

WORKING PAPER

The Case of Chile

Rodrigo Caputo and Diego Saravia

JANUARY 2019



The Monetary and Fiscal History of Chile, 1960–2016*

Rodrigo Caputo

CESS, Oxford University-USACH

Diego Saravia

Central Bank of Chile

Abstract

Chile has experienced deep structural changes in the last fifty years. In the 1970s, a massive increase in government spending, not financed by an increase in taxes or debt, induced high and unpredictable inflation. Price stability was achieved in the early 1980s after a fixed exchange rate regime was adopted. This regime, however, generated a sharp real exchange rate appreciation that exacerbated the external imbalances of the economy. The regime was abandoned and nominal devaluations took place. This generated the collapse of the financial system, which had to be rescued by the government. There was no debt default, but in order to service the public debt, the fiscal authority had to generate surpluses. Since 1990, this was a systematic policy followed by almost all administrations and helped to achieve two different but related goals. It contributed to reducing the fiscal debt and enabled the central bank to pursue an independent monetary policy aimed at reducing inflation.

*We are grateful to Jorge Alamos, Luis Felipe Céspedes, José Díaz, Pablo García, Alfonso Irrazábal, José Matus, Juan Pablo Medina, Juan Pablo Nicolini, Eric Parrado, Claudio Soto, Jaime Troncoso, Rodrigo Valdés, Gert Wagner, and seminar participants at the Central Bank of Chile, the University of Chicago, the University of Barcelona, LACEA 2017, the BFI–University of Chicago 2017 Conference, the BFI–Central Bank of Chile 2008 Conference, and the BFI–IDB Conference in 2008 for helpful comments and discussions. We extend our gratitude to Roberto Álvarez, Manuel Agosín, José De Gregorio, Sebastián Edwards, Arnold Harberger, Rolf Lüders, Patricio Meller, Felipe Morandé, Gabriel Palma, Jorge Roldós, Andrés Velasco, and Pedro Videla, who discussed, extensively, a previous version of this chapter. Stefano Banfi, Rolando Campusano, Matías Morales, Fabián Sepulveda, Catalina Larraín, and Felipe Leal provided excellent research assistance in different stages of this project. Rodrigo Caputo is thankful for the hospitality of both the BI Norwegian Business School and the Nuffield College Center of Experimental Social Sciences, University of Oxford. The views expressed here are those of the authors and do not necessarily reflect the position of the Central Bank of Chile or its board members.

1 Introduction

Thirty years ago, when referring to the study of the economic history of Chile, Edwards and Cox (1987) asserted that “the study of Chile’s modern economic history usually generates a sense of excitement and sadness. Excitement, because from 1945 to 1983 Chile has been a social laboratory of sorts, where almost every possible type of economic policy has been experimented. Sadness, because to a large extent all these experiments have ended up in failure and frustration.” Today, when analyzing the recent economic history of Chile, we still share this sense of excitement: many economic policies, new to the country, have been adopted since then. However, we do not have a sense of sadness, mainly because the economy has been on a stable economic path for the last three decades.¹ Of course, the Chilean economy today faces substantial challenges, and looking into the past may be useful for designing efficient policies and avoiding costly mistakes. In this chapter, we review the economic history of Chile from 1960 to 2017 in order to understand the role of monetary, fiscal, and debt management policies in determining the macroeconomic outcomes in Chile.

In terms of growth, inflation, and fiscal deficits (figures 1 to 3), we are able to identify four different phases that are homogeneous in terms of outcomes and policies. The first, from 1960 to 1973, is characterized by a very stable growth path: GDP per capita grew around 2 percent a year, with a minor contraction in 1965 (see figure 1). In this phase, per capita GDP did not deviate significantly from a predetermined trend. In terms of inflation, this phase is characterized by high and persistent inflation rates, as shown in figure 2. On average, annual inflation was 30 percent, although it increased to 100 percent in 1972. This was not a new phenomenon: inflation had a long history in Chile, becoming entrenched during and after the 1930s.² In terms of fiscal policy, this period was characterized by systematic—and mild—fiscal deficits, as shown in figure 3. Until 1970, these deficits were relatively small: on average, 2 percent. This trend was broken in 1971 and 1972, years in which fiscal deficits reached 8 percent and 12 percent of GDP, respectively. As with inflation, the existence of mild fiscal deficits was a persistent feature of the Chilean economy, but the figures in 1971 and 1972 were, even for Chilean standards, very high.

The second phase goes from 1974 to 1981 and is characterized by great real and nominal instability. As shown in figure 1, there is a pronounced bust-boom cycle in which per capita GDP declined in 1975 by almost 30 percent, relative to the predetermined trend. Then it recovered over a period of five years, so that by 1981 per capita GDP was almost back to the trend level. In terms of inflation, this period witnessed the exacerbation of inflationary pressures of the previous phase. In 1973 inflation reached 400 percent, and in 1974, after price controls were removed, it reached 600 percent. This was the highest inflation level

¹According to World Bank data, per capita GDP in Chile (purchasing power parity [PPP] in constant 2011 US dollars) increased from US\$8.995 in 1990 to US\$22.707 in 2016. This is an increase of 153 percent. In the same period, per capita GDP in Latin America increased 48 percent.

²See Velasco (1994).

ever reached in the history of the country. Inflation declined slowly. By 1981 it had reached 20 percent in a context in which the exchange rate was fixed. The fiscal deficit continued to increase from the previous phase: by 1973 it had reached an unprecedented level of 23 percent of GDP.³ From 1974 onward, an important fiscal adjustment took place. Despite this fact, inflation remained relatively high until the last years of this phase.

The third phase, from 1982 to 1990, is again a severe bust-boom cycle episode. This phase, however, has two features that are different from the previous episode. The first is that the fiscal discipline, implemented in the mid-1970s, was still present for most of the time. As shown in figure 3, in this phase the fiscal deficit was almost zero: 0.1 percent on average. The second difference is that inflation increased substantially but did not return to the hyperinflation levels of the early 1970s. As shown in figure 2, inflation increased from 10 percent in 1982 to 27 percent in 1983. It remained at this level during the whole period. Overall, the main feature of this phase is the deep and long recession that affected the economy. In particular, as a result of the severe balance of payments crisis of the early 1980s, real per capita GDP declined by 20 percent between 1981 and 1983, as shown in figure 1. Then, it gradually recovered, so that in 1990 per capita GDP was at the same level as in 1981.

The last phase goes from 1991 to 2017. This period marks the beginning of a disinflation process that was never reverted and that was unprecedented in Chile. It is the longest period with single-digit inflation rates. As shown in figure 2, inflation was 22 percent in 1991 and declined gradually to 3.5 percent in 2001. Ten years later, in 2011, inflation was at the same level: 3.3 percent. By 2017 inflation was 2.2 percent. In terms of economic growth, this period is characterized by systematic increases in real per capita GDP each year (two exceptions are the mild contractions of 1999 and 2009). As shown in figure 1, per capita GDP almost doubled between 1991 and 2017. Also, since 1994 this variable has been growing above the 2 percent trend. Today real per capita GDP is 24 percent higher than the level implicit in the constant trend line. In terms of fiscal behavior, as is clear from figure 3, the fiscal discipline of the previous decades was maintained: on average, there was a fiscal surplus of 0.9 percent of GDP.

To understand the role of different policies in each of the four phases, we describe the main macroeconomic developments and discuss the policies implemented and the limitations, or unexpected consequences, they may have induced. Of course, because of the length of the chapter, not all developments can be described in detail. When appropriate, we use the contributions in the literature to explain developments observed in the data. In the analysis of the different periods, we use the fiscal budget constraint, described in chapter 2 in this book, as the common conceptual framework. This approach allows us to associate the sources and uses of funds and to relate them to economic outcomes, such as inflationary episodes, for example.

³The data on public deficits include the deficits of public sector companies.

2 Macroeconomic, debt evolution, and fiscal adjustment in Chile: 1960–2016

Over the past sixty years, Chile experienced radical economic changes and witnessed real and nominal instability. Policies shifted from an import-substitution strategy, adopted by many Latin American economies in the 1940s, to market-oriented policies, in which the role of the state, as both producer and regulator, greatly diminished. In this period, Chile presented a scenario of a wide range of economic policies and economic outcomes. It experienced almost all definitions of inflation, from moderate to hyperinflation. It had periods of high fiscal deficits and periods of fiscal surpluses, balance of payments crises, banking crises, and successful and unsuccessful stabilization plans, as well as severe economic recessions in the 1970s and 1980s. In political terms, changes were drastic: after a relatively long period of democracy since 1925, the military seized power in 1973, overthrowing Salvador Allende, an elected socialist president. Democracy was recovered in 1990, and since then, seven elected presidents have been in office.

Before discussing in detail the four phases that characterize the Chilean economy, we present the fiscal budget constraint decomposition in table 1. It considers, as stressed in chapter 2, the sources of fiscal financing: external debt, domestic debt, and seigniorage. It also takes into account the main fiscal obligations: interest payments and the primary deficit. Both sources and obligations can change as a consequence of specific policies; hence, movements in these variables could reflect *ex professo* policy innovations. Sources and obligations, however, may also change as a result of exogenous shocks unrelated to policy. For instance, a decline in foreign funding could trigger a fiscal adjustment, which is a response induced by exogenous shocks rather than an explicit fiscal action. Now, we are able to compute independent measures of all components of the budget constraint. As a result, total sources and obligations will not necessarily coincide at any point in time.

The difference between the sources and obligations gives rise to the implicit transfer, which measures the excess or unrecorded spending in any given period (if positive), or they may reflect unaccounted income sources (taxes) when negative. In table 1, we present sources, obligations, and implicit transfers. In general, periods of high volatility are associated with relatively high and positive implicit transfers. Figure 7 shows the implicit transfer as a percentage of GDP for every year in the period 1960 to 2016. Implicit transfers increase substantially in the early 1970s and the early 1980s. Both were periods of important macroeconomic volatility. In Figure 8 we present all the “off the books” measures that we could identify. As is clear, in different periods the implicit transfers play a role as an element that put pressure on the public finances. We can identify the role of public deficits, in the early 1970s, or Treasury notes in the 1980s issued to rescue the private banks. We will describe in each period the determinants of the implicit transfers and to what extent they were the source of economic instability or a consequence of policy responses to attenuate exogenous shocks.

The role of public debt is also crucial to determine the magnitude and sources of implicit transfers. As seen in figure 9, public total debt increased substantially in the early 1970s and early 1980s. This correlation does not necessarily reflect causation, as it may be driven by exogenous shocks. For instance, the exchange rate depreciation in the mid-1970s determined an increase in the ratio of external public debt to GDP; however, if we fix the exchange rate level and generate a counterfactual path for the external debt (see figure 10), we can see that the increase in the debt position of the government is driven not only by policy decisions but also by exogenous shocks. Public debt is also influenced by the implicit transfers, as these represent a liability; they increase the debtor position of the government. To illustrate this point, in figure 11 we present an exercise in which the level of implicit transfers, denoted τ_t in chapter 2, is kept to zero in each period. As is clear, in this counterfactual scenario, the debt position of the government could have been substantially lower, especially in the 1960s and 1970s.

Now, we describe in more detail the main features that characterize each of the four phases. The 1960s was a period of relatively high inflation with mild fiscal deficits. The persistent inflation in the 1960s was, as in the previous periods of Chilean history, closely related to fiscal deficits and wage indexation. The beginning of the 1970s was a period of socialist reforms. In this period, fiscal deficits increased substantially and were financed by money issuance. As a consequence, the high inflation episodes of the previous decades turned to hyperinflation. We think that in this first period, from 1960 to 1973, the main policy mistake was to rely on inflation taxes to finance an ambitious fiscal policy expansion that turned out to be unsustainable, because in the end the base over which the inflation tax was obtained (money) was reduced significantly during hyperinflation periods.

In the mid-1970s, market-oriented reforms were followed and a period of fiscal adjustment began. The reduction of inflation was relatively slow in the second half of the 1970s, and a stabilization plan, based on fixing the nominal exchange rate, was implemented in 1978. This policy coincided with the opening of the capital account and the expansion of the financial sector. Credit was intermediated by private banks to households. Those credits were, in large proportion, denominated in foreign currency. Also, they were provided by foreigners through the local financial system. In this context, there was an increase in private absorption financed by banks. Eventually, the fixed exchange rate regime was abandoned, and the balance of payments crisis turned into a banking crisis: the private sector was unable to pay credits denominated in foreign currency once the devaluation materialized. In this context, the government and the central bank intervened in order to rescue the private sector. We should stress that this crisis was not generated by excessive fiscal deficits. In fact, the fiscal authority was able, from 1974 until today, to generate mild fiscal deficits and, in many cases, substantial fiscal surpluses. We think that a crucial policy mistake in this case was in the sequence of policy reforms. In particular, fixing the exchange rate indeed successfully stabilized inflation. The problem was to fix the exchange rate at the same time as the economy was completely open to foreign capital flows intermediated by the financial system.

The policy efforts after the financial crisis were concentrated in putting the country back on the growth path and fortifying the financial system. The contraction of GDP in 1982 and 1983 was severe, as shown in figure 1. The main focus of the policies implemented soon after this recession was on solving the balance of payments crisis along with the financial crisis. To that end, the fiscal authority and the central bank designed a program to rescue the private banks. In this context, the central government implemented austerity measures with two objectives in mind: to prevent an increase in the fiscal deficit and to be able to support the rescue plans of the private sector. These austerity measures were difficult to implement and, of course, were very unpopular. In the end, however, these painful measures worked. In particular, from 1984 to 1990, the rate of growth in per capita output was positive and employment recovered. The emphasis on controlling inflation was diminished, and from 1984 to 1990, inflation was much higher than in 1982, when it reached single-digit values. Despite this fact, inflation was relatively stable and below the hyperinflation levels of the early 1970s.

In 1990 per capita GDP was already above, by 12 percent, the level of 1981. The economy was growing in a stable way, although inflation problems persisted. The central bank was granted independence in 1989, and from the early 1990s, it pursued an inflation-targeting regime. This regime was implemented even though there was, for most of the 1990s, an exchange rate band. The inflation target was set each year for the year-on-year inflation of the end of the year (December). The target was slowly declining from 1990 until 1999. In that year, Chile adopted a flexible exchange rate, and a full-fledged inflation-targeting regime was implemented. Specifically, since that year the central bank has set an inflation target of 3 percent, with a tolerance range of 1 percent (above or below), with the objective of anchoring market expectations in a two-year horizon. Also, since 1999 the fiscal authority has followed a structural balance fiscal rule, which despite many changes is countercyclical.

Now, there is a view among some economists, such as Calvo and Mendoza (1998), that the exchange rate appreciation helped to stabilize inflation during the 1990s. We tend to disagree with this hypothesis and believe, as shown by Valdés (1998), that the nominal anchor from 1991 to 1999 was indeed the declining inflation target announced by the central bank. We will provide some evidence of the joint behavior of inflation and exchange rate that supports this hypothesis.

3 Slow growth, public deficits, and inflation: 1960–1973

In the 1940s, Chile, as well as many Latin American economies, adopted an industrialization process based on import substitution. The idea was to promote the development of a domestic industrial sector. This, in turn, could be achieved if those

industries were granted a high degree of protection in the form of import tariffs and quotas. The protection was supposed to be only a temporary measure. Protectionism, however, became a permanent feature of the Chilean economy. During the 1950s and early 1960s, this strategy began to run out of steam.⁴

During the 1960s, the fiscal authority mainly had access to foreign debt, which increased from 10 percent of GDP in 1960 to 22 percent in 1969. Internal public debt, on the other hand, was at 7 percent of GDP on average, well below the level it reached in subsequent years (figure 9). Inflation was in general high, although below the hyperinflation levels reached in the mid-1970s (see figure 4). It moved from 45 percent in 1963 to 30 percent in 1969 (see figure 2).

