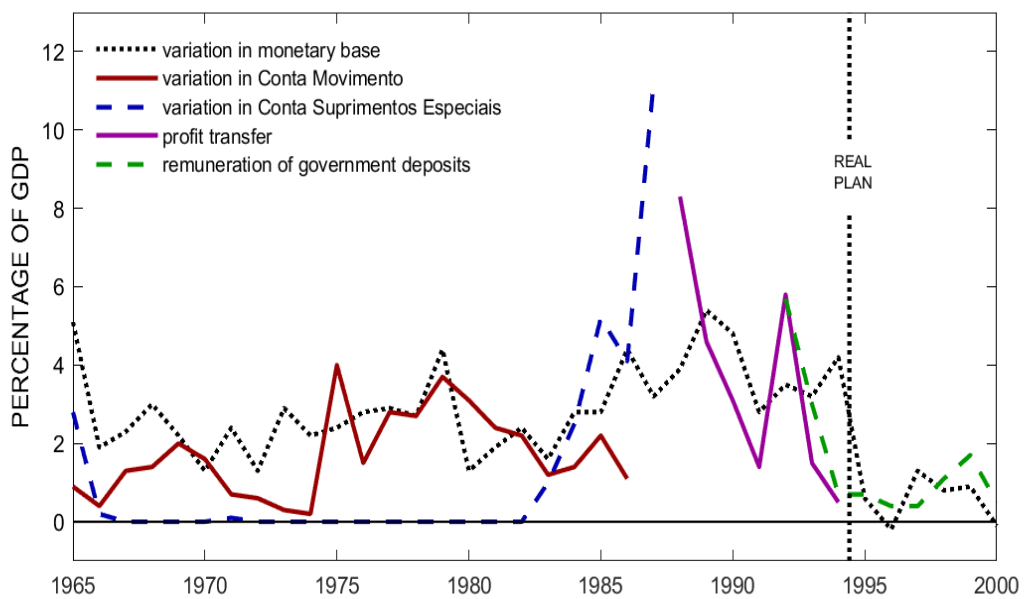
Source: Central Bank of Brazil (CBB).

Figure 27: Government debt securities held by the Central Bank of Brazil



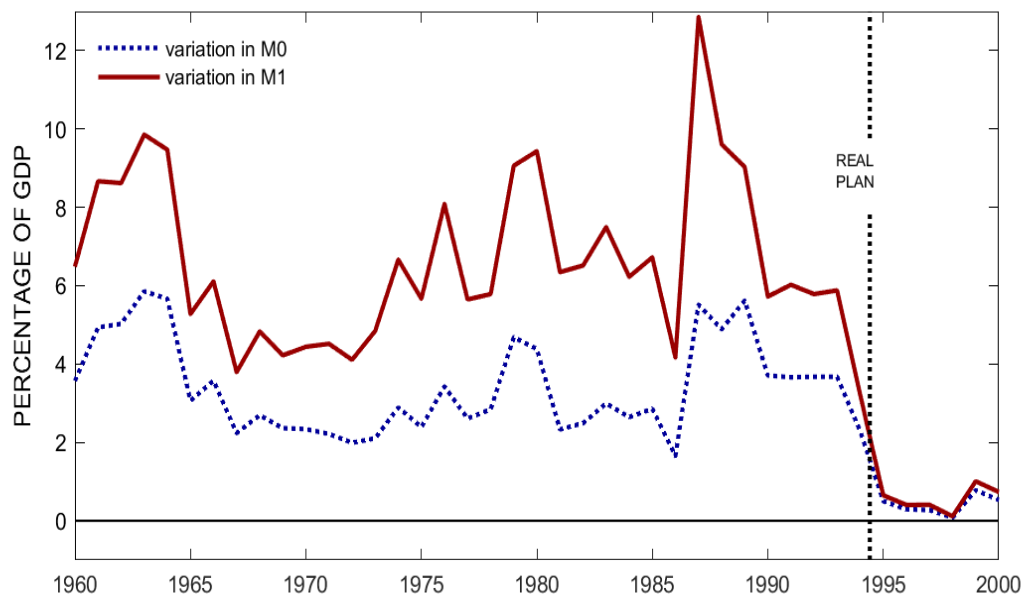
Source: IPEADATA.

