The Fiscal and Monetary History of Chile
1960-2016*

Rodrigo Caputo
CESS, Oxford University-USACH
rodrigo.caputo@cantab.net

Diego Saravia
Central Bank of Chile
dsaravia@bcentral.cl

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Abstract

Chile 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, that 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 1987, this was a systematic policy followed by all administrations, and helped achieving two different, but related, goals. It contributed to reducing the fiscal debt and enabled the central bank to pursue and independent monetary policy aimed at reducing inflation.

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1 Introduction

Thirty years ago, when referring to the study of the economic history of Chile, Edwards (1985) 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 the 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. Of course, the Chilean economy faces today 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 (Figure 1 to 3), we are able to identify four different phases that are homogenous in terms of outcomes and policies. The first one, from 1960 to 1973, is characterized by a very stable growth path: GDP per capita grew around 2% 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%, although it increased to 100% in 1972. This was not a new phenomenon: inflation had a long history in Chile, becoming entrenched during and after the 1930s. In terms of fiscal policy, this period is characterized by systematic, and mild, fiscal deficits as shown in Figure 3. Until 1970, these deficits were relatively small: on average, 2%. This trend is broken in 1971 and 1972 years in which fiscal deficits reached 8 and 12 per cent of GDP. As with inflation, the existence of mild fiscal deficits was a persistence feature of the Chilean economy, but the figures in 1971 and 1972 where, 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%, relative to the predetermined trend. Then it recovered over a period of five year, so that by 1981 the per capita GDP was almost back to the trend level. In terms of inflation, this period witnessed the exacerbation of the inflationary pressures of the previous phase. In 1973 inflation reached 400% and in 1974, after price controls were removed, it reached 600%. This was the highest inflation

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1 According to World Bank data, per capita GDP in Chile (PPP in constant 2011 US$) increased from US$ 8,995 in 1990 to US$22,707 in 2016. This is an increased of 153%. In the same period per capita GDP in Latin America increased 48%.

2 See Velasco (1994).
levels ever reached in the history of the country. Inflation declined slowly. By 1981 it had reached 20% in a context in which the exchange rate was fixed. The fiscal deficit continue to increase from the previous phase: by 1973 it had reached an unprecedented level of 23% of GDP. From 1974 onwards, there was an important fiscal adjustment. 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. There are, however, two features that are different from the previous episode. The first one 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% on average. The second difference is that inflation increased importantly but did not return to the hyperinflation levels of the early 1970s. As shown in Figure 2 inflation increased from 10% in 1982 to 27% 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 payment crisis of the early 1980s, real per capita GDP declined by 20% between 1981 and 1983, as shown in Figure 1. Then, it gradually recovered, so that in 1990 the per capita GDP was at the same level than 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% in 1991, and declined gradually to 3.5% in 2001. Ten years later, in 2011, the inflation was at the same level: 3.3%. By 2017 inflation was 2.2%. 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% trend. Today real per capita GDP is 24% larger than the level implicit in the constant trend line. In terms of fiscal behavior, as it is clear from Figure 3 the fiscal discipline of the previous decades was maintained: on average, there was a fiscal surplus of 0.9% 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 paper, not all developments can be described in detail. When appropriate, we use the contributions in the literature to rationalize developments observed in the data. In the analysis of the different periods, we use the fiscal budget constraint, described in Chapter 2, as the common conceptual framework. This allows us to associate the sources and uses of funds and to relate them to economic outcomes, like inflationary episodes for example.

3 The data on public deficit include the deficit 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 imports substitution strategy, adopted by many Latin American economies in the 1940s, to market oriented policies, in which the role of the State, both as producer and regulator greatly diminished. In this period Chile was 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 surplus, balance of payment crisis, banking crisis, successful and unsuccessful stabilization plans, together with 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 and hence, movements in these variables could reflect ex profeso 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 results, totals 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 measure 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 or high volatility are associated to relatively high and positive implicit transfers. In Figure 7 shows the implicit transfer as percentage of GDP for every year in the period 1960 to 2016. Implicit transfers increase importantly in the early 1970s and in the early 1980s. Both where 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 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 generated a counterfactual path for the external debt, Figure 10, we can see that the increase in the debt position of the government is not only driven 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 $\tau_t$ 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, specially in the 1960s and 1970s.

Now, we describe in more details 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 the Chilean history, closely related to fiscal deficits and wage indexation. The beginning of the seventies was a period of socialist reforms. In this periods fiscal deficits increased substantially and were financed by money issuance. As a consequence, the high inflation episodes of the previous decades turn 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 turn out to be unsustainable, because in the end the base over which the inflation tax is obtained (money) is reduced significantly during hyperinflation periods.

In the mid seventies, market-oriented reforms were followed and a period of fiscal adjustment begun. The reduction of inflation was relatively slow in the second half of the seventies 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 a large proportion, denominated in foreign currency. Also, they were provided by foreigners through the local financial system. In this context, there was a increase in private absorption financed by banks. Eventually, the fixed exchange rate regime was abandoned and the balance of payment crisis turn 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’s 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 was able, indeed, to succesfully stabilize inflation. The problem, in our view, 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 in 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 were designed to solve the balance of payment crisis along with the financial crisis. To that end, the fiscal authority and the central bank designed a rescue program of the private banks. In this context, the central government implemented austerity measures with two objectives in mind: to prevent the fiscal deficit to increase 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 reached one-single digit values. Despite this fact, inflation was relatively stable and below the hyperinflation levels of the early 1970s.

In 1990 the per-capita GDP was already above, by 12%, 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 pursue an inflation targeting regime. This regime was implemented despite the fact that there was, for more of the 1990s, an exchange rate band. The inflation taget 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 set an inflation target of 3%, with a tolerance range of 1% (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 the view among some economists, 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 support 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 tariff 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. 