Chile experienced high inflation levels since the 1940s, although during the 1950s this became a serious problem. In an effort to tackle this problem, in July 1955 the government hired the Klein-Saks consulting firm to provide technical advice regarding anti-inflationary policy. The mission's diagnosis of Chile's inflationary pressures revolved around four basic areas: (1) fiscal deficit, (2) monetary expansion, (3) exchange rate policy, and (4) wage rate policy. In addition, the mission forcefully argued that the state of government finances and, in particular, the extremely high fiscal deficit were at the heart of the inflationary process (Edwards 2007). In this context, when Jorge Alessandri was elected in September 1958, an inflationary stabilization policy was implemented. This policy consisted of reducing the fiscal deficit and fixing the nominal exchange rate to the dollar. The fixed exchange rate lasted until 1962 when a balance of payments crisis took place (this and 1979–1982 are the only two periods of fixed exchange rates in the whole period of analysis; a short attempt took place in 1970). During 1959, the first year of Alessandri's government, the fiscal deficit, which averaged 2 percent of GDP in the previous administration, was drastically reduced and reverted. In that year, the government was able to generate a fiscal surplus of 1.6 percent of GDP. Besides the fiscal adjustment, Alessandri's administration pushed (and succeeded) for wage adjustments that were well below past inflation. In particular, in 1960 wages increased by 10 percent, even though past (1959) inflation was 33 percent. These elements contributed to anchor inflation expectations and increased the credibility of the stabilization plan. In 1960 and 1961, inflation declined to single digits: 5.5 percent and 9.6 percent, respectively.

The stabilization plan was apparently a success. The low level of inflation, however, was not going to last. In 1960 and 1962, the fiscal deficit increased to nearly 3 percent of GDP. At the same time, a balance of payments crisis took place in 1961 and 1962, inducing the abandonment of the fixed exchange rate, and the nominal exchange rate depreciated 33 percent in October 1962. Soon after the nominal depreciation, prices increased substantially. Inflation increased to 27.7 percent in 1962 (mostly explained by events during the last quarter), 45.3 percent in 1963, and 38.5 percent in 1964. Hence, inflation returned to its historical levels, with a fiscal deficit that, though not exorbitant, seemed to constitute a source of inflationary pressures in a context when fiscal debt was a stable proportion of GDP (around 3 percent).

⁴Further details can be found in Edwards and Cox (1987).

Now, using the budget constraint in chapter 2, we conclude that financing needs during Alessandri's administration were, on average, 2.68 percent of GDP. In the 1961–1964 period, primary fiscal deficits constituted the main fiscal obligation. These deficits, representing 3.20 percent of GDP, were financed mainly by seigniorage (2.21 percent of GDP) and to a lesser extent by external debt (0.87 percent of GDP). Transfers, computed as residual, represented a very small proportion of overall financing needs: 0.24 percent of GDP. As can be seen in figure 7, extraordinary transfers (which are calculated as the residual term of the budget constraint in chapter 2) were close to zero during Alessandri's administration.

Overall, during Alessandri's administration, the modest contribution of external and internal debt to finance the public deficit generated a close link between public deficits, seigniorage, and inflation. Accordingly, the roots of inflation in that period could be traced back to persistent fiscal deficits, as was the case in the previous administrations.

Eduardo Frei was elected with 56 percent of the vote and took office in November 1964. The government's main economic focus was the implementation of basic structural changes, such as the land reform process and the Chilean participation in the ownership of the big copper mines. These reforms were slowly implemented in order to avoid impairing macrostability. There was a certain perception that structural reforms could generate short-run disequilibrium; hence, when there was an accumulation of inflationary pressures, priority was to be given to the restoration of macrostability.

Frei's program was, in terms of social policies, quite ambitious. The public sector was given a more active role in improving income distribution and increasing the investment capacity of the economy. Some of the goals of Frei's program were to increase real wages in the public sector, government expenditure in social areas (education and health, among others), and public investment in infrastructure and housing first, and then in other sectors of the economy. Public investment was expected to be financed by an increase in income taxes and more foreign debt.

In macroeconomic terms, Frei's administration faced significant challenges. One of them was to stabilize inflation from a level of 40 percent in 1964. The stabilization plan was to be gradual: the government expected to bring inflation down to 25 percent, 15 percent, and 10 percent in each of the first three years in office (Ffrench-Davis 1973). During the administration's first year in office, 1965, inflation declined to 25 percent, and in 1966 inflation declined further, to 17 percent. The fiscal deficit was reduced to 1.5 percent of GDP in 1966 and continued to adjust in the following years. This occurred in a context in which GDP growth was, on average, 6 percent in 1965 and 1966. The stabilization program was, at least until 1967, successful. Two elements determined that, after 1967, the stabilization plan was no longer viable. First, although the fiscal authority increased its savings (the fiscal deficit declined significantly) and investment, the national level of investment did not increase enough. Second, wages adjusted much more than was initially expected. During these years, the exchange rate policy followed was of mini-devaluations to prevent real exchange rate appreciation. These elements put upward pressure on inflation, which began to increase from 21.9 percent in 1967 to 34.9 percent in 1970, the last year of the administration.

During Frei's administration, financing sources increased, on average, to 4.52 percent of GDP. Compared with the previous government, the availability of foreign debt more than doubled, representing 2.13 percent of GDP, and the availability of domestic debt followed a similar increasing pattern. Frei's administration could not stabilize inflation, particularly at the end of this government period. On average, inflation was 25 percent, almost the same figure that prevailed during Alessandri's administration (see figure 2). In this context, it is not surprising that seigniorage under Frei's and Alessandri's administrations was nearly identical: 2.19 percent of GDP.

In terms of obligations, in this period there was a significant decline in the primary deficit, which moved from 3.2 percent of GDP during Alessandri's administration to 0.90 percent in Frei's administration. This decline in obligations, coupled with a sharp increase in funding sources, determined an increase in extraordinary transfers, τ_t , which on average represented 3.99 percent of GDP. As can be seen in figure 7, these transfers increased systematically from 1965 to 1970.

Now, in order to identify the nature of the extraordinary transfers, we compute additional obligations, not accounted in the central government primary deficit, taken during this administration. As seen in figure 8, reserve accumulation, expenditures related to nationalizations, and the financing of public enterprise deficits could explain an important fraction of the extraordinary transfers, especially at the end of Frei's administration. In particular, reserve accumulation represents, on average, 0.8 percent of GDP in this period. Nationalizations and the financing of public enterprise deficits represent 0.42 percent and 0.53 percent of GDP, respectively, in the same period.

As documented in Reinhart and Rogoff (2009), and related to the balance of payments crises, during the 1960s three external debt restructuring episodes occurred. Those were implemented through International Monetary Fund programs in 1961 and in 1963 to 1965. They may explain the fact that in the first half of the 1960s, the external sources of funding were not very important (less than 1 percent of GDP).

The beginning of the 1970s was a period of great political instability: three years of a socialist government ended in 1973 with a military coup that put the armed forces into power until 1990. Even though different economic policies were implemented under each government, some economic problems were long-lasting. This decade witnessed high inflation, deep contractions in output (1972, 1973, and 1975), and high unemployment.

3.1 The socialist experience: 1970–1973

In September 1970, Allende was elected with 37 percent of the vote and took office in November 1970. His economic program was characterized by several left-wing-oriented structural reforms, including the nationalization of the banking sector and most industries. In terms of fiscal policy, an aggressive expansion of government spending generated an unprecedented increase in the public deficit.

An essential assumption of the economic program was that, in 1970, there was substantial underutilized capital capacity in the manufacturing sector. In this context, it was expected that an increase in aggregate demand could be accommodated without generating inflationary pressures in the short run. As a result, in 1971 an aggressive expansionary fiscal policy was implemented. The fiscal deficit, as a percentage of GDP, rose from 0.5 percent in 1970 to 7.3 percent in 1971, whereas nominal growth of high-powered money increased from 66 percent in 1970 to 136 percent in 1971. Not surprisingly, aggregate demand grew at double-digit rates—10.5 percent in 1971—while real GDP experienced an expansion of 9.4 percent with an important decline in the unemployment rate to 3.9 percent. In the first year of Allende's government, prices did not increase substantially. This fact is attributed to the existence of price controls as well as commodity and factor market rationing.⁵

The output expansion of 1971 was not to be sustained in the following years. In 1972 the fiscal deficit increased further, to 11.4 percent of GDP. The rate of growth of high-powered money was 178 percent, and prices, despite the official controls, could not be contained: inflation reached almost 255 percent on an annual basis.⁶ In terms of real activity, a particularly serious problem evolved around the *de facto* process of expropriations of manufacturing firms implemented by Allende's administration. In particular, government interventions were usually preceded by long labor strikes and seizures of the firms' installations by their workers that generated significant output losses. In October 1972, a national strike generated a further decline in activity.⁷ In 1972 real output declined by 1.2 percent, and the trade deficit reached 3.5 percent of GDP. In 1973 the economic crisis deepened. During that year, the fiscal deficit almost doubled, reaching 23 percent of GDP, the highest level experienced in the previous forty years (see figure 3). At the same time, the signs were clear that the inflationary process was tending toward hyperinflation. In 1973 inflation reached 433 percent on average, whereas the rate of monetary growth was 365 percent (see figure 4).

The expansionary policies caused a progressive deterioration of the current account deficit, which was 3 percent on average in the 1971–1973 period. In this context, the government used the large foreign reserves it had inherited from the previous administration to finance those deficits. As a consequence, foreign reserves declined significantly during Allende's administration.

⁵More details can be found in Edwards and Cox (1987) and Corbo and Fischer (1994).

⁶For the period 1970–1980, we use the alternative price series proposed in Schmidt-Hebbel and Marshall (1981), since the official series is somewhat unreliable.

⁷Further details can be found in Edwards and Cox (1987).

From 1971 to 1973, nominal and real volatility increased substantially. Three elements

characterized this period: first, a sequence of increasing fiscal deficits; second, an important expansion of high-powered money; and, finally, an inflationary process that became a hyperinflation. To understand the correlation among the previous variables and fiscal debt strategies, we follow Sargent (2013), who develops a framework to analyze the inflationary consequences of government deficits and alternative ways of financing them.

To see the extent to which the budget constraint in chapter 2 can be used to understand the period of nominal volatility in Chile, we first analyze the relationship between money and inflation. From November 1970 to April 1972, the annual growth rate of high-powered money increased from 82 percent to 108 percent, without inflation experiencing any substantial change (see figure 4). In fact, in April 1972 inflation was 55 percent, a level higher than the one experienced during the previous decade.⁸ In May 1972, however, inflation increased substantially, and from that date until December 1979, inflation and monetary growth tended to move together.

In November 1971, the government declared a moratorium on its existing external debt. This event implies a default, which is reported to have happened in 1972, according to Reinhart and Rogoff (2009). This moratorium implied no more external financing for Chile. In this context, in the absence of enough funding, both domestic and foreign, to cover both the fiscal deficit and the interest rate payments on the debt, the government had to rely on seigniorage as a source of funding (see figure 12). As is clear, between 1971 and 1974 the fiscal deficit and seigniorage moved in the same direction. Furthermore, in quantitative terms, the magnitude of the increase is quite similar, with the exception of 1973, during which the fiscal deficit of 22.5 percent exceeded the seigniorage level by 5 percent of GDP. The evolution of debt, on the other hand, suggests that Allende's government was unwilling (or unable) to increase domestic and foreign borrowing considerably. Between 1970 and 1973, foreign public debt was almost constant at US\$2 million. This means that, as a percentage of GDP, external debt actually declined in those years (see figure 9). On the other hand, domestic debt increased, as a percentage of GDP, from 2.6 percent in 1970 to 3.2 percent in 1973 (see figure 1A in the online appendix). This increase was, of course, not enough to finance a fiscal deficit that went, during the same period, from 0.5 percent to 22.5 percent of GDP.

The evidence presented thus far indicates that fiscal deficits, which increased substantially between 1971 and 1973, could not be completely financed by additional public debt (domestic and foreign). As a consequence, seigniorage became the most important source of funds for the fiscal authority. The implication of this strategy was that inflation became, in the end, a fiscal phenomenon. The fiscal deficit was, by far, the most important component of obligations in the 1971–1973 period, whereas the sources of funds were seigniorage and, to a smaller degree, an increase in domestic public debt (see figure 2A in the online appendix).

⁸Price controls and sticky prices may have contributed to a delayed response of prices to the increase in monetary growth.

We construct the path of obligations and sources for this period. In the 1971–1973 period, financing needs, compared with those in the 1960s, increased substantially, mainly

by the increased importance of fiscal deficits, which averaged 9.10 percent of GDP. These needs were covered mostly by seigniorage, which represented 12.9 percent of GDP in that period. The availability of external funding and domestic funding in US dollars declined greatly during Allende's administration. Domestic debt in local currency increased, although it could finance a small fraction of overall fiscal needs (representing 0.9 percent of GDP). Transfers, τ_t , were around 7 percent of GDP during this period (see figure 7).

In figure 8 we present the potential factors behind the residuals of the budget constraint (i.e., the transfers). We do so by calculating the transfers implied by the budget constraint considering counterfactual exercises. In these particular years, we can see that the transfers calculated considering the public enterprise deficits are much lower than the ones without considering them.⁹

Thus, during these years, the deficits of public enterprises are the key factor in explaining the extraordinary transfers. In particular, they represent on average 7.2 percent of GDP, which is roughly the same value of transfers in this period.¹⁰

In aggregate terms, the 1960–1973 period is characterized by the existence of important fiscal deficits financed by seigniorage. This is especially true in the 1970–1973 period, so the average deficit from 1960 to 1973 of 3.44 percent of GDP, the seigniorage of 4.43 percent, and the implicit transfers of 3.67 percent in table 1 underestimate the values observed in Allende's government.

4 From stabilization to balance of payments crisis: 1974-1981

The armed forces, led by General Augusto Pinochet, took power in September 1973 after a military coup overthrew President Allende. Under Pinochet's administration, several structural changes were carried out. In 1974, Chile followed a stabilization policy based on a reduction of the government's deficit (from 22.5 percent of GDP in 1973 to 0.4 percent in 1975) through the elimination of subsidies and the increase in taxes (VAT, among others), the reduction of public employment, and the reprivatization of public companies that were in a precarious financial situation and required the permanent support of public funds. The government liberalized prices that were regulated, including a gradual unification of the multiple exchange rates in place (up to six during Allende's government). Inflation continued at high levels; in April 1974 the inflation rate (measured as a year-on-year variation) increased to more than 700 percent, reflecting in part the behavior of liberalized prices.

⁹ In the basic framework, fiscal deficits do not include public enterprises deficits.

¹⁰ The gray bars for the years 1971, 1972, and 1973 in figure 8 explain almost all the transfers

The monetary base was increased at high but declining rates in the first years of Pinochet's government. In 1973, the rate of expansion in nominal terms was 365 percent, while it was 320 percent, 283 percent, and 272 percent in 1974, 1975, and 1976,

respectively. The monetary base in real terms contracted in 1973 by 34 percent, while it contracted by 11 percent in 1974 and 14 percent in 1975. In 1976 this monetary growth rate in real terms returned to positive values by increasing 24 percent. These variations are indicative of a reduction in the real demand of money until 1976. The monetary base continued increasing in real terms at positive (but lower) rates until 1981, the year when the financial crisis began.

In 1975, a severe crisis hit the economy, and real output growth declined by 13 percent. The recession of 1975 was generated by several factors. First, an important decline in terms of trade took place at the end of 1974, with copper prices falling by about 50 percent in real terms and the price of oil rising by a factor of 4. Second, the fiscal adjustment undertaken, which reduced the fiscal deficit to 0.4 percent of GDP, had an adverse effect on aggregate demand, which in 1975 declined by 21 percent. Inflation did not decline substantially from the previous year: it was 343 percent in December 1975. Despite the recession, the reduction of fiscal deficits, the lower growth rate of the monetary base, and the openness of the economy, inflation continued to be high and erratic. This path was incorporated in inflation expectations. The economy was highly indexed; salaries and the exchange rate were indexed to past inflation.¹¹ This was the case until 1978 when the exchange rate followed a predetermined rate of devaluation in an effort to anchor inflation expectations and reduce inflation. This policy ended with a fixed exchange rate in June 1979. Between 1976 and June 1979, the reduction in inflation and the accumulation of reserves were the driving forces of monetary exchange rates and financial policies. It is likely that it took longer to reduce inflation because of the conflicting implications of policies directed at reducing inflation and increasing international reserves. In 1979 inflation, though not at the level of the early 1970s, was at double-digit levels: 39 percent at the end of 1979. Eventually, at the beginning of the 1980s, inflation was stabilized.

From 1974 to 1976, seigniorage was an important source of revenues, accounting for 7.4 percent of GDP on average in those years. Those revenue sources were important in a context in which the burden of foreign public debt increased. In particular, as a result of nominal exchange rate devaluations,¹² foreign public debt increased from 27 percent of GDP in 1973 to over 40 percent of GDP in 1975 (figure 9). To assess the impact of the nominal devaluation on the public finances, we perform a counterfactual simulation of the foreign public debt. In particular, we allow the nominal rate to devalue, from 1973 onward, in a way in which the real exchange rate is constant at its 1973 level. In other words, we generate a counterfactual nominal exchange rate series that is adjusted by the inflation differential between Chile and its main trading partners. As shown in figure 9, nominal devaluations between 1974 and 1975 increased the burden of public external debt by more.