Figure 28: Transfers from the central bank to Bank of Brazil and to the treasury



Source: Central Bank of Brazil (CBB).

Figure 29: Variation in M0 and M1 over GDP



Source: IPEADATA.

C Appendix

This appendix describes the data and methodology that were used to compute the government budget constraint that is used in Table 1, and discuss the different primary deficit series that are available for Brazil.

We consider the following consolidated budget constraint of the government in units of the domestic currency (in our case, reais):

$$P_t b_t + E_t P_t^* b_t^* + M_t = P_t (D_t + T_t) + P_t r_{t-1} b_{t-1} + E_t P_t^* r_{t-1}^* b_{t-1}^* + M_{t-1} \quad (1)$$

where P is the price level of the domestic good in local currency, b is the real stock of domestic debt in units of the domestic good, E is the nominal exchange rate between the foreign (dollar) and local currencies, P^* is the price level of the foreign good in foreign currency, b^* is the real stock of external debt in units of the foreign good, M is the monetary base in units of the local currency, D is the real primary deficit in units of the domestic good, r is the gross real return on domestic debt, r^* is the gross real return on the external debt, and T denotes the transfers in units of the domestic good. The transfers, T , account for the residual in equation (1).

We follow the same methodology as in Chapter 2, with two simplifying assumptions: (i) we assume that the share of the domestic good in the domestic price level is one ($\alpha = 1$) and we express the stock of external debt, b_t^* , in units of the foreign good, so the value of the external debt in units of the foreign currency is $P_t^* b_t^*$; and (ii) we assume that all domestic debt is real, because most domestic debt in Brazil is indexed to inflation and/or nominal interest rates and we do not have data on interest payments that separate real from nominal debt.

Dividing equation (1) by $P_t Y_t$, in which Y_t is real GDP of the domestic country, and after some algebra, we can express the consolidated government budget constraint as:

$$\begin{aligned} & \underbrace{(\theta_t - \theta_{t-1})}_{\text{domestic debt}} + \underbrace{\xi_t (\theta_t^* - \theta_{t-1}^*)}_{\text{external debt}} + \underbrace{(m_t - m_{t-1})}_{\text{monetary base}} + \underbrace{\frac{\pi_t g_t - 1}{\pi_t g_t} m_{t-1}}_{\text{seigniorage}} \quad (2) \\ & = \underbrace{\frac{r_{t-1} - g_t}{g_t} \theta_{t-1}}_{\text{interest on domestic debt}} + \underbrace{\xi_t \frac{r_{t-1}^* - g_t}{g_t} \theta_{t-1}^*}_{\text{interest on external debt}} + \underbrace{(d_t + \tau_t)}_{\text{primary deficit + transfers}}, \end{aligned}$$

where we used the following definitions: $\theta_t \equiv \frac{b_t}{Y_t}$, $\theta_t^* \equiv \frac{b_t^*}{Y_t}$, $\xi_t \equiv \frac{E_t P_t^*}{P_t}$, $m_t \equiv \frac{M_t}{P_t Y_t}$, $g_t \equiv \frac{Y_t}{Y_{t-1}}$, and $\pi_t \equiv \frac{P_t}{P_{t-1}}$. Next, we describe how we use the available data to compute the government budget constraint in equation (2), whose averages are reported in Table 1. The fiscal deficit, as in Figure 1c, corresponds to *interest on domestic debt + interest on external debt + primary deficit*.

We start by describing how we compute the price level, real GDP, and exchange rate

series.⁵⁵ An important issue in our case is that stock values are expressed in units of the domestic currency in the end of the period, while the official price statistics report average prices within the period. In periods of high inflation, the difference between end-of-period and average prices is substantial. To overcome that, we deflate stock values by an estimate of end-of-period prices. In addition, for the most recent period (after 1990) we are able to compute the government budget constraint for each month, so we use the 12-month sum of the budget constraint to compute the annual sequence of government budget constraints. To do that, we also construct a monthly series of real GDP.