During the 60s, the fiscal authority had access, mainly, to foreign debt, which increases from 10% of the GDP in 1960 to 22% in 1969. Internal public debt, on the other hand, was at 7% 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% in 1963 to 30% 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 of 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 was at the heart of the inflationary process. In this context, when Alessandri was elected, in September 1958, an inflationary stabilization policy was implemented. This consisted in reducing the fiscal deficit and fixing the nominal exchange rate to the dollar. The fixed exchange rate lasted until 1962 when a Balance of payment crisis took place (this and 1979-1982 are the only two periods of fixed exchange rates in the whole period of analysis; plus a short attempt in 1970). During 1959, the first year of Alessandri’s government, the fiscal deficit, that averaged 2% of the 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% of the GDP. Besides the fiscal adjustment, Alessandri’s administration pushed (and succeeded) for wage adjustments well below past inflation. In particular, in 1960 wages increased by 10%, despite the fact that past (1959) inflation was 33%. These elements contributed to anchor inflation expectations and increase the credibility of the stabilization plan. In 1960 and 1961, inflation declined to single digit numbers: 5.5% and 9.6% 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% of the GDP. At the same time a balanced of payment crisis took place in 1961 and 1962 inducing the abandonment of the fixed exchange rate and the nominal exchange rate depreciated 33% in October 1962. Soon after the nominal depreciation, prices increased substantially. Inflation increased to 27.7% in 1962 (mostly explained by the events during the last quarter) and to 45.3% in 1963 and 38.5% in 1964. Hence, inflation came back to its historical levels, with a fiscal deficit that, though not exorbitant, seemed to constitute a source of inflationary pressures in a context in which fiscal debt was a stable proportion of GDP (around 30%).

Now, using the budget constraint in Chapter 2, we concluded that financing needs during Alessandri’s administration were, on average, 2.68% of GDP. In the 1961-1964 period, primary fiscal deficits constituted the main fiscal obligation. These deficits, representing 3.20% of GDP, were financed mainly by seignorage (2.21% of GDP) and to a lesser extent by external debt (0.87% of GDP). Transfers, computed as residual, represented a very small proportion of overall financing needs: 0.24% of the GDP. As can be seen in Figure 7, extraordinary transfers (which are calculated as the residual term of 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, seignorage and inflation. Accordingly, the roots of inflation in that period could be traced back to persistent fiscal deficits, as it was the case in the previous administrations.

Frei was elected with 56% of the votes 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 not to impair macro stability. There was certain perception that structural reforms could generate short-run disequilibriums and hence, when there was an accumulation of inflationary pressures, priority was to be given to the restoration of macro stability.

Frei’s program was, in terms of social policies, quite ambitious. The public sector was given a more active role in improving the income distribution and increasing the investment capacity of the economy. Some of the goals of such program were: i) increase real wages in the public sector, ii) increase government expenditure in social areas (education and health, among others) and iii) increase 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 levels of 40% in 1964. The stabilization plan was to be gradual: the government expected to bring down inflation to 25%, 15% and 10% in each of the first three years in office (French-Davis 1973). During the first year in office, 1965, inflation declined to 25%, and in 1966 inflation decline further, to 17%. The fiscal deficit was reduced to 1.5% of GDP in 1966 and continued to adjust in the following years. This in a context in which GDP growth was, on average, 6% in 1965 and 1966. The stabilization program was, at least until 1967, successful. There where two elements that determined that, after 1967, the stabilization plan was no longer viable. First, despite the fact that the fiscal authority increased its savings (fiscal deficit declined importantly) and investment, the national level of investment did not increased enough. Second, wages adjusted much more than was expected initially. During these years, the exchange rate policy followed was of mini-devaluations to prevent real exchange rate appreciation. These
elements put upward pressure to inflation that began to increase in 1967 (21.9%) until the last year of the government, 1970, to 34.9%.

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

In terms of obligations, in this period there was a significant decline in the primary deficit, which moved from 3.2% of GDP during Alessandri’s administration to 0.90%. This decline in obligations, coupled with a sharp increase in funding sources, determined an increase in extraordinary transfers, $\tau_t$, that on average represented 3.99% 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, specially at the end of Frei’s administration. In particular, reserve accumulation represent, on average, 0.8% of GDP in this period. Nationalizations and the financing of public enterprise deficits represent 0.42% and 0.53% of GDP in the same period.

The beginning of the seventies 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. Despite the fact that 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% of votes 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 of most industries. In terms of fiscal policy, an aggressive expansion of the government spending generated an unprecedented increase in the public deficit.

An essential assumption of the economic program was that, in 1970, there was substantial unutilized 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% in 1970 to 7.3% in 1971, whereas nominal growth of high-power money increased from 66% in 1970 to 136% in 1971. Not surprisingly, aggregate demand grew at double-digit rates, 10.5% in 1971, whereas real GDP experienced an expansion of 9.4% with an important decline in the unemployment rate to 3.9%. In the first year of Allende’s government prices did not increase importantly. This fact is attributed to the existence of price controls and 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% of GDP. The rate of growth of high-powered money was 178% and prices, despite the official controls, could not be contained: inflation reached almost 255% on annual basis. 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 firm’s installations by their workers that generated significant output losses. In October 1972, a national strike generated a further decline in activity. In 1972 real output declined by 1.2% and the trade deficit reached 3.5% of GDP. In 1973 the economic crisis deepened. During this year, the fiscal deficit almost doubled, reaching 23% of GDP, the highest level experienced in the previous forty years (see Figure 3). At the same time there were clear sings that the inflationary process was tending towards hyperinflation. In 1973 inflation reached 433% on average whereas the rate of growth of money was 365% (see Figure 4).

The expansionary policies caused a progressive deterioration of the current account deficit, that was 3% 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 importantly during Allende’s administration.

