The copper sector, fiscal rules, and stabilization funds in Chile

Scope and limits

Andres Solimano[1] and Diego Calderón Guajardo[2]

March 2017

United Nations University World Institute for Development Economics Research

wider.unu.edu

Abstract: Historically, Chile has been an economy dominated by mineral and agro-industrial products and subject to frequent external shocks particularly in copper prices. Since the 1980s, the authorities have developed various mechanisms to cope with these shocks and dampen their effects on the domestic business cycle. These mechanisms include a fiscal rule, an economic and social stabilization fund, a pension reserve fund, and a (informal) 'defence fund'. The first two sovereign wealth funds are regulated by a Fiscal Responsibility Law and complemented by a flexible exchange rate regime and an autonomous Central Bank. This paper recognizes that this macro framework has been associated (causality is another matter) with reasonably good macro outcomes. However, the paper highlights some trade-offs and questions not always recognized in evaluations of the Chilean case and cautions against a blind endorsement of macro rules as the cornerstone for good macro management. In general, this framework entails more discretion than often portrayed and includes: (i) frequent revisions in the methodology that affects the fiscal rule and the level of the structural balance by the authorities, thereby reducing its anchoring role on expectations and policy predictability; (ii) SWFs tend to have clear rules for accumulating resources at good times but no rules for using them at bad times; and (iii) a possible bias to over-accumulation of resources in SWFs without paying attention to the opportunity cost of over-investing in stabilization funds at the cost of less resources being available for funding egalitarian social policy in a high-inequality country.

---

[1] International Center for Globalization and International Development (CIGLOB), Santiago, Chile, corresponding author: asolimano@ciglob.org, asolimano@gmail.com; [2] University of Chile, Santiago, Chile.

1   Introduction

The copper sector constitutes the main export product, the main source of fiscal revenues, foreign exchange, and national income in the Chilean economy. Its price is affected by both changes in productive demand (chiefly in the construction sector and industry in copper-importing countries) and speculation in metals markets. Copper price volatility can have major macroeconomic consequences on the internal economy. Since the 1980s and more aggressively in the 2000s, Chile developed macroeconomic mechanisms to deal with this volatility.

After the nitrate cycle faded away in the 1930s, copper started to play a pivotal role but mines were owned and exploited by foreign corporations (mostly originating in the United States) under often-generous tax policies and repatriation of dividends arrangements. In this context, 'Chilenization' (mixed public–private partnership) policies were developed in the 1960s to be followed by nationalization in 1971 (approved by the Chilean Congress with the unanimous support of all political parties) that gave the full responsibility of property and management of copper mines to the Chilean state. Those policies were initially maintained by the military regime after the coup of 1973 but then gradually reversed as the country embarked on a neoliberal economic model. As early as 1974 a decree law (DL 600) to attract foreign investment was enacted that provided tax, repatriation, and property protection for foreign corporations. This was followed in the 1980s by a mining code for foreign corporations that paved the way for a steady privatization of the large-scale copper production sector. In the 2000s, the policy regime regarding mining established low royalties and moderate taxes to foreign direct investment along with generous leasing and concession agreements to private investors. However, the prevailing constitution, approved in 1980 and still ruling, maintained several provisos of the nationalization policies of 1971.

At macroeconomic level, the Chilean government created the copper stabilization fund (CSF) in 1987. The copper fund accumulated resources when the current price was higher than a reference price and drew down funds accumulated in previous periods when the current price was below that reference price. This was followed by a fiscal rule (2001) and later by a law of fiscal responsibility in 2006 that created the economic and social stabilization fund (ESSF) that replaced the existing CSF and created the pension reserve fund (PRF). The ESSF is oriented to dampen the effects of changes in international copper prices and copper demand on domestic economic activity (output, investment, and employment), the balance of payments, and the fiscal budget. As the revenues from the copper sector are a main source of fiscal revenues this would help ensure a more stable stream of revenues for the state and, in principle, avoid cycles of expansion and contraction in public expenditure.

The *fiscal rule* was to operate under the principle that 'permanent' spending should follow 'permanent' revenues (determining what is permanent in an uncertain and volatile world is not easy) and was expected to contain fiscal spending and isolate it from political and social pressures.

In addition to the ESSF and PRF, there is an opaque fund managed by the Ministry of National Defence and the Chilean armed forces. Since 1976, a 'secret' copper law introduced by the military regime of General Augusto Pinochet sanctioned that 10 per cent of gross annual revenues of the Corporación Nacional del Cobre de Chile (CODELCO, the copper state-owned company) must be transferred to this fund to finance the acquisition of military equipment. This law is still in operation and prevents congressional accountability of these transfers.

The rest of this paper is organized as follows. Section 2 provides a brief historical background of the evolution of the copper sector since the 1930s to the present and focuses on the relationship

between gross domestic product (GDP) and investment cycles and copper price cycles, considering also policy and other external shocks, in the last four to five decades. Section 3 documents the evolving institutional regime (affecting the property of mines, taxation, and concession schemes) governing the copper sector since the 1950s until the present, consisting of dominant foreign-ownership, Chilenization, nationalization, and then gradual de-facto privatization. Section 4 shows the interplay between fiscal shocks, fiscal rules, and stabilization funds [sovereign wealth funds (SWFs)] and provides additional detail on how the funds were created, their rules of operation, and their expected benefits and management costs. Section 5 evaluates the existing macro framework in Chile to cope with external cycles, highlighting also some open questions (and loose ends) regarding the optimal level of resource accumulation of these funds in an economy of high inequality and pending social demands and the prevailing discretion governing the use of funds at bad times. It also touches on issues about the level of taxation in mining, current ownership/leasing arrangements, and the primacy given to defence spending in the allocation of part of CODELCO's gross revenues.