¹¹See Edwards (1985), De Gregorio (1991), and Corbo and Fischer (1994), who discuss the importance of wage indexation as a self-preserving device of inflationary pressures.

¹²The nominal exchange rate increased from 0.11 in 1973 to 13.05 in 1976 than 20 percent of GDP. Nominal devaluations also increased the burden of domestic debt, which, after 1973, was denominated mainly in US dollars (see figure 1A in the online appendix).

To assess the impact of the devaluations on the external fiscal debt, we per- form a

counterfactual exercise in which we fix the level of the real exchange rate from 1974 onward and compute a counterfactual path for the nominal exchange rate according to the actual level of foreign prices and domestic inflation. As a result of this exercise, we obtain a counterfactual path for the evolution of debt. As shown in figure 10, the devaluation of the exchange rate contributed to a significant increase in the external debt position of the fiscal authority.

From 1974 to 1981, the fiscal deficit was reduced substantially (figure 3). This was determined by a combination of a sharp increase in fiscal revenues after 1974 and an important contraction in government expenditures (see figures 3A and 4A in the online appendix). In the period 1974–1981, there was a primary fiscal surplus of 0.6 percent of GDP. This determined that financial needs during that period declined significantly from those in the previous administration: 5.0 percent of GDP (table 1). In this period, the country regained access to foreign financial markets, and as a consequence, both external debt interest payments (on average 0.8 percent of GDP) and external debt (0.3 percent of GDP) contributed as sources and obligations. In this period, and particularly between 1974 and 1981, inflation was at high levels and seigniorage was an important source of financing: 4.5 percent of GDP. Other sources of financing, external debt, and domestic debt denominated in US dollars accounted for nearly 1 percent of GDP (table 1).

The sharp contraction in fiscal deficits during this period, along with a positive source of financing, implied that transfers, τ_t , increased substantially from the previous administration. In particular, these transfers accounted for nearly 7 percent of GDP and were particularly important in 1974 and 1975 (figure 7). Now, given the fact that the real exchange rate depreciated substantially in 1974 and 1975, foreign debt could be contributing to the transfers' term in the budget constraint. To show the effects that the depreciations had in the transfers, we compute the contribution of foreign debt assuming that the nominal exchange rate between 1974 and 1975 evolves so as to keep the real exchange rate at the same level as the one observed in 1973. In this counterfactual scenario, transfers in 1974 and 1975 declined significantly. This can be seen in figure 8, where the green bars in the years 1974 and 1975 refer to the transfer, assuming that the real exchange rate had been constant.

As discussed above, an objective of the government in the second half of the 1970s was to increase the level of reserves. Given that increases in the monetary base could be the consequence of this policy and that it would not have a correlation on the expenditure side of the budget constraint (thus affecting the transfers), we compare the increases in reserves as a share of output with the effective transfers that follow from the equation. As can be seen in figure 8, the direction and size of the increase in reserves seem likely to have been important factors in the transfers in the years 1976, 1978, 1979, and 1980.

As a summary, we find that from 1974 to 1981, there was an important increase in seigniorage in a context in which the monetary base was still growing at high rates (although below the rate of growth reached in 1973). Given that fiscal deficits were drastically reduced, it follows that implicit transfers during this period were relatively large: on average, nearly 7 percent of GDP. Now we can identify two elements that could partially explain those residuals. First, the impact of large depreciations account for, on

average, 1.34 percent of GDP in that period. Second, reserve accumulation, after the exchange rate was controlled (in 1978), could also explain an important fraction of transfers: 1.24 percent of GDP on average. Now, it is clear that, besides the elements just discussed, additional transfers may have contributed to the residuals. The unexplained fraction is relatively important in two specific years: 1974 and 1977. Two possible candidates could be related to contingent transfers associated with pension reforms,¹³ some fiscal expenses not explicitly stated in the central government budget, or a combination of these. In this latter case, we follow Larraín (1991), Larraín and Vergara (2000), and Scheetz (1987), who provide information associated with defense expenses in the mid-1970s and contrast them with the ones provided by the fiscal authority. The difference between these two series, which is positive, is considered part of the transfers during the mid-1970s. As shown in figure 8, that extra defense spending can account for a significant fraction of the transfers. On average, between 1974 and 1979, the unaccounted military expenses could represent 3 percent of GDP each year. One concern is that, given the existence of price controls from 1971 to 1973, the consumer price index could be underestimated (which in turn induces a seigniorage overestimation). To overcome this problem, we have used the CPI series computed by Schmidt-Hebbel and Marshall (1981), which aims to identify the true inflation rate. At least in the 1971 to 1973 period, seigniorage is used to fully finance the public enterprise deficits.

4.1 External fragility

In the context of a fixed exchange rate regime, the existence of wage and financial contract indexation to past inflation induced an important real appreciation. In fact, the real exchange rate declined from 92.1 in 1975 to 70.3 in 1979 and 60.9 in 1980. There is some consensus that the exchange rate policy in conjunction with a domestic financial liberalization, carried out while the financial system was poorly regulated, were the main causes of the boom that developed between 1979 and 1981 and the severe recession that hit the economy in 1982–1983.

¹³As noted by Diamond and Valdés-Prieto (1994), the program of fiscal tightening that started in 1977 had as its main purpose to finance the planned reform of social security. It was expected that, as a consequence of this reform, social security income (contributions) would decline significantly, whereas social security benefits (paid by the state) would remain constant as a fraction of GDP. This analysis, ex post, turned out to be accurate. In the 1970s, the social security deficit of the state was, on average, 2.6 percent of GDP. After the 1981 social security reform and until 1990, this deficit was, on average, 6.1 percent of GDP (see figure 5A in the online appendix). The fiscal authority systematically generated fiscal surpluses that could more than compensate for the fiscal deficit related to social security (see figure 6A in the online appendix). This fact could explain a fraction of transfers observed between 1974 and 1981

The period between 1979 and 1981 was one of an economic boom with increasing consumption, investment, and asset prices financed by capital inflows intermediated by national banks. As shown in figure 6, the credit to the private sector (intermediated mostly by financial institutions) increased by a factor of 14 between 1974 and 1982. In particular, this variable was 7 percent of GDP in 1974 and increased to 80 percent of GDP in 1982.

In addition to the expansion in credit, there was an increase in real wages, an indexation of salaries, and a reduction in taxes on labor. As a consequence, domestic demand expanded significantly: on average, it grew at 11 percent per year between 1979 and 1981.

In the same period, the rate of growth in GDP was, on average, 7.8 percent. The widening gap between the rate of growth in GDP and aggregate demand generated persistent trade balance deficits that went from 1.7 percent of GDP in 1979 to 7.8 percent in 1981. Similarly, the current account deficit grew from 5.6 percent of GDP in 1979 to 14 percent in 1981. The behavior of the fiscal authority between 1979 and 1981 was very conservative. In fact, in that period there was on average a fiscal surplus of 4.1 percent of GDP. As is clear, private and public savings were moving in opposite directions. While the public sector was increasing its savings and reducing its debt (both external and domestic), the private sector was increasing its overall external debt (figure 13).

After three years in which the exchange rate was fixed, inflation declined to single-digit numbers: 9.5 percent in 1981. The fact that the exchange rate was controlled helped to explain the important decline in inflation. In particular, the nominal anchor of the economy was the nominal exchange rate. As shown in figure 5, from 1975 to 1981 inflation and nominal devaluation, on a year-on-year basis, moved together. The contemporaneous correlation among these variables is high: 0.96. This behavior is determined by the introduction, in January of 1978, of a preannounced rate of devaluation, the so-called *tablita*. This system set the starting declining rate of devaluation at a lower level than ongoing inflation, with the aim of reducing inflation expectations and reducing actual inflation as long as the law of one price held. For instance, in 1978 the minister of finance, Sergio De Castro, announced that the rate of devaluation for 1978 had been determined at 21.4 percent and would decline further in the future. The *tablita* lasted until June 1979 when the nominal exchange rate was fixed.

The low inflation, however, was not going to last. Adverse external shocks—foreign capital reversals, an increase in international interest rates, and declining terms of trade—introduced some doubt regarding the sustainability of the fixed exchange rate policy. Once the exchange rate was devalued, there were no nominal variables to anchor inflation.

This business cycle related to a fixed exchange rate stabilization is documented in the literature. Kiguel and Leviatan (1990) note that the Chilean experience is shared by other countries with chronic inflation that stabilized inflation using the exchange rate as the nominal anchor. They note that the response of the economy to such programs is an initial expansion of consumption and output, as well as appreciation of the real exchange rate, followed by a consumption and output contraction and by a depreciation of the real exchange rate. This business cycle behavior is rationalized by Calvo (1996), who argues that this is the consequence of the stabilization policy not being fully credible. If people think that the exchange rate will be abandoned in the future, they will increase consumption today to take advantage of the lower interest rates. In the context of some price stickiness, this produces an appreciation of the real exchange rate and a deterioration of the current account balance. In the Chilean case, a banking crisis also followed the abandonment of the fixed exchange rate. Velasco (1987) presents a model that explicitly includes a banking sector to study the interaction of macro and financial variables. In this economy, the fragility of the banking sector plus the government's (implicit) deposit guarantee plant the seeds of a crisis. The excessive rate of domestic credit creation does not come from a fiscal deficit, as in Krugman (1979), but from the governmental commitment to guarantee the liabilities of the banking system.

In 1981 the world entered a recession, and Chile was hit by a negative terms of trade shock. Since the country had borrowed at floating rates, the interest rate rose, and by the end of that year, Chile was in recession. In June 1982, Chile had to abandon the fixed exchange rate, and in the following three months, the exchange rate went from 39 pesos to 63 pesos per US dollar. After a period of instability that existed until August of that year, the exchange rate followed a crawling peg based on a PPP rule, with some discrete and bigger devaluations (September 1984, 23 percent; in February and June 1985, 5 percent in each case). The initial devaluation increased the burden of foreign debt, deepening the financial crisis. Jointly with the abandonment of the fixed exchange rate, the compulsory wage indexation was eliminated. In 1982 the economy experienced a severe recession: output declined by 11 percent, and aggregate demand fell by 19 percent. Unemployment was nearly 20 percent, even after considering the emergency programs established by the government. The monetary base contracted in real terms by 15 percent in 1981 and by 41 percent in 1982 (in both years, the nominal monetary base also diminished). The stabilization plans of the late 1970s had failed.¹⁴

5 Saving the banking system: the fiscal burden of the debt crisis (1982–1990)

The crisis that followed the phase of economic euphoria described above put the banking system at severe risk. As noted previously, the main debtor with the rest of the world was the private sector. Between 1975 and 1982, the private foreign debt, as a percentage of GDP, increased from 10.5 percent to 41.8 percent. In the same period, the public external debt declined from 54.3 percent to less than 27 percent (see figure 13). An important part of the private external debt was intermediated by domestic private banks, and a currency mismatch emerged in their balance sheets. The sharp depreciation of the peso, in the context of a severe recession, made many banks insolvent. They could not recover an important proportion of their credits and, as a consequence, were unable to repay their foreign loans.

¹⁴Although during 1983 and 1984 the monetary base grew in nominal terms, it continued decreasing in real terms. It was in 1985 when the monetary base began to grow again in real terms.

In 1982 the Pinochet government approached the IMF in order to obtain financial assistance to service the foreign debt. Private banks were also approached, and a rescheduling of the foreign debt was proposed. A standby agreement with the IMF, which called for a new orthodox stabilization program, was signed. From the beginning of the debt crisis, the government developed a strategy of renegotiating the foreign debt, but with the declared goal of servicing it in full. The idea was to reestablish full access to international capital markets. As noted by Reinhart and Rogoff (2009), there were three debt restructuring episodes: in 1983, 1985 and 1989. In this context, Chile was not part of the “Brady bunch.” In sharp contrast with other Latin American countries, default in Chile was never an option. The cost of this strategy was enormous and was borne by the fiscal authority and the central bank.¹⁵

To prevent widespread bankruptcies, the government introduced rescue programs,

which were implemented, mainly, by the central bank.¹⁶ As noted by Sanhueza (2001), the central bank undertook three sets of measures to save the banking system.

First, the central bank distributed subsidies to financial institutions in the form of contracts to buy foreign currency at a price below the market equilibrium (the so-called *D'olar Preferencial* program). Until September 1984, this subsidy corresponded to 17 percent of debt service and after that month was 35 percent until June 1985, when it ended. The losses of this program incurred by the central bank are estimated at US\$2.4 billion.

Second, different debt restructuring programs were implemented to alleviate the situation of debtors. In August 1982, the central bank lent US\$250 million directly to debtors to repay their debt with banks. In October of that year, the central bank issued money to buy long-term bonds from the banks, which used these funds to restructure their debt. In April 1983 and June 1984, two more debt restructure programs were implemented. These last two programs did not imply an increase in the monetary base because central bank funds given to the banks had to be invested in central bank bonds, as required by the targets of the monetary programs agreed upon with the IMF.

Third, several private banks were liquidated, and the central bank provided the liquidity necessary to cover bank liabilities and expenses during the liquidation process. For financial institutions intervened and sold off between 1981 and 1982, the central bank provided special credit lines to pay off liabilities at 100 percent par value. Between 1982 and 1987, the central bank offered to buy part of commercial banks' and finance companies' risk portfolios, subject to an eventual buyback. The purpose of this measure was to avoid the insolvency of banks. The amount of these operations was the equivalent of 30 percent of the system's total outstanding loans for that period, representing 25 percent of GDP.

Because of the rescue plan, the central bank experienced heavy operational losses. In 1985, as a consequence of having assets with a low or zero return and liabilities generating

¹⁵For further discussion, see Edwards (1985) and Corbo and Fischer (1994).

¹⁶The Chilean central bank has been autonomous since 1989.

large payments, the central bank experienced an operational loss equivalent to 18 percent of GDP in that year (see figure 7A in the online appendix). The central bank was able to access domestic and foreign financial markets to finance its rescue operations. In practice, the central bank also relied on direct transfers from the Treasury in the form of long-term bonds. Those entered the balance sheet of the central bank as assets and appeared as domestic fiscal debt. In fact, in 1985, the fiscal debt was in large proportion the Treasury bonds that were transferred to the central bank, representing nearly 20 percent of that year's GDP (see figures 1A and 8A in the online appendix).

The total net cost to the central bank of the portfolio purchase program was equivalent to 6.7 percent of the 1983 GDP, when the social cost of capital is used as the discount rate, and was equivalent to 5.4 percent of GDP when the cash flow is measured as a proportion of each year's GDP.¹⁷

The above strategy implied that the rescue plan was mainly financed by issuing domestic and foreign interest-bearing liabilities of the central bank and receiving transfers (long-term bonds) from the Treasury. For this strategy to be successful and coherent with price stability, the maturity of the central bank debt (and Treasury transfers) have to be such that it does not put too much pressure on public finances. In the literature there are two complementary ways in which this can be done. First, a long maturity debt contract can rule out an equilibrium in which default is expected and, as a consequence, funds cannot be raised and default materialized.¹⁸ In the case of Chile, the increase in debt, by both the central bank and the fiscal authority, was concentrated in long-term bonds (see figures 9A and 10A in the online appendix). As a consequence, the long maturity of debt has prevented the existence of an equilibrium in which deficits are financed by printing money. The same can be said regarding the public domestic debt. In this case, the bond transferred to the central bank was a twenty-seven-year Treasury bond. Furthermore, this bond was indexed to inflation and then converted to US dollars in the late 1980s (see figure 1A in the online appendix). As a consequence, debt repudiation was avoided by having an indexed bond or US dollar-denominated

The above strategy implied that the rescue plan was mainly financed by issuing domestic and foreign interest-bearing liabilities of the central bank and receiving transfers (long-term bonds) from the Treasury. For this strategy to be successful and coherent with price stability, the maturity of the central bank debt (and Treasury transfers) have to be such that it does not put too much pressure on public finances. In the literature there are two complementary ways in which this can be done. First, a long maturity debt contract can rule out an equilibrium in which default is expected and, as a consequence, funds cannot be raised and default materialized.¹⁸ In the case of Chile, the increase in debt, by both the central bank and the fiscal authority, was concentrated in long-term bonds (see figures 9A and 10A in the online appendix). As a consequence, the long maturity of debt

¹⁷This cost is computed by Sanhueza (2001). In this case, cash flow estimates are divided into two parts: flows from the central bank to financial institutions for payment of portfolio purchases, which reached 8.9 percent of GDP, and cash flows from financial institutions to the central bank for buying back portfolios, which reached 2.2 percent of GDP.