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 the 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 of alternative ways of financing them.


\[7\] Further details in Edwards (1985).
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% to 108%, without inflation experiencing any substantial change (see Figure 4). In fact, in April 1972 inflation was 55% a level which is higher than the one experienced the previous decade. In May 1972, however, inflation increased substantially and, from that date until December 1979, inflation and money growth tended to move together.

In the absence of enough funding to cover both the fiscal deficit and the interest rate payments of the debt, the government had to rely on seigniorage as a source of funding (see Figure 13). As is clear, between 1971 and 1974 the fiscal deficit and seigniorage moved in the same direction. Furthermore, in quantitative terms, the magnitude of increase is quite similar, with the exception of 1973 in which the fiscal deficit, of 22.5% could be highly financed with seigniorage. The evolution of debt, on the other hand, suggests that Allende's government was unwilling (or unable) to increase domestic and foreign borrowing considerably. On one hand, between 1970 and 1973 foreign public debt was almost constant at US$ 2,000 millions. 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% in 1970, to 3.2% in 1973 (Figure 12). This increase was, of course, not enough to finance a fiscal deficit that went, during the same period, from 0.5% to 22.5% of GDP.

The evidence presented so far indicates that fiscal deficits, which increased substantially between 1971 to 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. As shown in Figure 15, 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.

We construct the path of obligations and sources for this period. In the 1971-1973 period financing needs, compared to the 1960s, increase substantially, mainly by the increased importance of fiscal deficits that averaged 9.10% of GDP. These needs were covered, mostly by seigniorage that represented 12.9% of GDP in that period. The availability of external funding and domestic funding in US$ declined importantly during Allende’s administration. Domestic debt in local currency increased, although it could finance a small fraction of overall fiscal needs (representing 0.9% of GDP). Transfers, $\tau_t$, were around 7% of GDP during this period (see Figure 7).

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*Price controls and sticky prices may have contributed to a delayed response of prices to the increase in money growth.*
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 enterprises deficits are much lower than the ones without considering them.

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

In aggregate terms the 1960-1973 period is characterized by the existence of important fiscal deficits financed by seigniorage. This is specially true in the 1970-1973 period, so the average deficit from 1960-1973 of 3.44% of GDP, the seigniorage of 4.43% and the implicit transfers of 3.67% in Table 1 underestimate the values observed in the Allende´s government.

4 From stabilization to BOP crisis: 1974-1981

The armed forces, lead by General Pinochet, took power in September 1973 after a military coup overthrown 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% of GDP in 1973 to 0.4% in 1975) through the elimination of subsidies and the increase in taxes (VAT among others), the reduction of public employment, the re-privatization of public companies that were in 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 year on year variation) increased to more than 700%, reflecting in part the behavior of prices that liberalized.

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% while it was 320%, 283% and 272% in 1974, 1975 and 1976 respectively. The monetary base in real terms contracted in 1973 by 34% while it contracted by 11% in 1974 and 14% in 1975. In 1976 this monetary rate growth in real terms returned to positive values by increasing 24%. 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 crises hit the economy and real output growth declined by 13%. The recession of 1975 was generated by several factors. First, there was an important decline in

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9 In the basic set up, fiscal deficits do not include public enterprises deficits.
10 The grey blocks for the years 1971, 1972 and 1973, explain almost all the transfers.
terms of trade at the end of 1974, with copper prices falling by about 50% in real terms and the price of oil rising by a factor of four. Second, the fiscal adjustment undertaken, which reduced the fiscal deficit to 0.4% of GDP, had an adverse effect on the aggregate demand that in 1975 declined by 21%. Inflation did not decline substantially from the previous year: it was 343% in December 1975. Despite the recession, the reduction of fiscal deficits, the lower rate of growth 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. This was the case until 1978 when the exchange rate followed a predetermined rate of devaluation in an effort to anchor inflation expectations and to reduce inflation. This policy ended with a fixed exchange rate in June 1979. Between 1976 and June 1979 the reduction in inflation and 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 to reduce inflation and to increase international reserves. In 1979 inflation, though not at the level of the early 1970s, was at double-digit levels, 39% at the end of 1979. Eventually, at the beginning of the 80s, inflation was stabilized.

From 1974 to 1976 the seigniorage was an important source of revenues, accounting for 7.4% of GDP on average in those years. Those revenue sources were important in a context in which the burden of the foreign public debt increased. In particular, as a result of nominal exchange rate devaluations, the foreign public debt increased from 27% of GDP in 1973 to over 40% 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 let the nominal rate to devalue, from 1973 onwards, 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 to 1975 increased the burden of public external debt by more than 20% of GDP. Nominal devaluations also increased the burden of domestic debt that, after 1973, was denominated mainly in US dollars (see Figure 12).

In order to assess the impact of the devaluations on the external fiscal debt, we performed a counterfactual exercise in which we fix the level of the real exchange rate from 1974 onwards 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 fact that the devaluation of the exchange rate contributed to a significant increase in the external debt position of the fiscal authority.

\[11\] See De Gregorio (1991) and Corbo and Fischer (1994) who discuss the importance of wage indexation as a self preserving device of inflationary pressures.

\[12\] The nominal exchange rate increased from 0.11 in 1973 to 13.05 in 1976.
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 (Figure 17) and an important contraction in government expenditures (Figure 18). In the period 1974-1981 there was a primary fiscal surplus of 0.6% of GDP. This determined that financial needs during that period declined importantly from those in the previous administration: 5.0% of GDP (Table 1). The country in this period regained access to foreign financial markets and, as a consequence, both external debt interest payments (on average 0.8% of GDP) and external debt (0.3% 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% of GDP. Other sources of financing, external debt and domestic debt denominated in US dollars, accounted for nearly 1% of GDP (Table 1).