Price index We use the General Price Index (IGP) from Getulio Vargas Foundation. It is composed by three price indexes: 60% Producer Price Index (IPA), 30% Consumer Price Index (IPC), and 10% Construction Price Index (INCC). Prices are collected from day 1 to day 30 of the reference month. Data is available at the IPEADATA website, *IGP-DI - geral - índice (ago. 1994 = 100)*. End-of-period values are computed as the geometric average between in t and $t + 1$. We normalize the IGP-DI such that its average is equal to the GDP deflator in 1995. The GDP deflator in 1995 is equal to the nominal GDP in 1995 divided by 100 (we normalize real GDP to 100 in 1995). Data on nominal GDP is from IPEADATA, *Produto interno bruto (PIB) a preços de mercado - referência 2000*). Regarding the price index of the foreign good, we use the GDP deflator for the US for the annual series, and the US CPI for the monthly series.

Real GDP Data is from the Brazilian Institute of Geography and Statistics (IBGE), series SCN53. It is annual, from 1947 to 2014. The series show the percentage variation in volume. We normalize real GDP in 1995 to 100, and use the variation to construct the series of real GDP. We use the annual variation in real GDP (reference year 2010) between 2015 and 2016 to update the series until 2016. It is available at the IPEADATA website. To construct a monthly series, we assume that the annual values correspond to July values, and use linear interpolation to compute real GDP for the other months.

Exchange rate We use the exchange rate (buy price) between the Brazilian currency and US\$. Both average and end-of-period series are available at the IPEADATA website.

Sub-period 1960–1981

Most series are available at annual frequency for this sub-period, so we only compute the budget constraint at annual frequency. We use the sum of three series to compute the stock of domestic debt $P_t b_t$: federal government debt securities out of the central bank, debt securities of states and municipalities, and *dívida pública fundada*. Data is

⁵⁵Nominal GDP is computed as the price level multiplied by real GDP.

from IBGE - *Estatísticas do Século XX*. We use the series of monetary base, M_0 (end-of-period) from IPEADATA, as our measure of M_t .

We use the series of real interest payments on domestic debt divided by nominal GDP as our measure of interest payments on domestic debt $\frac{r_{t-1}-g_t}{g_t}\theta_{t-1}$. We avoid manipulating these series in the first sub-periods, because the series of interest payments and stock of debt come from different sources. The series of real interest payments is computed as the series of nominal interest payments on domestic debt minus the series of monetary correction, multiplied by the fraction of federal debt securities out of the central bank, all from IBGE - *Estatísticas do Século XX*.

Regarding the net external debt, we assume that b_t^* is zero up to 1972. After that, we use the series of registered public external debt (code 3564) minus foreign reserves (code 3566) as the measure of $P_t^*b_t^*$, both from the Central Bank of Brazil.⁵⁶ For the series of interest payments on external debt, we only observe the total payments of interest on gross external debt, which includes both public and private debt. We observe both the series of total gross external debt (code 3682) and public gross external debt, so we assume that interest payments are proportional to the stocks, which gives us a series of interest payments on public external debt, $P_t^*(r_{t-1}^* - 1)b_{t-1}^*$.

The series of primary deficit is computed as expenditures minus tax revenues plus the transfers from the central bank to the Bank of Brazil. Tax revenues include direct and indirect taxes. Expenditures correspond to government consumption, subsidies, transfers, and investment, net of other current net revenues. Data is from IBGE - *Estatísticas do Século XX*. The transfers to Bank of Brazil are computed as the variation in the balance of the Bank of Brazil accounts at the central bank: *Conta de Movimento* and *Conta de Suprimentos Especias*. The transfers τ_t are computed as the residual of equation (2).

Sub-period 1982–1990

In 1981, the Central Bank of Brazil started to publish the series of the public sector borrowing requirement, which requires the computation of both net domestic and net external debt series of the non-financial public sector. We rely mostly on these series to construct the budget constraint after 1981. As our measure of domestic debt, $P_t b_t$, we use the series of net domestic public debt, available at IPEADATA. However, this series include the monetary base as liabilities, and the accounts of the Bank of Brazil at the central bank as assets, so we adjust the series for that. We subtract the monetary base and add the balance of the *Conta de Movimento* and *Conta de Suprimentos Especias* at the balance sheet of the central bank to the series of net domestic debt.

Regarding the series of net public external debt, the central bank does not distinguish between exchange rate adjustments and inventory adjustments, it reports only the sum.