¹⁸See Calvo (1995) and Cole and Kehoe (1996).

has prevented the existence of an equilibrium in which deficits are financed by printing money. The same can be said regarding the public domestic debt. In this case, the bond transferred to the central bank was a twenty-seven-year Treasury bond. Furthermore, this bond was indexed to inflation and then converted to US dollars in the late 1980s (see figure 1A in the online appendix). As a consequence, debt repudiation was avoided by having an indexed bond or US dollar-denominated bond.¹⁹

The financial crisis and its implications demanded that the focus of economic policies be concentrated in the recovery of the economy and a troubled financial sector. Regarding the inflation rate, the goal was to keep it under control without trying to reduce it significantly. After 1985, monetary policy involved periodic devaluations in order to avoid appreciation of the real exchange rate. The result of these policies was an annual average inflation rate of around 20 percent between 1982 and 1989. In 1988 elections took place, and the uncertainty about the change in the political regime may have affected the higher inflation rate observed in 1989.

As for the budget constraint accounting used in chapter 2, during the period from 1982 to 1989, seigniorage reduced its relative importance as a source of financing, representing, on average, 0.5 percent of GDP. External debt, on the other hand, had a negative contribution of 1 percent of GDP (table 1). In this period, the main source of financing is related to domestic credit in local currency (0.2 percent of GDP) and domestic credit in US dollars (1.7 percent of GDP). In terms of obligations, the fiscal authority was able to generate a surplus of 1.3 percent of GDP. The difference between sources and obligations is such that transfers, τ_t , represented on average 3.8 percent of GDP.

Transfers were particularly important in the 1982–1989 period (figure 7). The Treasury bonds transferred to the central bank and the private debt guaranteed account for most of the transfers in this period (figure 8). For example, in the year 1985, the transfers are almost completely explained by the issuance of Treasury notes.

To summarize, in the latter stage of Pinochet's government, fiscal financing needs were determined mostly by the fiscal debt the Treasury acquired with the central bank. With the exception of the years when the crises were at their peak, fiscal deficits were absent in this period. In the same way, external and domestic (private) debt were not important sources of funding (table 1).

¹⁹This point is stressed by Calvo (1988).

6 Fiscal discipline, fiscal rules, and inflation targeting: 1991–2017

Chile avoided defaulting on its, mainly private, external debt. The cost of this strategy was assumed by the central bank and the fiscal authority (the Treasury), which assumed, de facto, the debt obligations of the private sector. As is clear, the rescue strategy implied an increase in the debt position of both the Treasury and the central bank. To avoid debt dilution and liquidity problems, debt obligations were indexed and set to long horizons. Now, those debts have to be paid eventually, and the only way to achieve this is by generating fiscal surpluses. This idea, present since the mid-1970s, was followed by the Pinochet administration in the late 1980s as well as by the democratic governments that came after. In fact, from 1987 to 2017, the fiscal authority has, in general, generated a surplus (see figure 3). Net asset accumulation over time by the central government helped to meet future public-sector commitments that grow at a higher rate than fiscal revenues and potential expenditures on contingent liabilities. Furthermore, they also helped to finance central bank losses due to the carryover of quasi-fiscal costs incurred from the rescue of commercial banks in the early 1980s and the sterilization of large capital inflows in the 1990s.

Despite this prudent fiscal policy and the central bank's autonomy since October 1989, the reduction of the inflation rate during the 1990s was gradual in order to avoid the social costs of a stabilization plan. It is important to note that this gradual reduction in inflation rates was possible because of very favorable external conditions and, as discussed above, the fiscal discipline. Until 1999, there was an exchange rate band. During this period, there was a permanent appreciation pressure on the Chilean peso (it was regularly at the lower part of the band) because of the significant capital inflows and terms of trade levels. This implied a lower imported inflation. This crawling-peg system was in place until the Asian crisis. After that event, the appreciation of the peso dissipated.

The depreciation of the peso made it difficult to continue defending the band under conditions that were present after the Asian crisis (a decline in terms of trade and tighter credit conditions), and in September 1999, once uncertainty abated, the central bank announced the abandonment of the band, and inflation became the only explicit and formal target of the monetary authority.

There is a view among some economists, Calvo and Mendoza (1998), for example, that the exchange rate appreciation helped to stabilize inflation during the 1990s. We tend to disagree with this hypothesis and believe, as shown by Vald'es (1998), that the nominal anchor from 1991 to 1999 was indeed the declining inflation target announced by the central bank during the 1990s. To illustrate this point, it is useful to compare the evolution of the nominal exchange rate and inflation in the 1990s and the 1970s. In panel A of figure 5, we can see a close correlation between inflation and nominal devaluations from 1975 to 1981. The sample correlation among those variables is almost one (0.96, to be precise). In panel B we can see that this correlation is not very strong in the 1991-1999 period. In fact,

the sample correlation is 0.4. In addition, at the end of the sample there is an important and persistent devaluation without inflationary consequences. In short, the stabilization experiences of the 1970s and the 1990s are very different. In the former, the exchange rate was the de facto nominal anchor of the economy, whereas in the latter case the nominal anchor was the inflation target announced by the central bank.

Summing up, fiscal discipline allowed a smooth transition from the troubled 1980s to the adoption of an inflation-targeting regime almost ten years later. This was true even though the central bank was experiencing operational losses (see figure 7A in the online appendix) and had a net worth that has declined steadily since the mid-1980s. In particular, in 2010 the net worth of the central bank was -3.5 percent of that year's GDP (see figure 11A in the online appendix).

An important fiscal institutional arrangement in Chile has been the adoption of a fiscal rule. In 2001 the government implemented a fiscal policy based on a yearly structural surplus of 1 percent of GDP. The basic logic of the rule is to stabilize public expenditures over the business cycle and fluctuations in the price of copper, preventing excessive adjustments in periods of recession or unsustainable expenditure levels in periods of prosperity. Hence, the rule is designed to generate savings in times of prosperity to pay debt contracted in times of recession, thus softening the economic cycle and granting sustainability to public finances. At the same time, because it is a known and transparent rule, it reduces uncertainty for economic agents regarding the future behavior of public finances and stabilizes public expenditure in economic and socially sensitive areas, such as investment and social spending. To establish the credibility of this rule, independent panels of experts have substantial influence in establishing the long-run reference value of the price of copper as well as the trend growth of GDP.

Going back to our budget constraint framework (in table 1), from 1991 to 2010, the fiscal authority has managed to generate surpluses in a systematic way. On average, these surpluses represented 3 percent of GDP, relaxing the financing needs of the government. The rest of the obligations were, on average, a small fraction of GDP. Transfers represented 2.2 percent of GDP in the period from 1991 to 2010. As can be seen in figure 8, fiscal incomes derived from copper seem to explain an important fraction of the transfers for the years around 2005. A potential additional explanation for these high transfers is that they may constitute assets accumulated by the state in order to be used when the cycle is adverse or the price of copper declines. In short, transfers in this period are going to wealth funds.²⁰

²⁰The fiscal responsibility law of 2006 allowed for setting up two sovereign wealth funds and establishing the basic institutional framework necessary for their management. These funds included the Pension Reserve Fund (PRF), created at the end of 2006, and the Economic and Social Stabilization Fund (ESSF), launched in early 2007.

6.1 Fiscal rule

The structural balance fiscal rule followed by Chile has experienced several changes over time, although this policy has been, in theory, countercyclical.²¹ In order to determine the de facto nature of the fiscal rule, we discuss some estimations of the fiscal rule in Chile performed by Caputo and Irarrazabal (2015). These estimations were made according to the specifications suggested by Fernandez-Villaverde et al. (2011):

$$v_t = c + \alpha v_{t-1} + \beta (ym_t - ym) + \gamma (\tau_{cu,t} - \tau_{cu}) \quad (6.1)$$

where $v_t = (g_t - tax_t) / ym_t$, g_t is government spending, tax_t is fiscal income, excluding copper-related revenues, ym is the real GDP noncopper, and τ_{cu} is the fiscal income (in real terms) related to copper. Variables without a time subscript represent the filtered variable (Hodrick-Prescott). If the fiscal authority is following a countercyclical fiscal rule, the coefficients β and γ are expected to be negative. The results for the whole sample indicate that the fiscal rule has been countercyclical in the case of noncopper GDP as well as in the case of the price of copper. From 1990 to 1999, the rule is almost neutral with a long-run response to the GDP cycle that is not different from zero and a response to copper-related income that is negative and statistically different from zero. For the latter sample period, 2000 to 2014, the responses to both the GDP cycle and the price of copper increase (in absolute value) quite significantly. This result suggests that in the last fourteen years, fiscal policy has been decisively countercyclical.

The countercyclical nature of the fiscal rule can explain to some degree the evolution of transfers since 2000: in times when the GDP cycle and the price of copper cycle are positive, the fiscal authority generates fiscal surpluses that are eventually used to increase the net asset position of fiscal authority. Hence, it is not surprising that during the 2000s, transfers increased significantly and were not only explained by revenues from higher copper prices.

To summarize, after the debt crisis of the early 1980s, it was clear that the only way to both service the debt and avoid nominal volatility was to generate fiscal surpluses. This has been done in a systematic way since 1987 and, as a consequence, enabled the Treasury to service its foreign and domestic debt (with the central bank). In recent years, the fiscal authority has followed a more countercyclical policy that can explain, to some extent, the important level that transfers have reached. This, in turn, enabled the central bank to pursue an inflation-targeting regime. One important consequence of this strategy is that it broke the correlation between fiscal deficits, seigniorage, and inflation that was prevalent in the 1970s (see figure 12).

²¹See Tapia (2015), Ffrench-Davis (2016), and Céspedes, Parrado, and Velasco (2014).

7 Conclusions

Over the last fifty years, Chile has experienced deep structural changes. In the 1960s, two different administrations, led by Alessandri and Frei, attempted to stabilize inflation. Inflation declined in some particular years, but it could not be permanently contained. During Alessandri's administration, there was a clear link between inflation and fiscal deficits. This link became less apparent during Frei's administration, which adjusted fiscal deficits but was not able to reduce inflation. According to our findings, in this period seigniorage was used to finance transfers not explicit in the central government deficits and related to the cost of nationalizations and the financing of public enterprise deficits.

In the early 1970s, a massive increase in government spending, which was not financed by an increase in taxes or debt, induced nominal instability in the form of high and unpredictable inflation. Between 1973 and 1974, Chile experienced a hyperinflation process that had no precedent in its past history. Between 1971 and 1973, seigniorage contributed to financing the central government deficit. In addition, it contributed to financing the public enterprise deficits, which represented, on average, 7.2 percent of GDP in that period.

After the military took power in September 1973, some attempts were made to stabilize the economy. However, inflation could not be stabilized until the late 1970s. The rate of growth in high-powered money, inflation, and seigniorage declined but remained at relatively high levels. Given that fiscal deficits were drastically reduced, it follows that implicit transfers during this period were relatively large: on average, nearly 7 percent of GDP. Reserve accumulations and the impact of large depreciations in the early 1970s can explain a fraction of these transfers. The rest could be related to contingent liabilities, expenses undertaken by the government and not fully reflected in the fiscal deficit.

In the early 1980s, after the exchange rate was controlled, inflation converged to lower levels. However, as a consequence of nominal wages that were indexed to past inflation, the real exchange rate experienced a sharp appreciation. This, in turn, generated external imbalances that could not be sustained once capital inflows reversed in 1982. In this context, the exchange rate regime had to be abandoned to restore the external equilibrium. This, however, came at a significant cost: the banking system collapsed and had to be rescued by the central bank and the Treasury. During this period, both seigniorage and the public deficit were very small. The implicit transfers in this period are related to actions taken by the government and the central bank to save the private banking sector.

During the 1980s, the government did not enter into debt default, but in order to service its debt, the fiscal authority had to generate surpluses consistently over time. Since 1987 this has been a systematic policy followed by all administrations. This policy helped to achieve two different but related goals: it contributed to reducing the fiscal debt and enabled the central bank to pursue an independent monetary policy aimed at reducing inflation.

In terms of the accounting exercise we implement, we found that there were unaccounted transfers of 4 percent of GDP on average between 1960 to 2010. Once we include all the potential components associated with the transfers, the residual we obtained is close to 1 percent of GDP, and it fluctuates in a nonsystematic way.

References

- Arenas de Mesa, Alberto, and Mario Marcel. 1991. "Reformas a la seguridad social en Chile." *Serie de Monografías No. 5*.
- Calvo, Guillermo A. 1988. "Servicing the Public Debt: The Role of Expectations." *American Economic Review* 78 (4): 647–661.
- Calvo, Guillermo A. 1995. "Varieties of Capital-Market Crises." Working Paper 4008, Inter-American Development Bank, Research Department.
- Calvo, Guillermo A. 1996. "Exchange-Rate-Based Stabilization under Imperfect Credibility." Chap. 18 in *Money, Exchange Rates, and Output*, 365–390. Cambridge, MA: MIT Press.
- Calvo, Guillermo A., and Enrique Mendoza. 1998. "Empirical Puzzles of Chilean Stabilization Policy." Working Paper 98-02, Duke University.
- Caputo, Rodrigo, and Alfonso Irarrázabal. 2015. "The Business Cycle of a Commodity Exporter." Unpublished paper.
- Céspedes, Luis Felipe, Eric Parrado, and Andrés Velasco. 2014. "Fiscal Rules and the Management of Natural Resource Revenues: The Case of Chile." *Annual Review of Resource Economics* 6 (1): 105–132.
- Cole, Harold L., and Timothy J. Kehoe. 1996. "A Self-Fulfilling Model of Mexico's 1994–1995 Debt Crisis." *Journal of International Economics* 41 (3–4): 309–330.
- Corbo, Vittorio, and Stanley Fischer. 1994. "Lessons from the Chilean Stabilization and Recovery." In *The Chilean Economy: Policy Lessons and Challenges*, edited by Barry Bosworth, Rudiger Dornbusch, and Raúl Labán, 29–80. Washington, DC: Brookings Institution Press.
- De Gregorio, Jose. 1991. "Indexación versus credibilidad en un programa de estabilización: la experiencia Chilena a mediados de los 70." *Latin American Journal of Economics—formerly Cuadernos de Economía* 28 (83): 189–199.
- Diamond, Peter, and Salvador Valdés-Prieto. 1994. "Social Security Reform." In *The Chilean Economy: Policy Lessons and Challenges*, edited by Barry Bosworth, Rudiger Dornbusch, and Raúl Labán, 114–137. Washington, DC: Brookings Institution Press.
- Díaz, Jose, Rolf Lüders, and Gert Wagner. 2016. *Chile 1810–2010: la república en cifras*. Santiago: Ediciones Universidad Católica de Chile.
- Edwards, Sebastian. 1985. "Stabilization with Liberalization: An Evaluation of Ten Years of Chile's Experiment with Free-Market Policies, 1973–1983." *Economic Development and Cultural Change* 33 (2): 223–254.
- Edwards, Sebastián. 2007. "Establishing Credibility: The Role of Foreign Advisors in Chile's 1955–1958 Stabilization Program." In *The Decline of Latin American*

Economies: Growth, Institutions, and Crises, edited by Sebastian Edwards, Gerardo Esquivel, and Graciela Márquez, 291–332. Chicago: University of Chicago Press.

Edwards, Sebastián, and Alejandra Cox Edwards. 1987. *Monetarism and Liberalization: The Chilean Experiment*. Chicago: University of Chicago Press.

Fernández-Villaverde, Jesús, Pablo A. Guerrón-Quintana, Keith Kuester, and Juan Rubio-Ramírez. 2011. “Fiscal Volatility Shocks and Economic Activity.” Working Paper 17317, National Bureau of Economic Research.

Ffrench-Davis, Ricardo. 1973. *Políticas económicas en Chile: 1952–1970*. Santiago: Ediciones Nueva Universidad, Universidad Católica de Chile.

Ffrench-Davis, Ricardo. 2016. “La experiencia de Chile con el balance fiscal estructural.” *Cuadernos de Economía* 35 (67): 149–171.

Kiguel, Miguel, and Nissan Leviatan. 1990. “The Business Cycle Associated with Exchange-Rate-Based Stabilization.” Policy Research Working Paper WPS513, World Bank.

Krugman, Paul. 1979. “A Model of Balance-of-Payments Crises.” *Journal of Money, Credit and Banking* 11 (3): 311–325.