The sharp contraction of fiscal deficits in this period along with positive source of financing implied that transfers, $\tau_t$, increased substantially from the previous administration. In particular, these transfers accounted for nearly 7% of GDP and where 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 at the same level as the one observed in 1973. In this counterfactual scenario, transfers in 1974 and 1975 declined importantly. This can be seen in Figure 8 where the green blocks in the years 1974 and 1975 refer to the transfer if the real exchange rate would have been constant.

As discussed above, an objective of the government in the second half of the seventies was to increase the level of reserves. Given that increases of the monetary base could be the consequence of this policy and that it would not have a correlate in the expenditure side of the budget constrain (thus, affecting the transfers) we compare the increases in reserves as a share of output and compare them with the effective transfers that follow from the equation. As it can be seen in Figure 8 the direction and size of the increase in reserves seems likely to be an important factor of 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 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% of GDP. Now we could identify two elements that could partially explain those residuals. First, the impact of large depreciations account for, on average, 1.34% of GDP in that period. Second, reserve accumulation, after the exchange rate was controlled (in 1978) could also explain a important fraction of transfers: 1.24% of
GDP, on average. Now, it is clear that, besides the elements just discussed, there are additional transfers that may have contributed to the residuals. The fraction unexplained is relatively important in two specific years 1974 and 1977. Two possible candidates, whose could be related to contingent transfers associated to pension reforms and/or some fiscal expenses not explicitly stated in the central government budget. In this latter case, we follow Larraín (1991), Larraín and Vergara (2000) and Scheetz (1987), who provide information associated to 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 as a part of the transfers during the mid 1970s. As shown in Figure 8, those 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% of GDP each year.

4.1 External Fragility

In the context of a fixed exchange rate regime, the existence of wage and financial contracts 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, where the main causes of the boom that developed between 1979 and 1981 and of the severe recession that hit the economy in 1982-1983.

The period between 1979 and 1981 was one of 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% of GDP in 1974 and increased to 80% of GDP in 1982.

In addition to the expansion in credit, there was an increase of real wages, indexation of salaries and a reduction of taxes on labor. As a consequence of this, domestic demand expanded significantly: on average it grew at 11% per year, between 1979 to 1981. In the same period, the rate of growth of GDP was, on average, 7.8%. The widening gap between the rate of growth of GDP and the aggregate demand, generated persistent trade balance deficits, that went from 1.7% of GDP in 1979 to 7.8% in 1981. Similarly, the

13 As noted by Diamond and Valdés-Prieto (1994), the program of fiscal tightening that started in 1977 had, as main purpose, to finance the planned reform of social security. It was expected that, as a consequence of this reform, the social security income (contributions) would decline importantly whereas social security benefits (paid by the State) would remain, as a fraction of GDP, constant. This analysis, ex-post, turn to be accurate. In the 1970s the social security deficit of the State was, on average, 2.6% of the GDP. After the 1981 social security reform and until 1990, this deficit was, on average 6.1% of the GDP (Figure 19). The fiscal authority generated, systematically, fiscal surpluses that could more than compensate the fiscal deficit related to social security (Figure 20). This fact, could explained a fraction of transfers observed between 1974 and 1981.
current account deficit grew from 5.6% of GDP in 1979 to 14% in 1981. The behavior of the fiscal authority between 1979 and 1981 was very conservative. In fact, in that period there was a fiscal surplus of 4.1% of GDP on average. 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 21).

After three years in which the exchange rate was fixed, inflation declined to single-digit numbers, 9.5% 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 tablita, from 1975 to 1981 inflation and nominal devaluation moved together. The contemporaneous correlation among these variables is high: 0.96.

Now, 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, put some doubts on the sustainability of the fixed exchange rate policy. Once the exchange rate was devalued, there were no nominal variable to anchor inflation.

This “business cycle” related to a fixed-exchange-rate stabilization was documented in the literature. Kieguel and Leviatan (1990), noted that the Chilean experience is shared by other countries with chronic inflation that stabilized inflation using the exchange rate as the nominal anchor. They noted that the response of the economy to such programs is an initial expansion of consumption and output and 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 was 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 would be abandoned in the future they increase consumption today to take advantage of the lower interest rates. In a 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, in addition, there was a banking crisis that followed the abandonment of the fixed exchange rate, Velasco (1987) presents a model explicitly including a banking sector to study the interaction of macro and financial variables. In this economy, the fragility of the banking sector plus the (implicit) government’s deposit guarantees 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 went up 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 to 63 $ per US$. After a period of instability that went until August of that year,
the exchange rate followed a crawling peg based on a PPP rule, with some discrete and bigger devaluations (September of 1984, 23%, in February and June of 1985 a 5% in each case). The initial devaluation increased the burden of foreign debt deepening the financial crises. 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% and aggregate demand felt by 19%. Unemployment was nearly 20%, even after considering the emergency programs set by the government. The monetary base contracted in real terms by 15% in 1981 and by 41% in 1982 (in both years the nominal monetary base also diminished). The stabilization plans of the late 1970s had failed.\footnote{Although in the year 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 draw again in real terms.}

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 in severe risk the banking system. 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 percentage of GDP, increases from 10.5% to 41.8%. In the same period, the public external debt declined from 54.3% to less than 27% (see Figure 21). 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 a context of a severe recession made many banks insolvent. They could not recover an important proportion of their credits and, as a consequence were not able to pay back their foreign loans.

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. On the other hand, 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 re-establish full access to international capital markets. 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. \footnote{For further discussion, see Edwards (1985) and Corbo and Fischer (1994).}

In order to prevent widespread bankruptcies, the government introduced rescue programs that were implemented, in an important proportion, by the Central Bank.\footnote{The Chilean central bank is autonomous since 1989.} As noted by Sanhueza (2001), the Central Bank undertook three set of measures to save the banking system.
First, the Central Bank distributed subsidies to financial institutions in the form contracts to buy foreign currency at a price below the market equilibrium (the so-called Dólar Preferencial program). Until September 1984 this subsidy corresponded to a 17% of debt service and after that month was a 35% until June 1985 when it ended. The losses of this program incurred by the Central Bank are estimated in 2.4 US$ billion.