⁵⁶Codes denote the series codes at the website of the central bank.

We construct the series of exchange rate adjustments and use the difference as the proxy for inventory adjustments on the external debt. We assume that, for the 1981–1990 period, all the adjustments that are made to compute the nominal deficit based on the variation in total net public debt are due to adjustments on the net external debt series. The reason is that this period is characterized by a sequence of external debt renegotiations, which could lead to variations in the net external debt figures without being related to nominal deficits.

In order to compute the series of interest payments on external debt, we proceed in a similar fashion as in the previous sub-period, but now we adjust the value of interest payments on external debt for default. We compute the fraction of total interest paid over total interest due relative to total gross external debt, and use this fraction to adjust for interest payments that were actually paid. The source of this data is the same as in Figure 16.

Regarding the series of interest payments on domestic debt, we use the same method as before up to 1984. After that, the central bank started to publish the series of nominal interest payments. We then subtract the series of interest payments on external debt described above and use the result as our measure of interest payments on domestic debt.

Sub-period 1990–2018

After 1990, the central bank began to publish its fiscal statistics on a monthly frequency. From that point on, we have all the information that is needed to compute the government budget constraint in (2), except for the primary deficit. At this point, we can only compute the sum of primary deficit plus transfers, corresponding to the residual of (2). This is similar to the primary deficit series that the central bank uses. As mentioned above, we proceed by summing the monthly budget constraints to have an annual series of the government budget constraint. We then use the primary deficit series from IBGE and subtract it from (primary deficit+transfers) to compute the transfers. Finally, note that the series of primary deficit from IBGE is available up to 2000. After that, we use the publications of the consolidated national public sector accounts available at the website of the National Treasury Secretariat.

C.1 Primary deficit series in Brazil

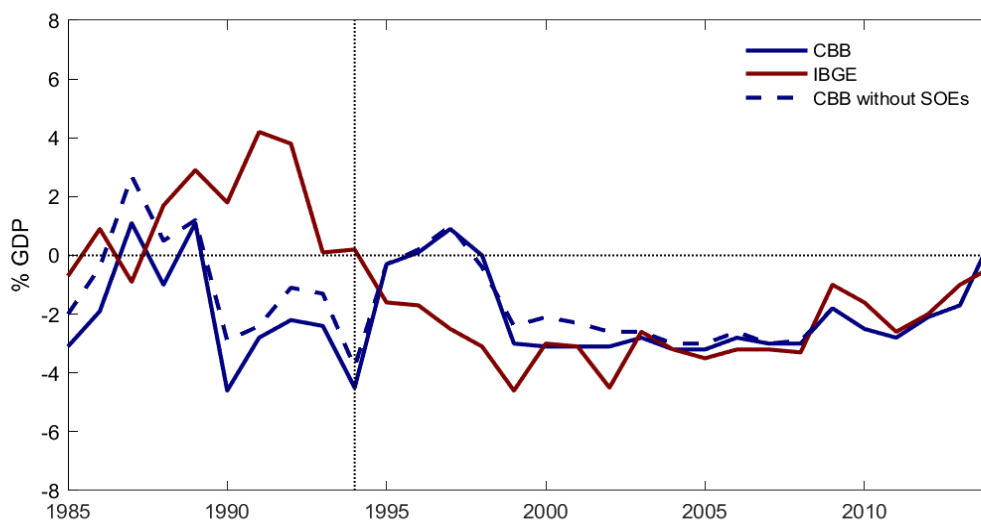
In Brazil, there are two main sources of data on the public sector primary deficit: the Brazilian Institute of Geography and Statistics (IBGE), and the Central Bank of Brazil (CBB). The data from IBGE is annual, and covers the period from 1947 to the present.⁵⁷

⁵⁷From 1947 to 2000, the series can be downloaded from the *Estatísticas do Século XX* from IBGE. We extrapolate it using the annual publications of the public sector accounts at the website of the National Treasury Secretariat.

It includes the federal government, states, and municipalities, and it is published in the national accounts - public sector.⁵⁸ Its data is based on the executed budget of the government. The data on primary deficit from CBB, on the other hand, is available on an annual frequency since 1985, and on a monthly frequency since January 1991. It includes the federal government, states, and municipalities, as well as the central bank and state-owned enterprises (SOEs). We illustrate both (original) series in figure 30.