Larraín, Felipe. 1991. “Public Sector Behavior in a Highly Indebted Country: The Contrasting Chilean Experience. In *The Public Sector and the Latin American Crisis*, edited by Felipe Larraín and Marcelo Selowsky, 89–136. San Francisco: ICS Press.

Larraín, Felipe, and M. Rodrigo Vergara. 2000. “Un cuarto de siglo de reformas fiscales.” In *La transformación económica de Chile*, edited by Felipe Larraín and M. Rodrigo Vergara, 73–109. Santiago: Centro de Estudios Públicos.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2009. *This Time Is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.

Sanhueza, Gonzalo I. 2001. “Chilean Banking Crisis of the 1980s: Solutions and Estimation of the Costs.” Working Paper 104, Central Bank of Chile.

Sargent, Thomas J. 2013. *Rational Expectations and Inflation*. 3rd ed. Princeton, NJ: Princeton University Press.

Scheetz, Thomas. 1987. “Public Sector Expenditures and Financial Crisis in Chile.” *World Development* 15 (8): 1053–1075.

Schmidt-Hebbel, Klaus, and Pablo Marshall. 1981. “Revisión del IPC para el período 1970–1980: Una nota.” Documento No. 176, Departamento de Estudios de Empresas BHC, Santiago.

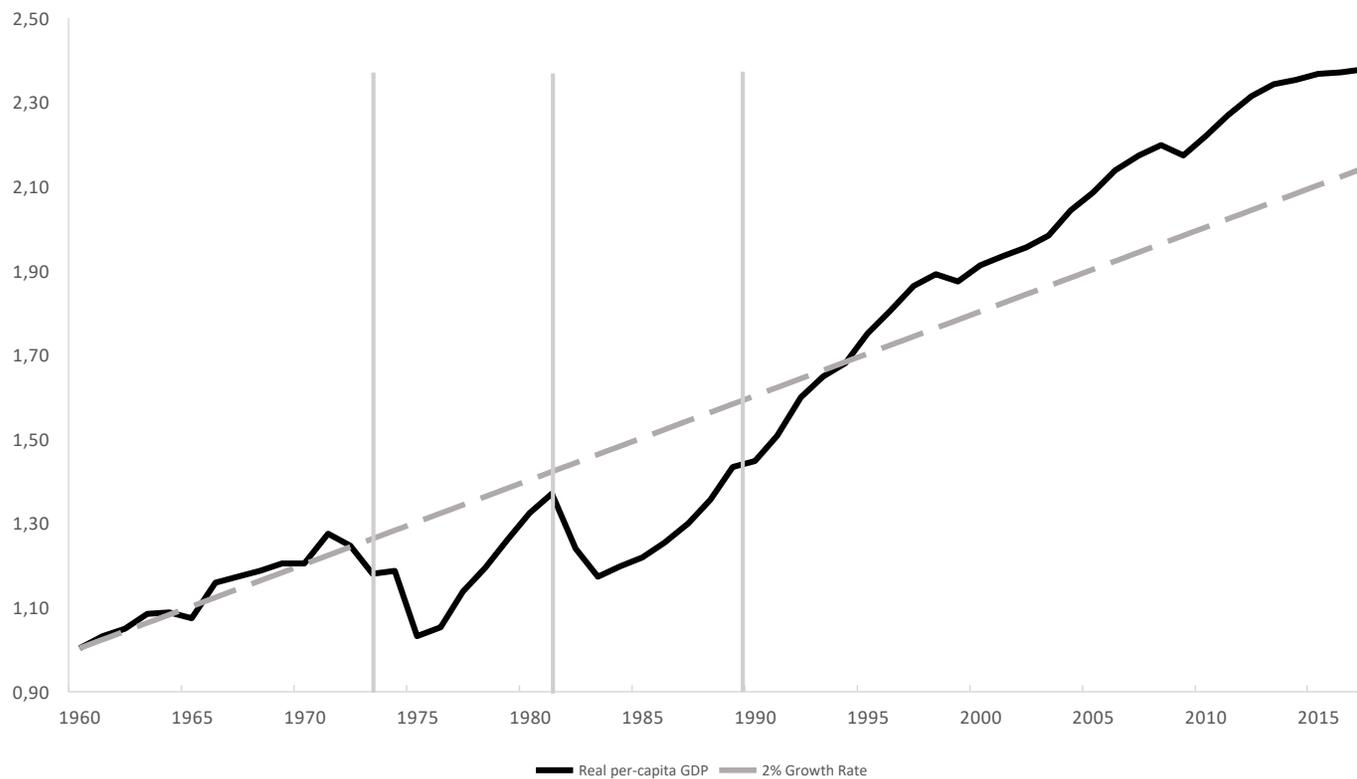
Tapia, Heriberto. 2015. “Fiscal Rule in Chile: From Automatic Pilot to Navigation Device.” Unpublished paper, Human Development Report Office.

- Valdés, Rodrigo. 1998. "Efectos de la política monetaria en Chile." *Cuadernos de Economía* 35 (104): 97–125.
- Velasco, Andrés. 1987. "Financial Crises and Balance of Payments Crises: A Simple Model of the Southern Cone Experience." *Journal of Development Economics* 27 (1–2): 263–283.
- Velasco, Andrés. 1994. "The State and Economic Policy: Chile 1952–92." In *The Chilean Economy: Policy Lessons and Challenges*, edited by Barry Bosworth, Rudiger Dornbusch, and Raúl Labán, 379–410. Washington, DC: Brookings Institution Press.

Table 1: Budget Constraint Decomposition, 1960–2016

Periods	1960–1973	1974–1981	1982–1990	1991–2016
<i>Sources (%)</i> :				
External debt	0.64	0.33	-0.99	-0.03
Domestic debt (CLP + Indexed)	0.23	-0.21	0.16	0.60
Domestic debt (USD)	-0.26	0.36	1.65	-0.69
Seigniorage	4.43	4.53	0.49	0.52
Total	5.04	5.01	1.32	0.40
<i>Obligations (%)</i> :				
External debt interest payment	-0.93	0.78	0.63	0.04
Domestic debt interest payment (CLP)	-0.89	-1.35	-2.14	-0.12
Domestic debt interest payment (USD)	-0.25	-0.53	0.26	0.09
Primary Deficit	3.44	-0.58	-1.28	-2.11
Partial Total	1.37	-1.69	-2.52	-2.10
Implicit Transfers (Residuals)	3.67	6.70	3.83	2.50
Total	5.04	5.01	1.32	0.40

Figure 1: Log of per capita GDP (1960–2017)

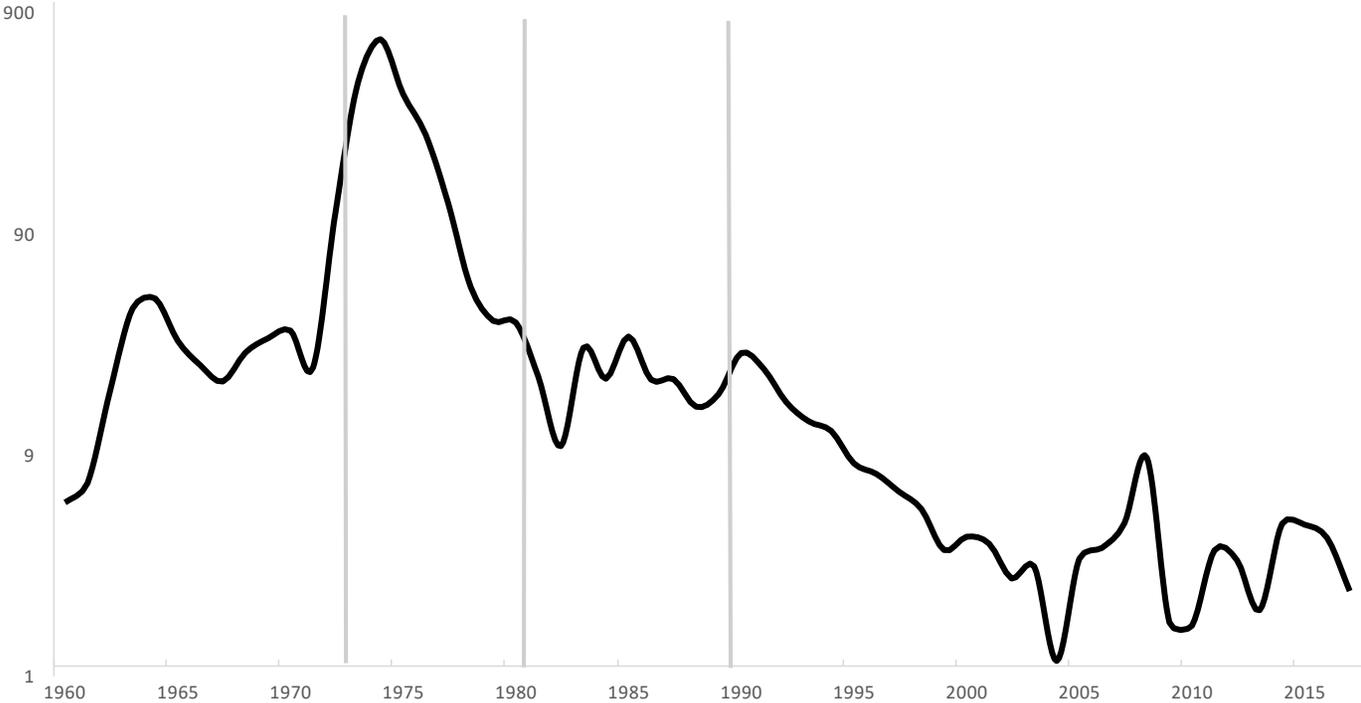


27

Sources: World Bank and Central Bank of Chile, www.bcentral.cl.

Figure 2: Inflation in log-scale (1960–2017)

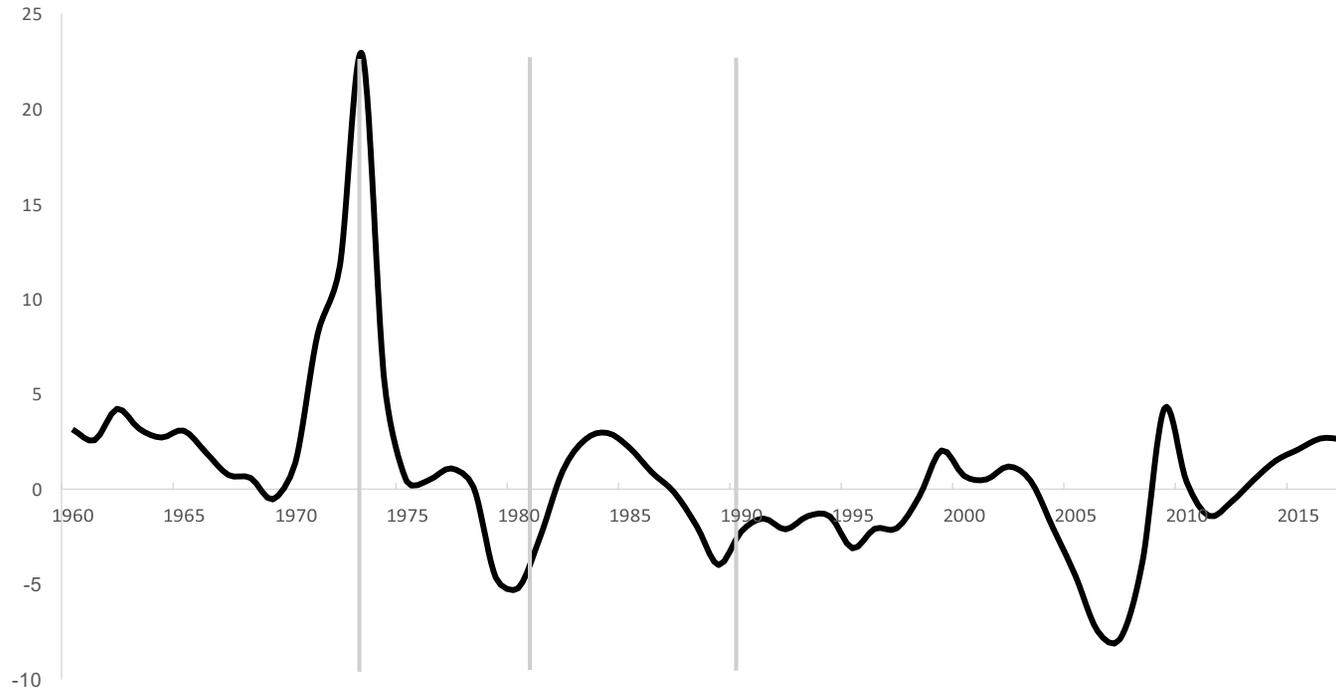
28



Source: Central Bank of Chile.

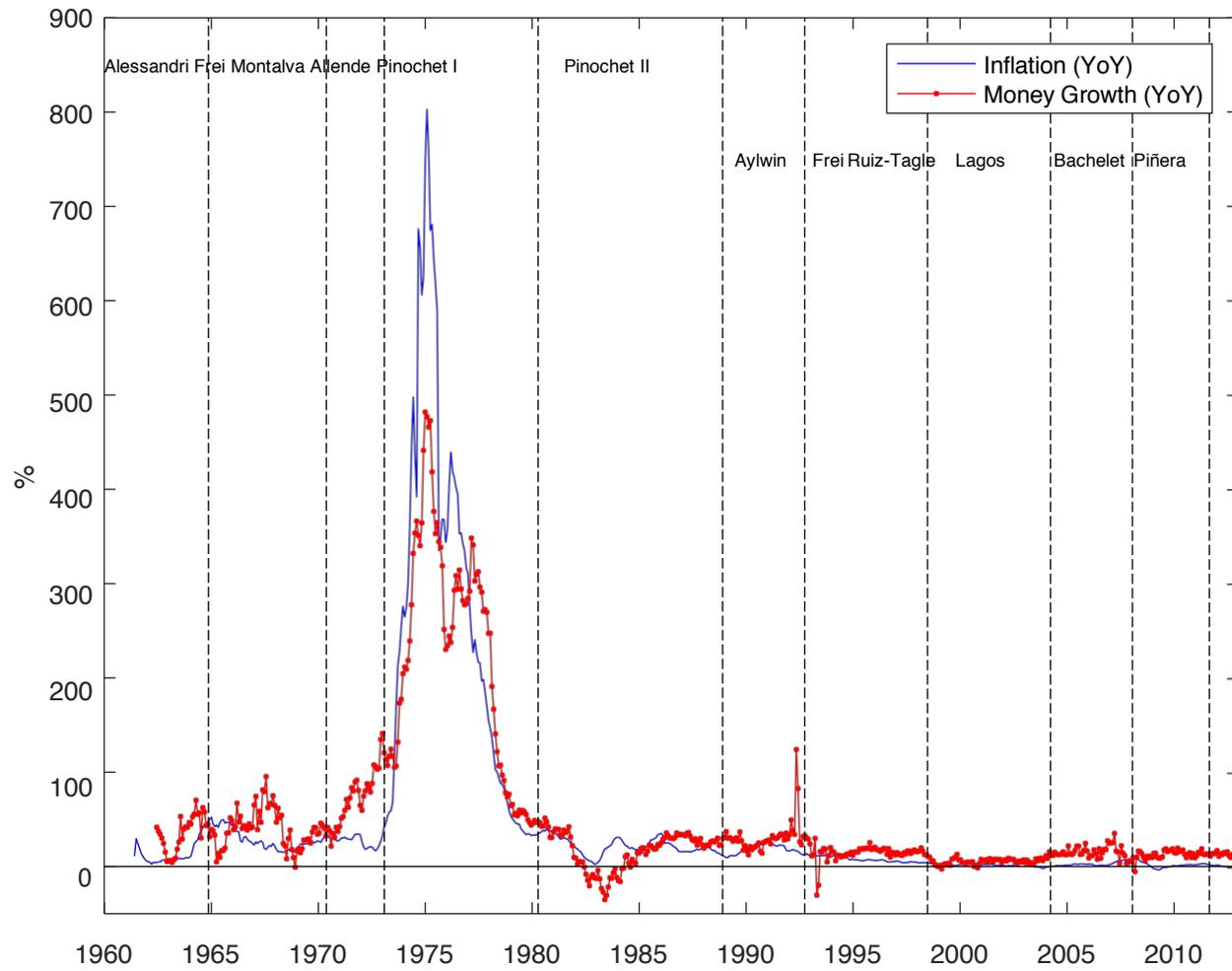
Figure 3: Public deficit to GDP (1960–2017)