Second, different debt restructuring programs were implemented in order to alleviate the situation of debtors. In August of 1982, the Central Bank lent 250 US$ 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 programs to restructure debts were implemented. These last two programs did not imply an increase in the monetary Base because the funds given by the Central Bank to the banks had to be invested in Central Bank’s bonds as required by the targets of the monetary programs agreed 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% par value. Between 1982 and 1987, the Central Bank of Chile offered to buy part of commercial banks’ and finance companies’ risk portfolio, subject to an eventual buy-back of it. The purpose of this measure was to avoid banks going broke. The amount of these operations were the equivalent of 30% of the system’s total outstanding loans for that period, representing 25% of the GDP.

Because of the rescue plan, the Central Bank experienced heavy operational losses. In 1985, as a consequence of having assets with low or zero return and liabilities generating large payments, the Central Bank experienced a operational loss equivalent to 18% of the GDP in that year (see Figure 22). The Central Bank was able to have access to 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 enter the balance sheet of the Central Bank as assets and appear as domestic fiscal debt. In fact in 1985, the fiscal debt was in a large proportion the Treasury bond that was transferred to the Central Bank representing nearly 20% of that year’s GDP (compare Figure 12 and Figure 14).

The total net cost to the Central Bank of the portfolio purchase program was equivalent to 6.7% of the 1983 GDP, when the social cost of capital is used as the discount rate, and it was equivalent to 5.4% of GDP when the cash flow is measured as a proportion of each year’s GDP. [17]

[17] This 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% of GDP, and cash flows from Financial Institutions to the Central Bank for buying back portfolios, which reached 2.2% of the GDP.
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. In the case of Chile, we see in Figure 23 and Figure 24 that the increase in debt, both by the Central Bank and the fiscal authority was concentrated in long-term bonds. As a consequence, the long maturity of debt have 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 27 year Treasury bond. Furthermore, this bond was indexed to inflation and then converted to US dollar in the late 1980s (see Figure 12). As a consequence, debt repudiation was avoided by having an indexed bond or US dollar denominated bond.

The financial crisis and its implications demanded that the focus of the economic policies were concentrated in the recovery of the economy and of a troubled financial sector. Regarding the inflation rate, the goal was to maintain it under control but 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% between 1982 and 1989. In 1988 elections took place and the uncertainty about the change in political regime may have affected the higher inflation rate observed in 1989.

As for the budget constraint accounting used in the paper, during the period from 1982 to 1989, seigniorage reduced its relative importance as a source of financing, representing, on average, 0.5% of GDP. External debt, on the other hand, had negative contribution of 1.0% of GDP (Table 4). In this period, the main source of financing is related to domestic credit in local currency (0.2% of GDP) and domestic credit in US$ (1.7% of GDP). In terms of obligations, the fiscal authority was able to generate a surplus of 1.3% of GDP. The difference between sources and obligations is such that transfers, \( \tau \), represented, on average, 3.8% 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). See 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 the Pinochet’s government, fiscal financing needs were determined, mostly, by the fiscal debt the Treasury acquired with the Central Bank.

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19 This is stressed by Calvo (1988).
With the exception of the years when the crisis where at the peak, fiscal deficits were absent in this period. In the same way, external debt or domestic (private) debt were not important sources of funding (Table 1).


Chile avoided defaulting its, mainly private, external debt. The cost of this strategy was assumed by the Central Bank and the fiscal authority (Treasury) who 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, eventually, paid and the only way to achieve this is by generating fiscal surpluses. This idea, that was 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 meeting future public sector commitments that grow at a higher rate than fiscal revenues, and potential expenditures on contingent liabilities. Furthermore, they also helped financing the Central Bank losses due to the carry-over of quasi fiscal costs of 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 Central Bank’s autonomy since October 1989, the reduction of the inflation rate during the nineties was gradual in order to avoid 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 the, discussed above, 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. At that moment the pressures on the appreciation of the peso dissipated.

The depreciation of the peso make it difficult to continue defending the band in conditions present after the Asian crisis (decline in terms of trade, tighter credit conditions) and in by September of 1999, once uncertainty calmed down, the Central Bank announced the abandonment of the band and inflation became the only explicit and formal target of the monetary authority.

There is the view among some economists, 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 Valdes (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 in 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 Figure 5, 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 of the 1990s are very different. In the former, the exchange rate was the facto de nominal anchor of the economy, whereas in latter case the nominal anchor was the inflation target announced by the central bank.

Summing up, fiscal discipline allowed to transit a smooth road from the troubled eighties to the adoption of an inflation target regime almost ten years later. This, despite the fact that the Central Bank was experiencing operational losses (Figure 22) and has a net worth that steadily declined since the mid 1980s. In particular, in 2010 the net worth of the Central Bank was -3.5% of that year GDP (see Figure 25).

An important fiscal institutional arrangement in Chile is the adoption of a fiscal rule. In 2001 the government implemented a fiscal policy based on a yearly structural surplus of 1% of GDP. The basic logic of the rule is to stabilize public expenditures over the business cycle and the swings of the copper price, 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 a substantial influence in establishing the reference long run value of the copper price 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% 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% 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.