There are important differences in the methodology used to compute each of these series. The data from IBGE uses the actual data reported in the books of government authorities, and can be considered the traditional measure of primary deficit.⁵⁹ CBB, on the other hand, estimates it based on the public sector borrowing requirement. That is, CBB computes the variation of the stock of net debt and money supply from the federal government, central bank, states and municipalities, and state-owned enterprises. That variation gives a proxy for the fiscal deficit of the government, that includes both interest payments and the primary deficit. CBB then estimates the interest payments based on the characteristics of assets and liabilities and computes the primary deficit as a residual.

Figure 30: Primary deficit: CBB versus IBGE



Source: Brazilian Institute of Geography and Statistics and Central Bank of Brazil.

In Brazil, there is a preference among economists to use the deficit series from CBB after 1985.⁶⁰ A few factors explain that. First, on the onset of the external debt crisis in the early 1980s, authorities needed to work with recent data and the statistics on the primary deficit took long to be released. CBB, on the other hand, had the ability to

⁵⁸Data on the federal government deficit and central government are also readily available at the website of the Department of the Treasury for the most recent period.

⁵⁹For example, it uses data from the *Balanço Geral da União* (Union General Budget) for the federal government.

⁶⁰See Giambiagi and Alem (2011).

compile the debt information for both domestic and external debt on a timely fashion, so it decided to compute its own fiscal statistics based on the public sector borrowing requirements. The second factor is the inclusion of SOEs. The debt series used by CBB covered SOEs, while other deficit series did not. Since SOEs were constantly used by the government to implement its economic policies (see main text), that was considered to be a significant advantage. Third, there was lack of confidence in the capability of the government to report its finances accurately. The National Treasury Secretariat, for example, was created only in 1986.

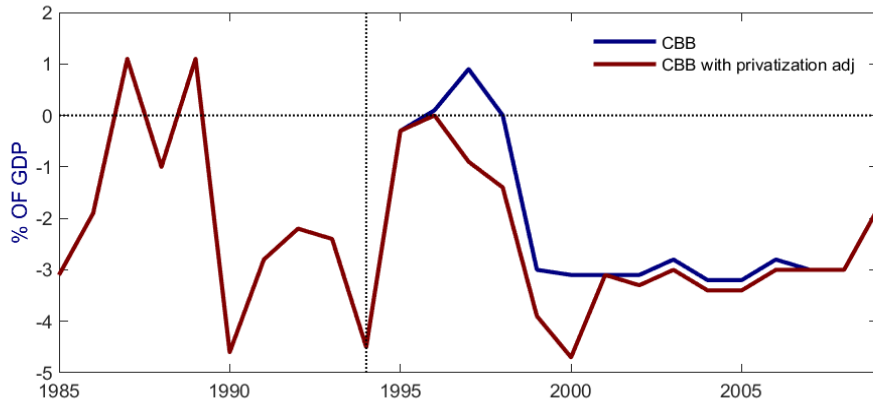
Next, we discuss a few points regarding the primary deficit series of the central bank. First, the inclusion or not of SOEs in the primary deficit series does not make a big difference after 1985, especially after the 1990s when most privatizations took place (figure 30). Second, CBB did not take into account privatizations when estimating primary deficits. In other words, if the government sold some of its assets to finance current expenditures, that would not be captured in the deficit series from CBB. Figure 31a compares both series, with privatization and not, for the period after 1996, which is the year when the data on privatizations used by CBB become available.

Third, CBB does not account for defaults. It estimates interest payments on an accrual basis. So if the government defaulted on its interest payments, CBB would underestimate the primary deficit. The reason is that CBB assumes that the government paid all the interests that were due. Therefore, it would conclude that the government had the resources to pay for them, which must have come from lower primary deficits (or higher surpluses) according to CBB's methodology. Remember that primary deficit is computed as a residual. But if the government defaulted on the interest payments, then it must be the case that deficits were actually higher than the ones reported by CBB. As the main text mentions, the country accumulated arrears on interest payments on the external debt for many years, especially in the 1990–1994 period. We use the information on the fraction of interests on external debt that were actually paid to correct for both the interest payments and primary deficit series reported by CBB. The difference in the primary deficit series is illustrated in figure 31b. Unfortunately, we do not have information regarding defaults on domestic debt.