29



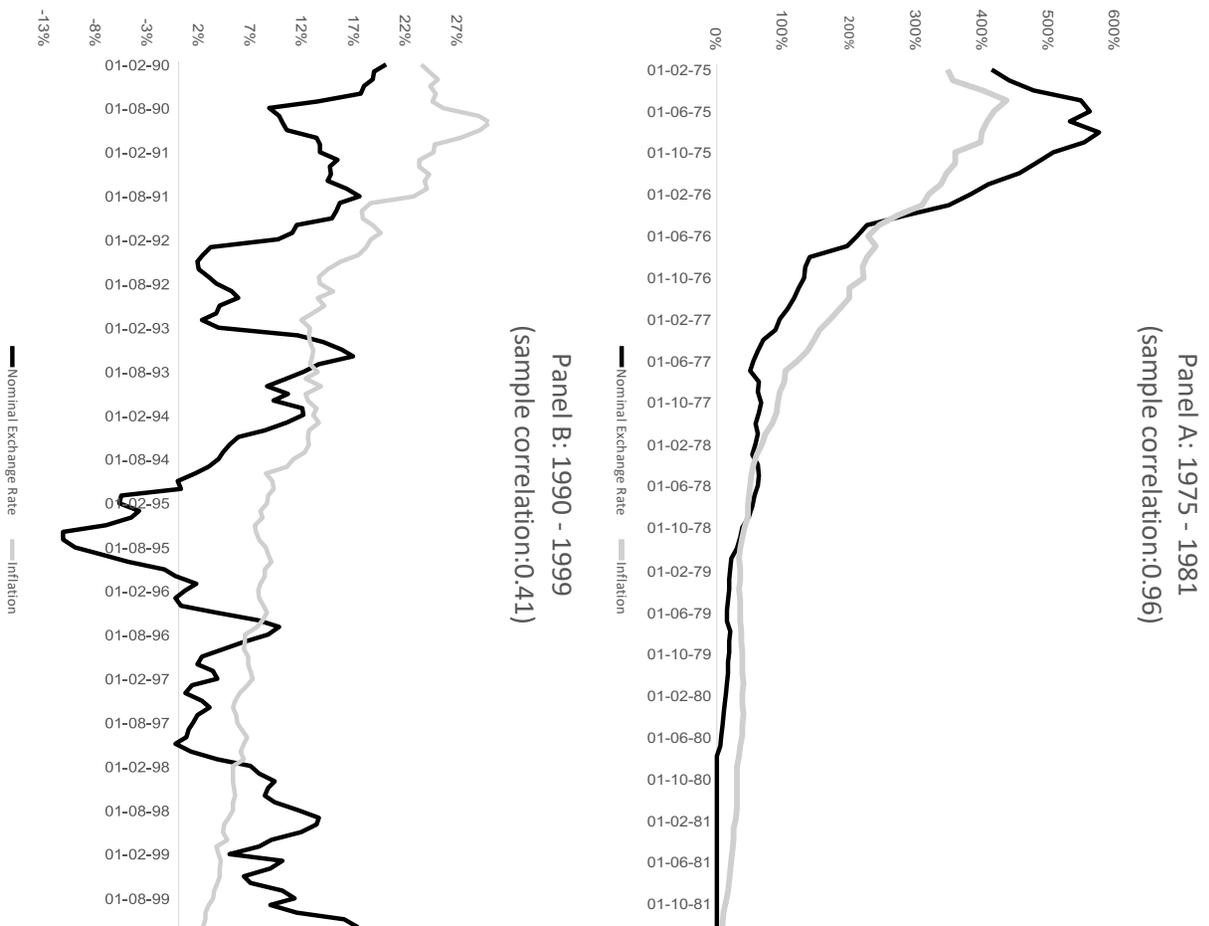
Sources: DIPRES and Central Bank of Chile. Includes the deficits of state-owned enterprises.

Figure 4: High-powered money growth and CPI inflation (annual rates)



Sources: National Statistics Institute of Chile, Schmidt-Hebbel and Marshall (1981), and Central Bank of Chile, www.bcentral.cl.

Figure 5: Stabilization phases: inflation and devaluation rates (twelve-month rate of growth)



Source: Central Bank of Chile, www.bcentral.cl

Figure 6: Credit to the private sector as percentage of GDP (1960–2017)

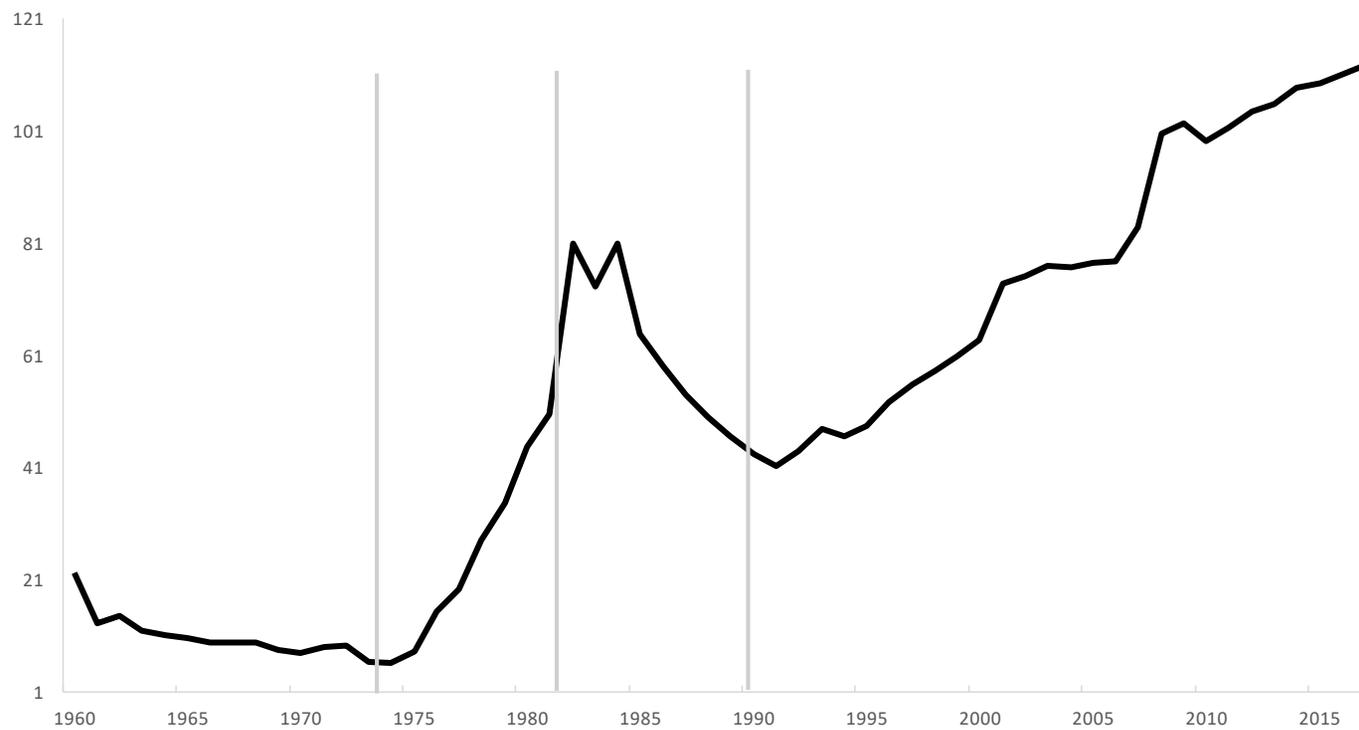


Figure 7: Budget constraint: baseline scenario

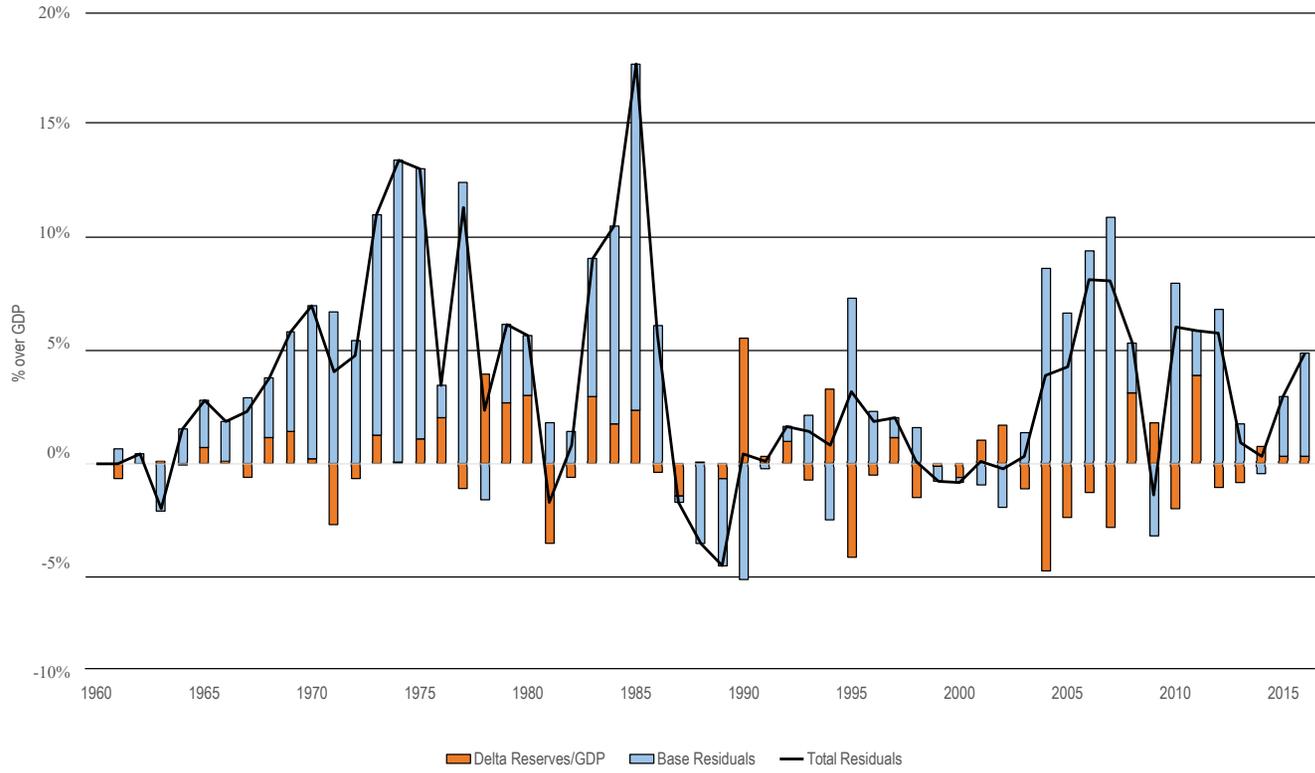


Figure 8: Potential factors behind the residuals

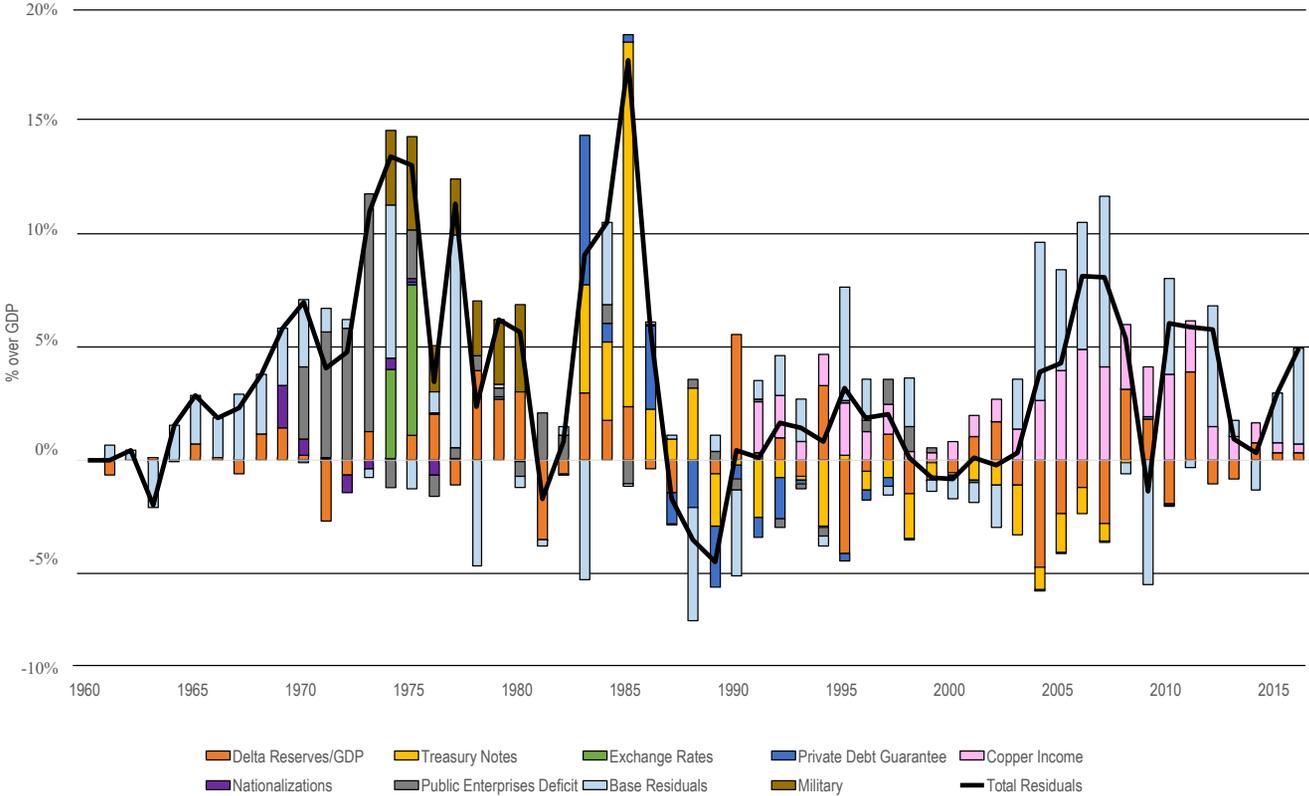
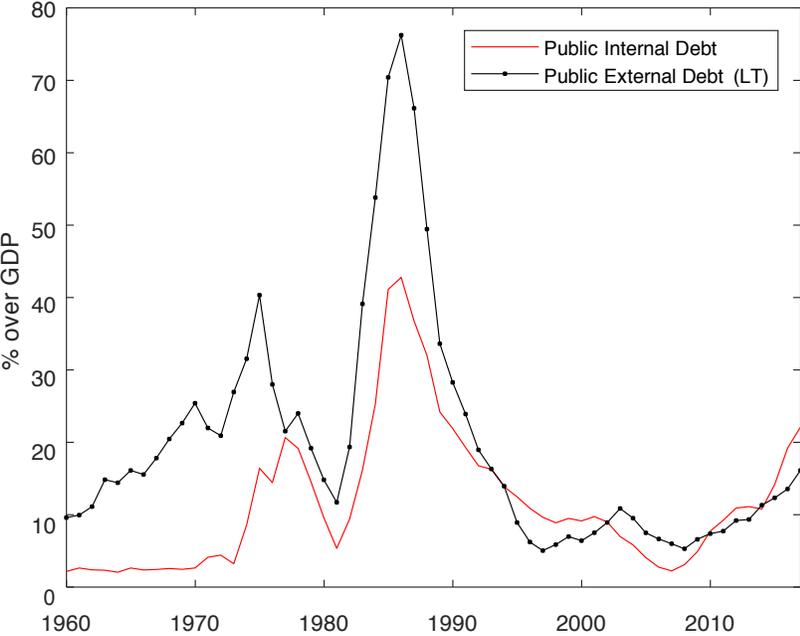
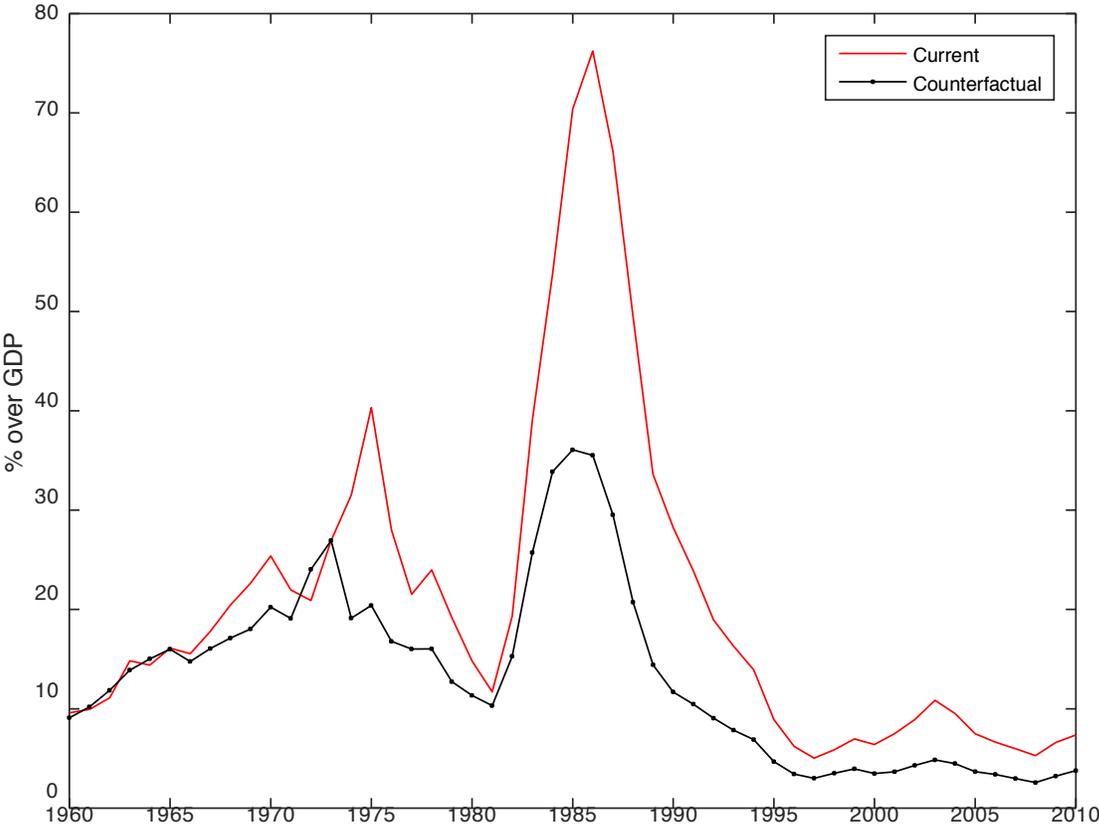