20The Fiscal Responsibility Law of 2006 allowed for setting up two sovereign wealth funds and es-
6.1 Fiscal Rule

The structural balance fiscal rule followed by Chile has experienced several changes over time, although this has been, in theory, countercyclical \[21\] In order to determine the \textit{de facto} nature of the fiscal rule, we discuss some estimation of the fiscal rule in Chile performed by Caputo and Irarrazabal (2015). These rules are estimated according to the specification suggested by Fernández-Villaverde et al. (2011):

\[ v_t = c + \alpha v_{t-1} + \beta (y_m t - \overline{y_m} t) + \gamma (\tau_{cu,t} - \overline{\tau}_{cu,t}) \] (6.1)

where \( v_t = (g_t - \tau_t) / y_m t \), \( g_t \) is government spending, \( \tau_t \) is fiscal income, excluding copper-related revenues, \( y_m \) is the real GDP non-copper, and \( \tau_{cu} \) is the fiscal income (in real terms) related to copper. The bar on top represent the filtered variable (Hodrick-Prescott). If the fiscal authority is following a countercyclical fiscal rule, the coefficients \( \beta \) and \( \gamma \) are expected to be negative. The results for the whole sample indicate that fiscal rule has been countercyclical in the case of non-copper 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 which is not different from zero and a response to copper-related income which is negative and statistically different from zero. For the latter sample period, 2000 to 2014, the response to both the GDP cycle and the price of copper increase (in absolute value) quite importantly. This result suggests that in the last fourteen years the 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 is positive, the fiscal authority generates fiscal surpluses which are, eventually, used to increase the net asset position of fiscal authority. Hence, it is not surprising that during the 2000s transfers increased importantly and not only explained by higher copper prices.

To summarize, after the debt crisis of the early 1980 it was clear that the only way to both, service the debt and avoid nominal volatility was to generate fiscal surpluses. This was 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 explained, 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 13).

\[21\] See (Tapia 2015), (Ffrench-Davis 2016) and Céspedes et al. (2014).
7 Conclusions

In the last fifty years Chile experienced deep structural changes. In the 1960s two different administrations, Alessandri and Frei, attempted to stabilize inflation. Inflation declined in some particular years, but it could not be contained permanently. During Alessandri’s government 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 results, in this period the seignorage 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 the past history. Between 1971 and 1973 the seignorage contributed to finance the central government deficit. In addition, it contributed to finance the public enterprise deficits which represented, on average, 7.2% of GDP in that period.

After the military took power, in September 1973, there were some attempts to stabilize the economy. However, inflation could not be stabilized until the late 1970s. The rate of growth in high-power money, inflation as well as the 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% of GDP. Reserve accumulations and the impact of large depreciations in the early 1970s can explained a fraction of these transfers. The rest could be related to contingent liabilities and/or 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 to an important cost: the banking system collapsed and had to be rescued by the Central Bank and the Treasury. During this period both, seignorage 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 in debt default, but in order to service its debt, the fiscal authority had to generate, consistently over time, surpluses. Since 1987 this was a systematic policy followed by all administrations. This policy helped achieving two different, but related, goals. On the one hand, it contributed to reducing the fiscal debt and, on the other, enabled the central bank to pursue and independent monetary policy aimed at reducing inflation.
In terms of the accounting exercise we implement, we found that there were during the whole period unaccounted transfers of 4% of the GDP on average, between 160 to 2010. Once we include all the potential components associated to the transfers, the residual we obtained is close to 1% of GDP and it fluctuates in a non systematic way.

References


Table 1: Budget Constraint Decomposition: 1960-2016

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<tbody>
<tr>
<td><strong>Sources:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External debt</td>
<td>0.64%</td>
<td>0.33%</td>
<td>-0.99%</td>
<td>-0.03%</td>
</tr>
<tr>
<td>Domestic debt (CLP + Indexed)</td>
<td>0.23%</td>
<td>-0.21%</td>
<td>0.16%</td>
<td>0.60%</td>
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<tr>
<td>Domestic debt (USD)</td>
<td>-0.26%</td>
<td>0.36%</td>
<td>1.65%</td>
<td>-0.69%</td>
</tr>
<tr>
<td>Seigniorage</td>
<td>4.43%</td>
<td>4.53%</td>
<td>0.49%</td>
<td>0.52%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5.04%</td>
<td>5.01%</td>
<td>1.32%</td>
<td>0.40%</td>
</tr>
<tr>
<td><strong>Obligations:</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>External debt interest payment</td>
<td>-0.93%</td>
<td>0.78%</td>
<td>0.63%</td>
<td>0.04%</td>
</tr>
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<td>Domestic debt interest payment (CLP)</td>
<td>-0.89%</td>
<td>-1.35%</td>
<td>-2.14%</td>
<td>-0.12%</td>
</tr>
<tr>
<td>Domestic debt interest payment (USD)</td>
<td>-0.25%</td>
<td>-0.53%</td>
<td>0.26%</td>
<td>0.09%</td>
</tr>
<tr>
<td>Primary Deficit</td>
<td>3.44%</td>
<td>-0.58%</td>
<td>-1.28%</td>
<td>-2.11%</td>
</tr>
<tr>
<td><strong>Partial Total</strong></td>
<td>1.37%</td>
<td>-1.69%</td>
<td>-2.52%</td>
<td>-2.10%</td>
</tr>
<tr>
<td>Implicit Transfers (Residuals)</td>
<td>3.67%</td>
<td>6.70%</td>
<td>3.83%</td>
<td>2.50%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5.04%</td>
<td>5.01%</td>
<td>1.32%</td>
<td>0.40%</td>
</tr>
</tbody>
</table>
Figure 1: Log of per-capita GDP (1960-2017)

Source: World Bank and Central Bank of Chile website www.bcentral.cl
Figure 2: Inflation in log-scale (1960-2017)

Source: Central Bank of Chile.
Figure 3: Public Deficit to GDP (1960-2017)

Source: DIPRES and Central Bank of Chile. Includes the deficits of state owned enterprises.
Figure 4: High-Powered Money Growth and CPI Inflation (annual rates)