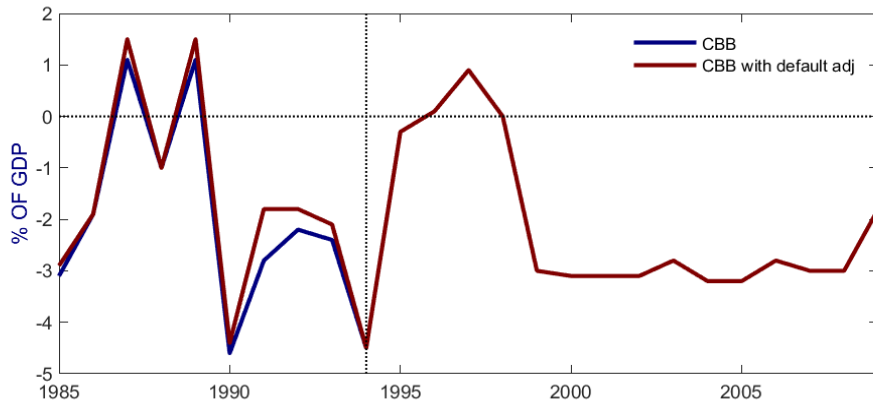
Fourth, CBB does not distinguish “bad assets” from the rest of the governments assets. In these cases, CBB might conclude that the government is saving, since it is accumulating more assets, when in reality those assets are worthless (extreme case). One example is the accounts from Bank of Brazil (BB) in CBB's balance sheet (see main text), that were used to transfer funds from CBB to BB. In figure 32a we show the magnitude of those transfers given by the variation in their balances. By looking at its own assets, CBB would conclude that the it is saving, but those funds were never repaid and represented deficits. We did correct the primary deficit series for the transfers between CBB and BB through those accounts. However, there might be other cases. Imagine, for example,

Figure 31: Adjustments to primary deficit series from CBB

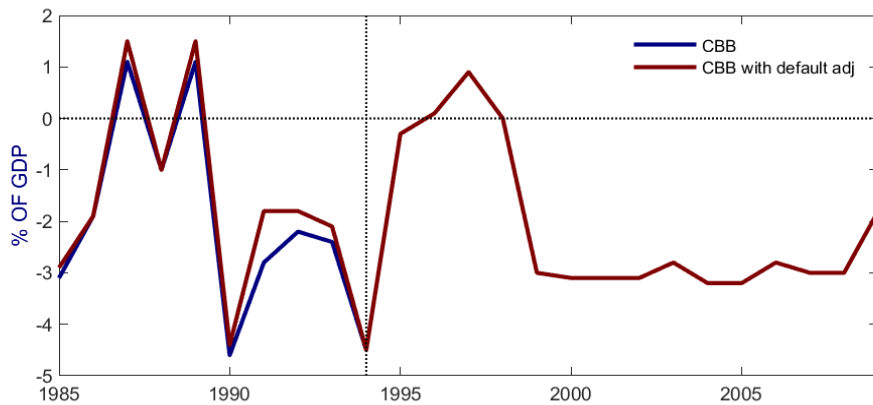
(a) Privatization adjustment



(b) Default adjustment



(c) Debt recognition adjustment



Source: Brazilian Institute of Geography and Statistics and Central Bank of Brazil.