Figure 9: Public internal and external debt (as % of GDP)



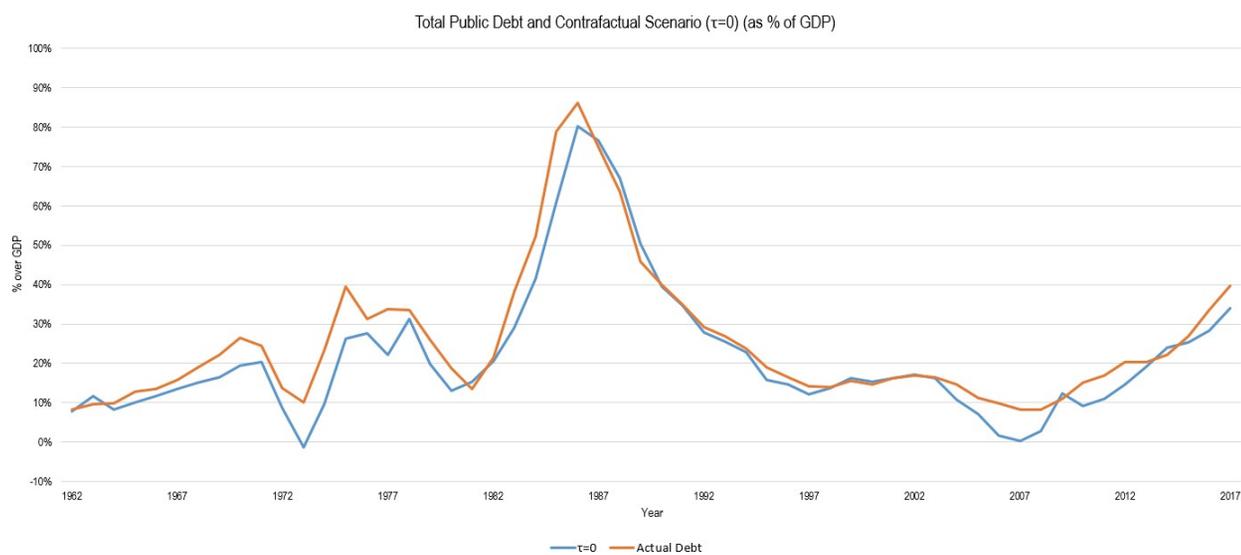
Sources: Central Bank of Chile (2002); Central Bank of Chile, "Chilean External Debt" (1977–2014); Central Bank of Chile, www.bcentral.cl; General Comptroller Republic of Chile, annual memories and annual Financial Management of the Public Sector Report; General Treasury of the Republic of Chile.

Figure 10: Long-term public external debt: counterfactual evolution with constant real exchange rate at 1973 (as % of GDP)



Source: Central Bank of Chile (2002); Central Bank of Chile, "Chilean External Debt" (1977–2014); Central Bank of Chile, www.bcentral.cl.

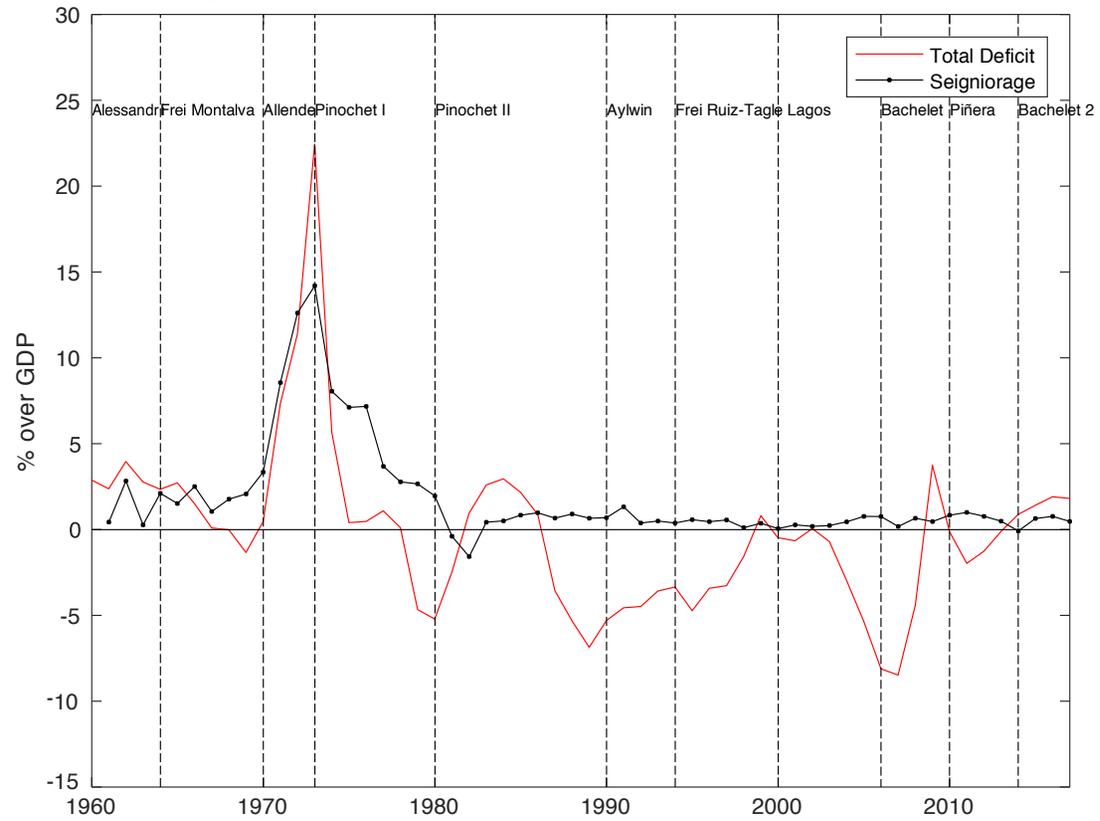
Figure 11: Counterfactual path for public debt



37

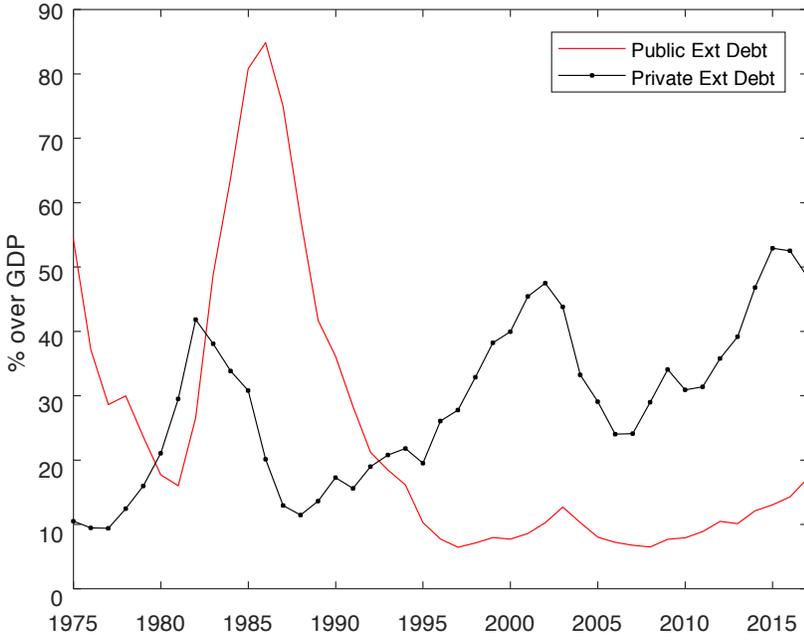
Source: Author's calculations.

Figure 12: Seigniorage and public deficit (as % of GDP)



Sources: Díaz, Lüders, and Wagner (2016); Central Bank of Chile (2002); DIPRES, "Estado de Operaciones de Gobierno Central Total"; National Statistics Institute of Chile; Schmidt-Hebbel and Marshall (1981).

Figure 13: Public (with central bank) and private external debt (as % of GDP)

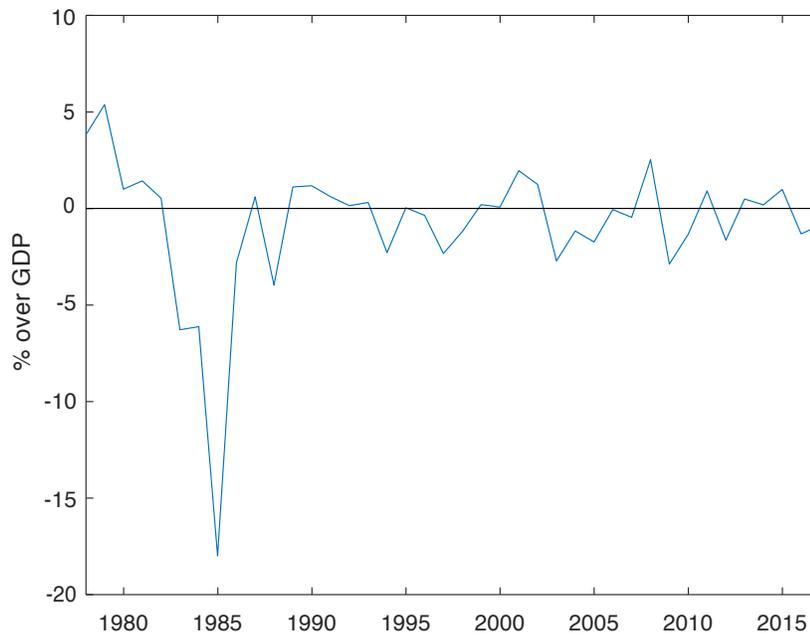


Sources: Central Bank of Chile (2002); Central Bank of Chile, "Chilean External Debt" (1977-2014); Central Bank of Chile, www.bcentral.cl.

ONLINE APPENDIX

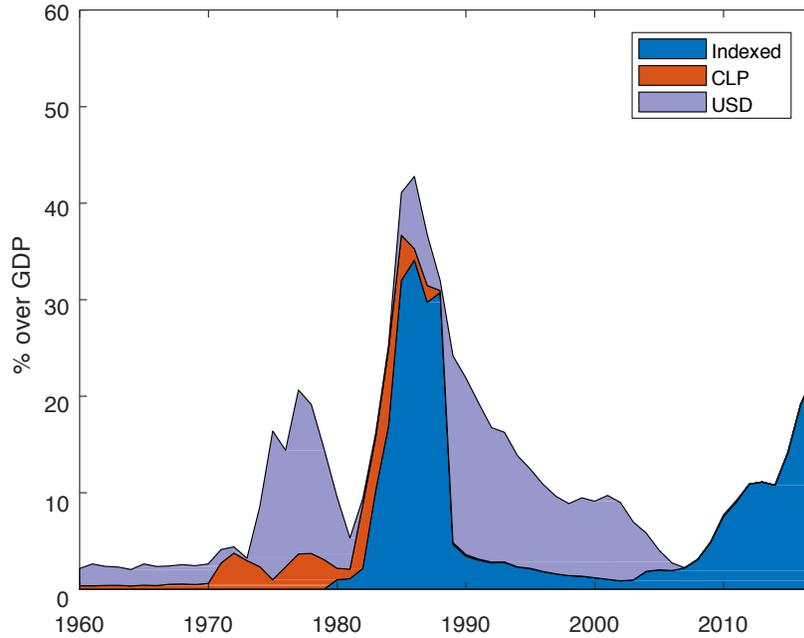
{If this appendix is going to be a completely separate document, I'd renumber starting with 1A. Otherwise, I recommend rearranging in chronological order here.}. OK, I put the number as they appear on the text. I am unable to move the figures in word without changing the format. Please, can you order the figures sequentially? I was unable to reorder the figures sequentially without messing up the format. See separate PDF document, which has one figure on each page, pages rearranged sequentially. --JMG

Figure 7A: Operational losses of the Chilean central bank (as % of GDP)



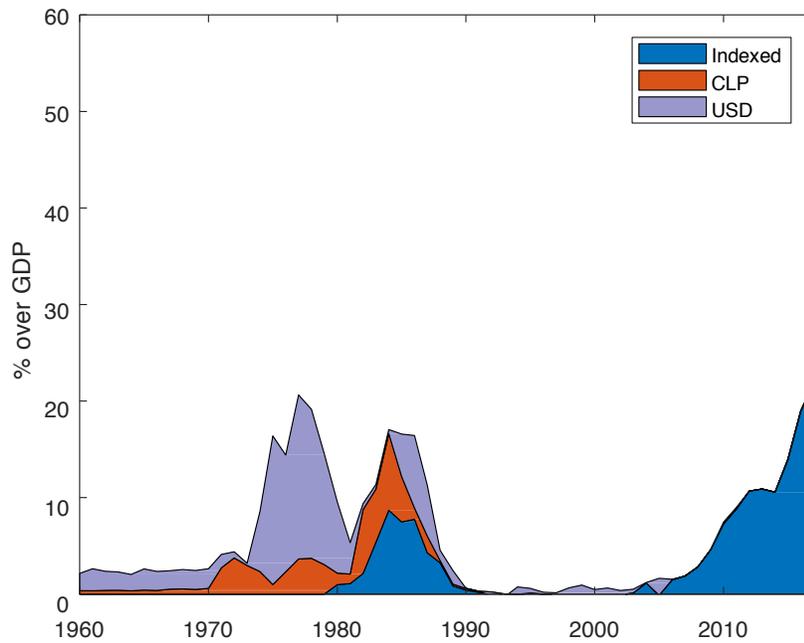
Source: Central Bank of Chile, www.bcentral.cl.

Figure 1A: Public internal debt (as % of GDP)



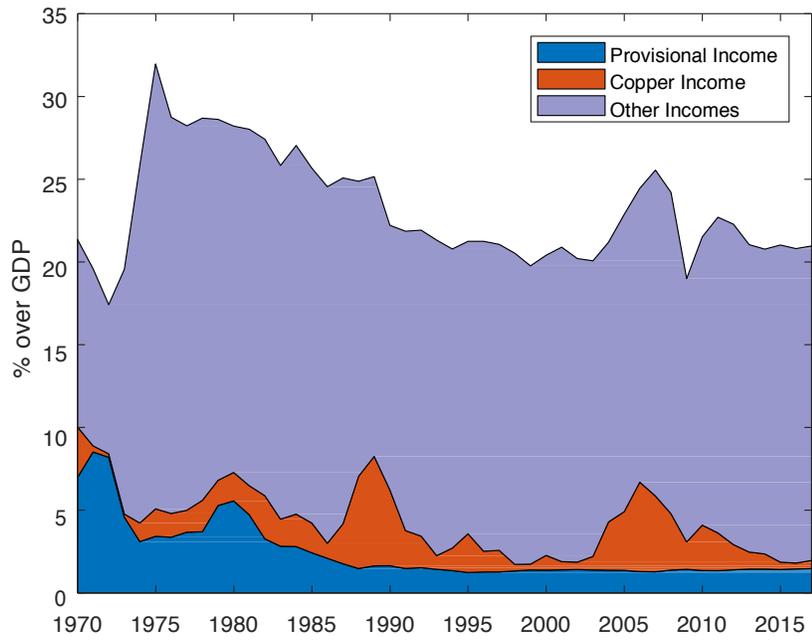
Sources: Contraloria General de la Republica, annual memories and annual Financial Management of the Public Sector Report; General Treasury of the Republic of Chile; Central Bank of Chile annual memories.