Source: National Statistics Institute of Chile, Schmidt-Hebbel and Marshall (1981) and Central Bank of Chile website www.bcentral.cl
Figure 5: Stabilization Phases: Inflation and Devaluations Rates

(sample correlation:0.96)

Panel B: 1990 - 1999
(sample correlation:0.41)

Source: Central Bank of Chile website www.bcentral.cl
Figure 6: Credit to the Private Sector as % of GDP (1960-2017)

Source: World Bank and Central Bank of Chile website www.bcentral.cl
Figure 7: Budget Constraint: Baseline Scenario
Figure 8: Potential Factors Behind the Residuals
Figure 9: Public Internal and External Debt (as % of GDP)

Figure 10: Long-Term Public External Debt: Counterfactual Evolution w/ Constant Real Exchange Rate at 1973 (as % of GDP)

Figure 11: Counterfactual Path for Public Debt

Source: Author’s calculations.
Figure 12: Public Internal Debt (as % of GDP)

Source:
General Comptroller Republic of Chile, 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 13: Seigniorage and Public Deficit (as % of GDP)

Figure 14: Public Internal Debt without Treasury Notes (as % of GDP)

Source: 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 15: Budget Constraint: Obligations

Source:
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 16: Budget Constraint: Sources

Figure 17: Fiscal Revenues Decomposition

Source:
Figure 18: Fiscal Expenditure Decomposition

Source:

Figure 19: Social Security Deficit

Source:
Figure 20: Fiscal Deficit

Source:
Figure 21: Public (with Central Bank) and Private External Debt (as % of GDP)

Source:
Figure 22: Operational Losses of the Chilean Central Bank (as % of GDP)

Source: Central Bank of Chile website www.bcentral.cl
Figure 23: Short and Long Term Public External Debt (as % of GDP)

Source:
Figure 24: Short and Long Term Central Bank External Debt (as % of GDP)

Figure 25: Net Worth of the Central Bank (as % of GDP)

Source: Central Bank of Chile website www.bcentral.cl
8 Appendix : Cagan Model

During hyperinflation episodes, a relevant question is whether the monetary authority is on the right hand side of the Laffer curve. To answer this question we follow Sargent (1977) and Phylaktis and Taylor (1993), and estimate the demand schedule for money as in Cagan (1956). This enable us to use the money demand estimates to calculate the sustained rates of inflation that maximize the flow of real resources that the creators of money could obtain by printing money.

Under a high inflation or a hyperinflationary regime, Cagan (1956) asserted that the demand for money will be largely determined by inflationary expectations, with additional determinants like output and interest rate, playing a relatively minor role. This model can be written as follows:

\[(m_t - p_t) = -\alpha \Delta p^e_{t+1} + \psi_t\]  \hspace{1cm} (8.1)

where \(m\) and \(p\) denote the logarithm of nominal money balances and prices respectively. The variable \(\Delta p^e_{t+1}\) is the expected inflation level in the next period and \(\psi_t\) represents elements of the money demand not captured by the model. The parameter of interest in this model is \(\alpha\), which is the elasticity of real money demand with respect to expected inflation. From this coefficient it is also possible to derive the optimal rate of inflation (the one that maximized seigniorage). The expression for this variable is \(1/\alpha\).

As noted by Phylaktis and Taylor (1993) if \(\psi_t\) is a variable admitting a Wold representation, then \(\psi_t\) will be a stationary but possibly serially correlated series. Now, under conditions of high and accelerating inflation it is possible that both, real balances and inflation are \(I(1)\). In this case it can be probed\(^{22}\) that the linear combination, \((m_t - p_t) + \alpha \Delta p_t\), is stationary. As a consequence, a simple test of the applicability of the hyperinflation model lies in testing whether or not real money balances and contemporaneous inflation are cointegrated. In this case, from the cointegrating vector it is possible to obtain the \(\alpha\) coefficient\(^{23}\).

We check that the real balances and inflation are \(I(1)\) in the sample 1971.01 to 1974.12, which is a period of highest, and more volatile, inflation in the history of Chile. We found that both series are stationary and, applying Johansses cointegration test, we could not reject the hypothesis that there is a long run relationship between the series\(^{24}\). Then we estimate, using the ML approach of Jonansen, a Vector Error Correction Model (VECM). From this procedure we obtain the long-run relationship linking real balances and inflation (i.e. the cointegrating vector) as well as an error correction representation for inflation (i.e. a short-run model for inflation). The estimation results are presented in Table 2.


\(^{23}\)See Cagan (1956).

\(^{24}\)For brevity we do not present the results here, but are available upon request.
We found that the $\alpha$ estimate is close to 12 and that the short-run speed of adjustment in inflation is 0.03.

From the previous estimates, and following Cagan (1956), we concluded that the inflation rate that maximizes seigniorage is $8.29\%$ per month (i.e. $\hat{\alpha}^{-1}$). This value is lower than the average per month inflation rate during 1971-1974, which was $11.65\%$. As a result one may conclude that actual inflation in that period was higher than its “optimal” level. This conclusion, however, does not take into account the fact that in some periods, per month inflation was well above $10\%$. In particular, between January 1971 and September 1973 the per month inflation rate was $8.93\%$. As a consequence, it is possible to argue that, in fact, during the early 1970s (Allende’s government) the monetary authority was on the right hand side of the Laffer curve (see Figure 27, where the ”optimal” annual inflation rate is obtained from our estimation of the Cagan model for Chile. ).

From the previous estimation it is possible to obtain the residuals from the ECM for inflation (last column in Table 2). Those residuals represent the difference between actual inflation and the value predicted by the shot-run model. If this value is positive it means the model is underpredicting inflation and viceversa. Figure 26 plots the residuals for the period 1971 to 1974. Perhaps not surprisingly, the model tends to underpredict inflation in the early 1970s during the hyperinflation period. In particular, the model underpredicts inflation in August 1972, May 1973 and October 1973. Furthermore, the distribution of residuals is apparently non symmetric: underpredictions tend to be more important (in absolute value) than overpredictions.