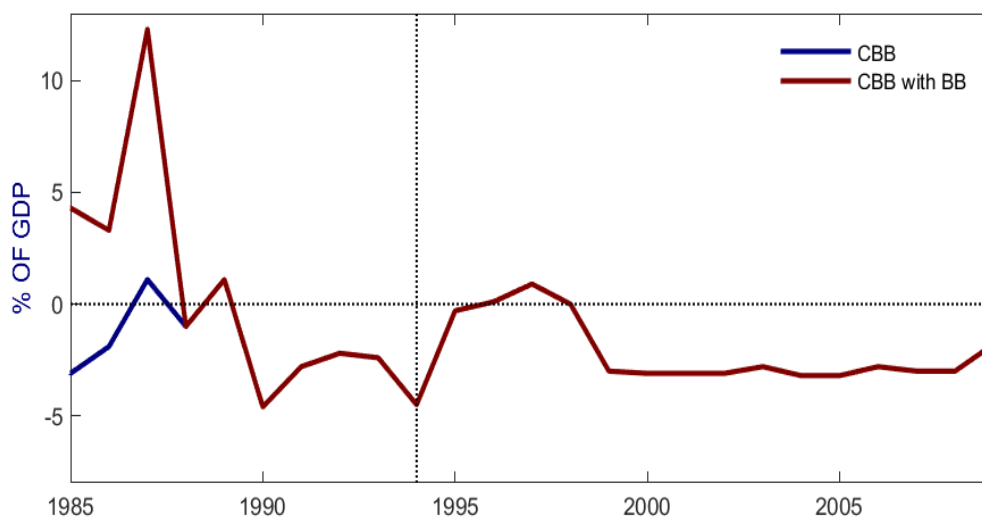
the case in which the government bails out a public bank by exchanging its “bad assets” that they were holding in their balance sheets. CBB would conclude that there were no surpluses or deficits, since the government is exchanging assets by liabilities in “equal”

amount, when in reality there were transfers to finance expenditures.⁶¹

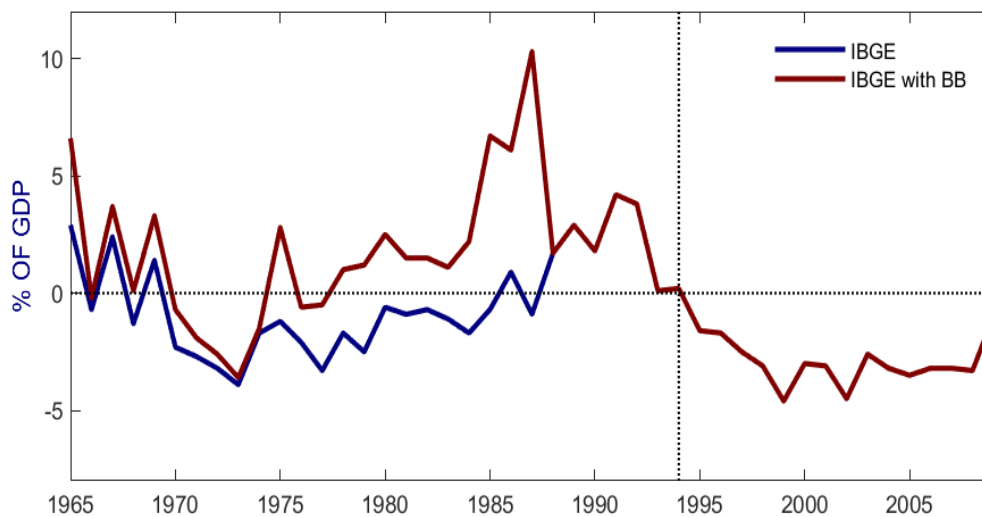
Finally, there are also cases in which there are debt recognitions (skeletons) that enter the debt series. CBB does not include those variations when estimating the primary deficit, but it shows that there were previous deficits that were not taken into account. They are shown in figure 31c.

Figure 32: Adjustment regarding Bank of Brazil (BB)

(a) CBB + BB



(b) IBGE + BB



Source: Brazilian Institute of Geography and Statistics and Central Bank of Brazil.

Finally, note that the IBGE series also misses the transactions between CBB and BB, so we also need to make that adjustment on the IBGE series. See figure 32b.

⁶¹In other words, the value of those assets in the balance sheet do not represent their true value.

Implications

As we could see in figure 30, the difference between both series is significant, especially around the Real Plan. However, the main conclusion from our analysis does not change, even when we include the adjustments mentioned above. The low inflation period (after 1994) is characterized by improvements in fiscal balances. Note that both series show primary surpluses after 1998. The main controversy arises in the period surrounding the implementation of the Real Plan. It is usually emphasized that the government switched from large surpluses to large deficits when it was implemented, but given the pitfalls in CBB's series, one cannot be 100% sure of it. If we look at IBGE's series instead, we observe the opposite. Large deficits before the Real Plan and an improvement right after. But again, this series also has its own pitfalls, so one must be careful when making conclusions based on these observations.