Figure 8A: Public internal debt without Treasury notes (as % of GDP)



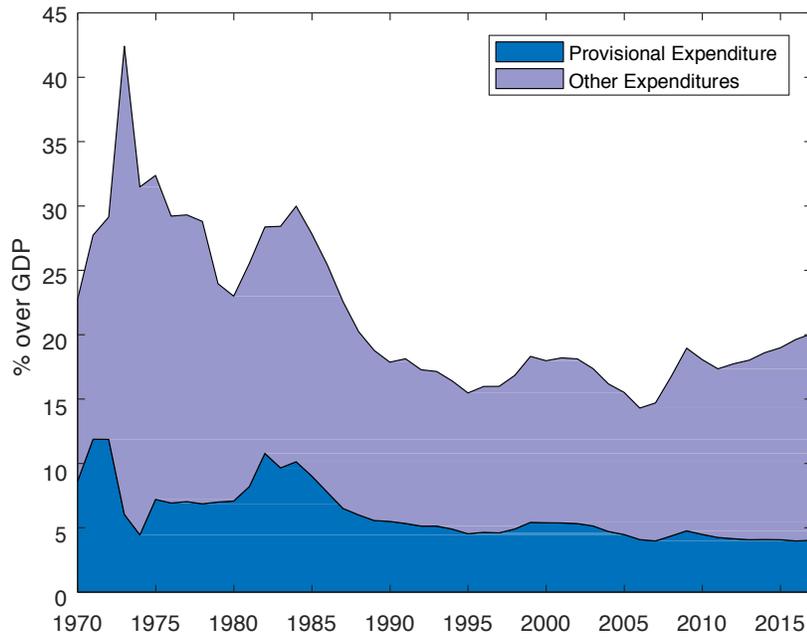
Sources: Contraloria General de la Republica, annual memories and annual Financial Management of the Public Sector Report; General Treasury of the Republic of Chile; Central Bank of Chile annual memories.

Figure 3A: Fiscal revenues decomposition



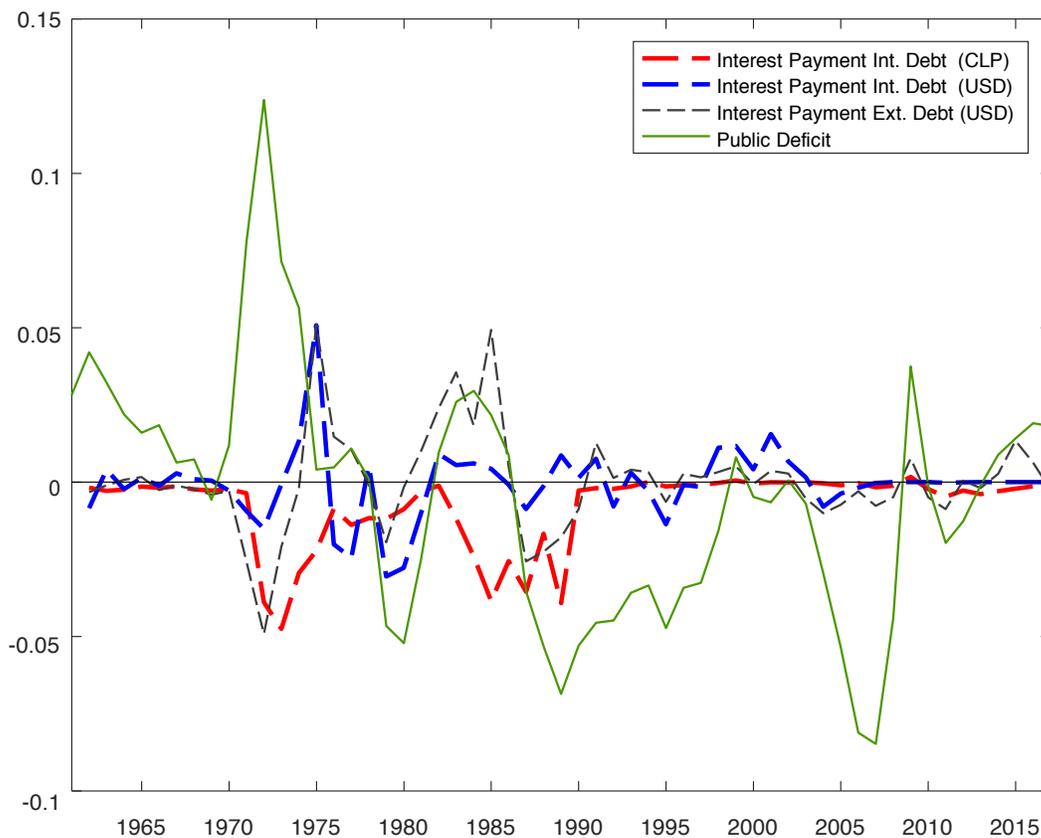
Sources: 1970–1985: Larraín (1991); 1986–1989: Díaz, Lüders, and Wagner (2016); 1990–2010: DIPRES, Ministry of Finance.

Figure 4A: Fiscal expenditure decomposition



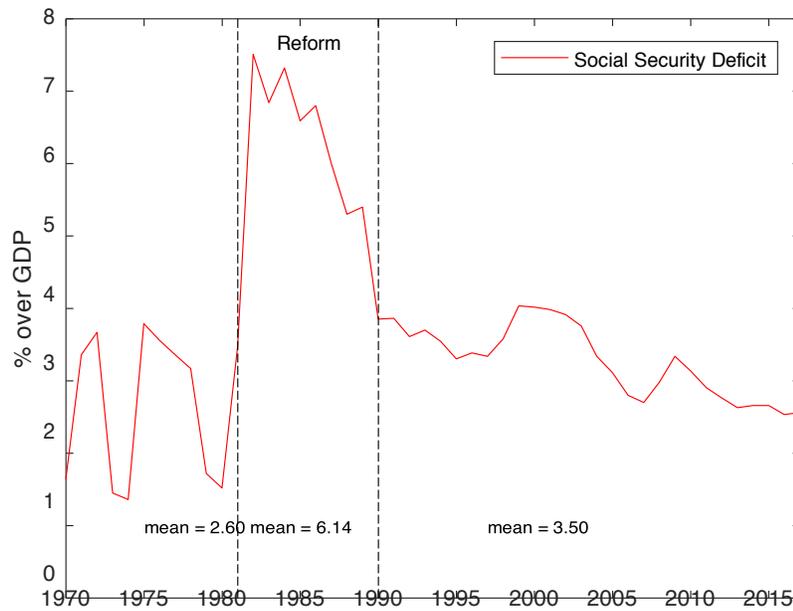
Sources: 1970–1985: Larrain (1991); 1986–1989: Díaz, Lüders, and Wagner (2016); 1990–2010: DIPRES, Ministry of Finance.

Figure 2A: Budget constraint: obligations



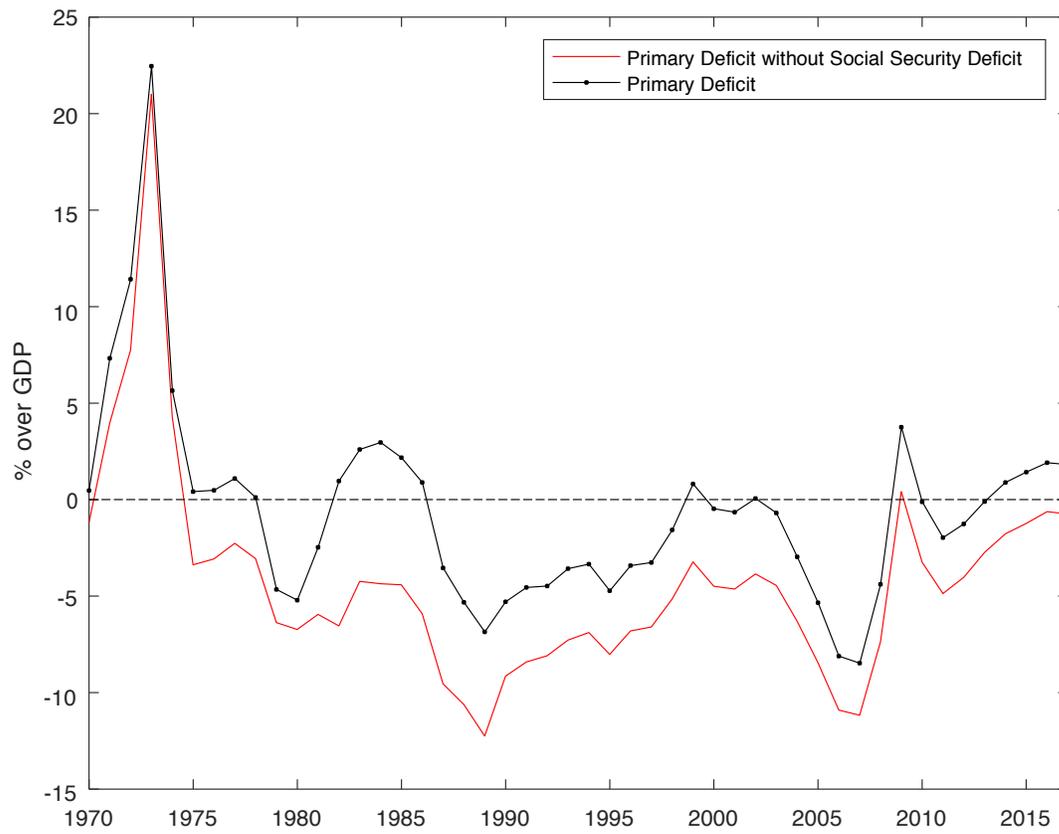
Sources: Contraloria General de la Republica, annual memories and annual Financial Management of the Public Sector Report; General Treasury of the Republic of Chile; Central Bank of Chile annual memories. Fiscal deficit excludes interest payments and public enterprise deficits.

Figure 5A: Social security deficit



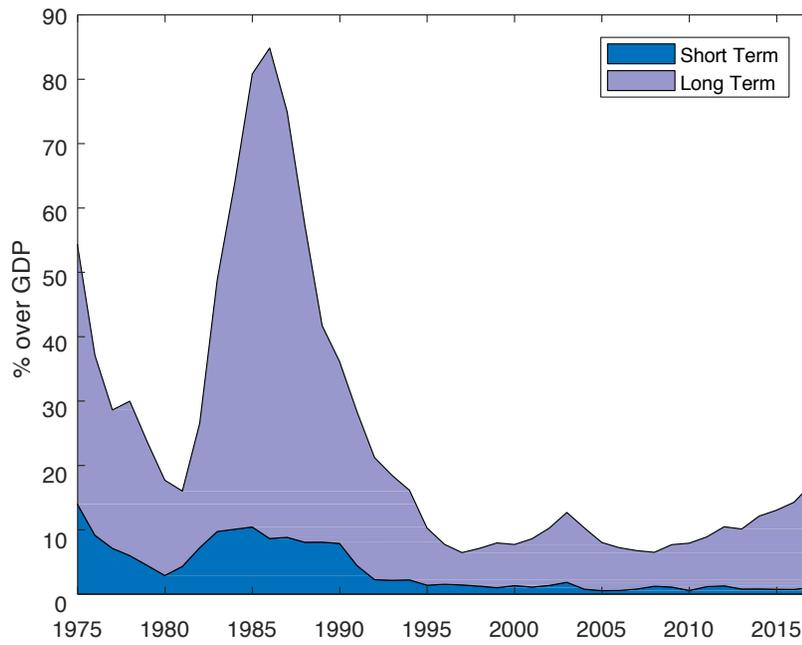
Sources: 1970–1985: Larraín (1991); 1986–1989: Arenas de Mesa and Marcel (1991); 1990–2010: DIPRES, Ministry of Finance.

Figure 6A: Fiscal deficit



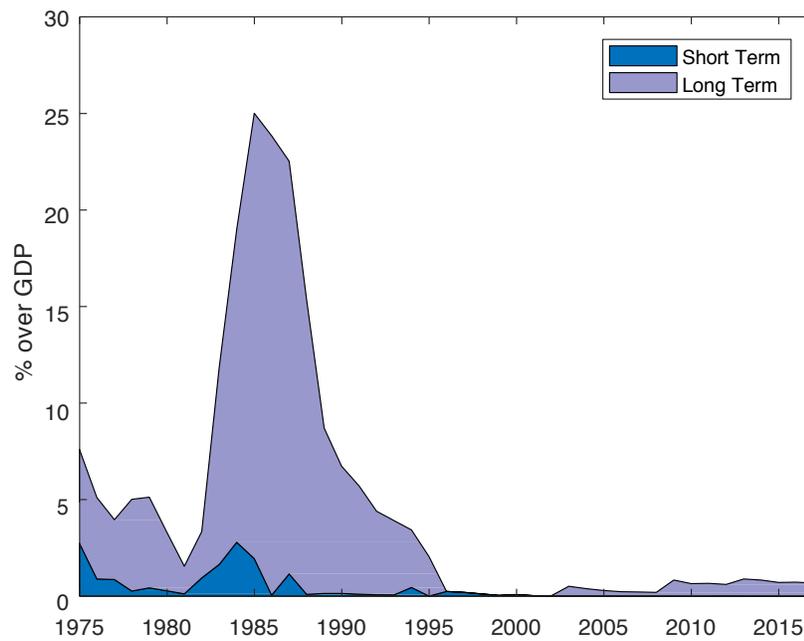
Sources: 1970–1985: Larraín (1991); 1986–1989: Arenas de Mesa and Marcel (1991); 1990–2010: DIPRES, Ministry of Finance.

Figure 9A: Short- and long-term public external debt (as % of GDP)



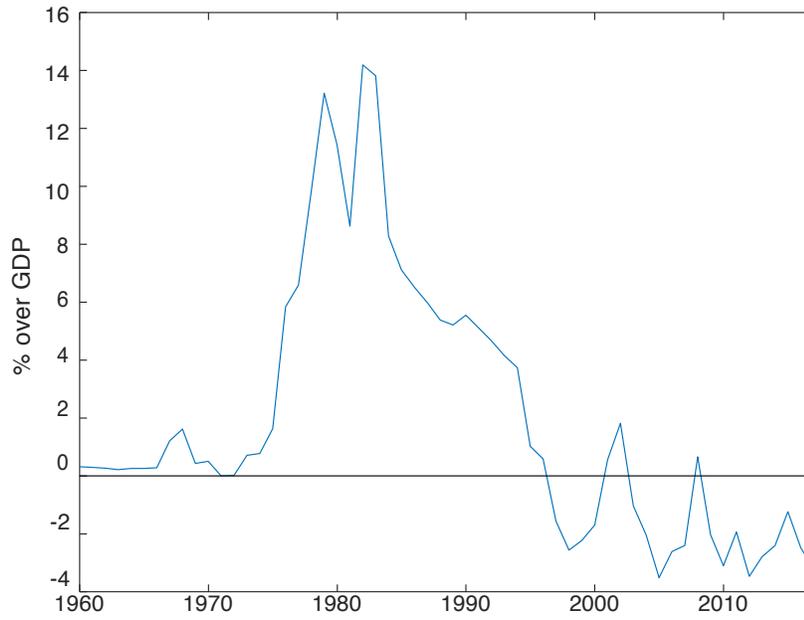
Sources: Central Bank of Chile (2002); Central Bank of Chile, "Chilean External Debt" (1977–2014); Central Bank of Chile, www.bcentral.cl.

Figure 10A: Short- and long-term central bank external debt (as % of GDP)



Sources: Central Bank of Chile (2002); Central Bank of Chile, "Chilean External Debt" (1977–2014); Central Bank of Chile, www.bcentral.cl.

Figure 11A: Net worth of the central bank (as % of GDP)



Source: Central Bank of Chile, www.bcentral.cl.