Why is it important to know if a model was able to predict inflation?. The reason is that the terms in which the public sector could issue debt may depend on whether agents are capable of predicting movements in inflation. For instance, public sector internal debt was issued, mainly, in nominal terms from 1970 to 1973. After that period it seems the private sector was unwilling to lend to the government in Chilean pesos. Instead, most of the internal debt of the government was denominated in US dollars in 1974 and 1975.

To summarize, in the early 1970s there was a clear link between nominal volatility and a high fiscal deficit. The impossibility to increase public debt, in the context of ever expanding fiscal deficits, determined that the only available option to finance an ever increasing public debt, was to print money.
Table 2: Cagan (1956) Model Estimation for Chile

<table>
<thead>
<tr>
<th>Vector Error Correction Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample: 1971M01 1974M12</td>
</tr>
<tr>
<td>Included observations: 48</td>
</tr>
<tr>
<td>Standard errors in ( ) &amp; t-statistics in [ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cointegrating Equation</th>
<th>((m - p)_{t-1})</th>
<th>(\pi_{t-1})</th>
</tr>
</thead>
<tbody>
<tr>
<td>((m - p)_{t-1})</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>(\pi_{t-1})</td>
<td>12.0589</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.19211)</td>
<td>[ -3.77772]</td>
</tr>
<tr>
<td>Constant</td>
<td>-7.50219</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error Correction:</th>
<th>(\Delta(m - p)_t)</th>
<th>(\Delta\pi_t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cointegrating Equation</td>
<td>-0.01074</td>
<td>-0.02685</td>
</tr>
<tr>
<td></td>
<td>(0.0253)</td>
<td>(0.02248)</td>
</tr>
<tr>
<td></td>
<td>[-0.42447]</td>
<td>[-1.19460]</td>
</tr>
<tr>
<td>(\Delta(m - p)_{t-1})</td>
<td>-0.01931</td>
<td>0.388338</td>
</tr>
<tr>
<td></td>
<td>(0.26413)</td>
<td>(0.23465)</td>
</tr>
<tr>
<td></td>
<td>[-0.07311]</td>
<td>[ 1.65497]</td>
</tr>
<tr>
<td>(\Delta\pi_{t-1})</td>
<td>-0.07564</td>
<td>-0.05473</td>
</tr>
<tr>
<td></td>
<td>(0.17576)</td>
<td>(0.15614)</td>
</tr>
<tr>
<td></td>
<td>[-0.43037]</td>
<td>[-0.35049]</td>
</tr>
<tr>
<td>C</td>
<td>-0.00419</td>
<td>0.004344</td>
</tr>
<tr>
<td></td>
<td>(0.01514)</td>
<td>(0.01345)</td>
</tr>
<tr>
<td></td>
<td>[-0.27692]</td>
<td>[ 0.32299]</td>
</tr>
</tbody>
</table>

| R-squared          | 0.027013          | 0.377698        |
| Adj. R-squared     | -0.03933          | 0.335269        |
| Sum sq. resid      | 0.479826          | 0.37868         |
| S.E. equation      | 0.104428          | 0.09277         |
| F-statistic        | 0.407195          | 8.901748        |
| Log likelihood     | 42.42373          | 48.10532        |
| Akaike AIC         | -1.60099          | -1.83772        |
| Schwarz SC         | -1.44506          | -1.68179        |
| Mean dependent     | -0.00423          | 0.002137        |
| S.D. dependent     | 0.102433          | 0.113785        |

| Determinant resid covariance (dof adj.) | 1.94E-05 |
| Determinant resid covariance              | 1.63E-05 |
| Log likelihood                             | 128.4232 |
| Akaike information criterion               | -4.9343 |
| Schwarz criterion                          | -4.54447 |
Figure 26: Residuals: ECM for Inflation
Figure 27: Laffer Curve between 1970 - 1974

Table 3: Inflation and Seigniorage

<table>
<thead>
<tr>
<th>Year</th>
<th>$\pi_t$ (YoY mean variation)</th>
<th>$\Delta M_t / P_t$ (in 1969 $)</th>
<th>$\Delta M_t / P_t y_t$ (as % of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>32.63%</td>
<td>2.404</td>
<td>3.35%</td>
</tr>
<tr>
<td>1971</td>
<td>22.09%</td>
<td>6.721</td>
<td>8.56%</td>
</tr>
<tr>
<td>1972</td>
<td>112.56%</td>
<td>9.784</td>
<td>12.62%</td>
</tr>
<tr>
<td>1973</td>
<td>432.82%</td>
<td>10.464</td>
<td>14.21%</td>
</tr>
<tr>
<td>1974</td>
<td>599.93%</td>
<td>6.087</td>
<td>8.05%</td>
</tr>
<tr>
<td>1975</td>
<td>383.12%</td>
<td>4.678</td>
<td>7.12%</td>
</tr>
<tr>
<td>1976</td>
<td>251.40%</td>
<td>4.893</td>
<td>7.18%</td>
</tr>
<tr>
<td>1977</td>
<td>123.42%</td>
<td>2.772</td>
<td>3.69%</td>
</tr>
<tr>
<td>1978</td>
<td>51.59%</td>
<td>2.254</td>
<td>2.78%</td>
</tr>
<tr>
<td>1979</td>
<td>36.28%</td>
<td>2.342</td>
<td>2.66%</td>
</tr>
<tr>
<td>1980</td>
<td>35.65%</td>
<td>1.866</td>
<td>1.96%</td>
</tr>
<tr>
<td>1981</td>
<td>20.25%</td>
<td>-0.393</td>
<td>-0.39%</td>
</tr>
</tbody>
</table>