2   Brief historical background of a mineral exporting economy and cycles related to the copper sector

Historically, Chile has been reliant on natural resources such as nitrate, copper, coal, gold, wheat, and other commodities for its development process. Two long cycles of commodity dependence can be distinguished: the *nitrate commodity cycle* of boom and decline that started around 1880 until its eventual decay in the early 1930s, and a *copper cycle* that started in the 1930s until today. In the period 1900–20, nitrate exports accounted for 65–80 per cent of total exports, which, in turn, represented nearly 40 per cent of GDP (Cariola and Sunkel, 1982; Meller 2006). The government imposed an export duty on nitrate that financed nearly 50 per cent of total public expenditure. Eventually, the boom of Chilean natural nitrate came to an end when Germany managed to develop synthetic nitrate at a lower cost; as a consequence, the Chilean production of nitrate declined by nearly 75 per cent between 1928 and 1934 (Díaz et al. 2016), prompting an economic and social crisis in the country. Since the 1930s, copper started to replace nitrate as the main export commodity, mainly directed to the American market.

Owing to the adverse effects of the Great Depression in core economies that hit Chile very hard in the first half of the 1930s, the country switched from a commodity export-oriented growth pattern into an import-substitution growth and industrialization strategy. In the period 1950–70, the importance of exports in GDP declined sharply and fluctuated between 7 and 9 per cent. Copper income at that time represented 55–65 per cent of exports and 15–30 per cent of total fiscal revenues.[1]

---

[1] In the last 55 years, reflecting Chile's effort at diversifying its export base from the share of copper in total exports declined from nearly 70 per cent in the 1960s to 46 per cent in 2000–09, followed by a small increase again by 2010–14 when the share moved slightly above the 50 per cent mark (see Table 1). However, as a proportion of gross domestic product (GDP), copper exports doubled from 8.1 per cent in 1960–69 to 16.4 per cent in 2010–14.

Table 1: Annual average copper exports in Chile, 1960–2014

	1960–69	1970–79	1980–89	1990–99	2000–09	2010–14	1960–2014
US millions (2014)	3582	5017	4978	7695	23,316	42,754	11,994
Percentage of total exports	68.9	63.9	45.8	37.8	45.7	53.9	52.5
Percentage of GDP	8.1	9.4	9.4	8.3	14.9	16.4	10.6

Source: Authors' elaboration based on DIPRES (2016).

2.1 The copper sector, policy shocks, and macroeconomic cycles

In macroeconomic terms, we observe a broad positive correlation between growth and investment cycles on the one hand and the evolution of real copper prices on the other, perhaps acting with some lags (see Figure 1). The dominant pattern is that years of slow GDP expansion, including episodes of negative growth (recessions and depressions) have, often, followed a reduction in real copper prices. These cycles also have been accompanied by adjustments in other variables such as investment, employment, and the real exchange rate.[2] Because of the importance of the copper sector and the country's trade and financial openness, Chile has developed a set of fiscal rules and SWFs to deal, with varying degrees of success, with external shocks, especially volatility of copper prices.[3]

A well-established regularity is that investment is highly pro-cyclical moving closely with but adjusting more than GDP, particularly in recession years (see Figure 2). The two main recessions/depressions in the period 1970–2015 took place in 1975 (associated with anti-inflationary shock policies and a decline in the price of copper) and in 1982–83 (led by a domestic financial crisis following unregulated banking deregulation and a currency crisis) (see Solimano 2012). In these two short but deep 'depressions', GDP declined sharply, on average, between 12 and 16 per cent, and investment contracted further in the range of 20–35 per cent. Then, there were two other years of negative growth—1999 (a follow-up of the effects of the Asian and Russian crises) and 2009 (following the global financial crises)—in which GDP contracted between −1.2 and −1.5 per cent each year and investment declined between 10 and 15 per cent.[4] As could be expected, in these four episodes of recession and depression the cut in investment was several times greater than the decline in GDP. In turn, the durations of the recoveries/expansions after these recessions/depressions were of variable magnitude, the longest being the period 1984–2008 after the depression of 1982–83 and before the recession of 2009.

---

[2] Variations in the price of copper are closely related to external economic activity (chiefly in the construction sector and industry) and also to financial speculation in commodities in what looks like a mean-reversing process.

[3] Several objective evaluations of these rules have been positive, although with some recommendations regarding forecast methodology, and have marked these policies as a successful example of natural resources boom management from a macroeconomic perspective (Céspedes et al. 2014; Frankel 2011). However, as we argue below these evaluations tend to overlook the opportunity cost involved in the accumulation of resources in stabilization funds and neglect the lack of rules governing the use of funds. Moreover, in terms of its output composition, the Chilean economy is still heavily concentrated in mining and services with a reduced share of the manufacturing sector in GDP, suggesting tendencies to de-industrialization (Solimano and Schaper 2015).

[4] Historically, the mining industry has been the sector that contributes the most to total investment given its capital intensity and the lumpy nature of investment. In the period 2008–14, mining investments represented nearly a quarter of total gross fixed capital formation. Mining accounted for roughly 30 per cent of total foreign direct investment from 1974 and 2015 equivalent to US$ 37,700 million.
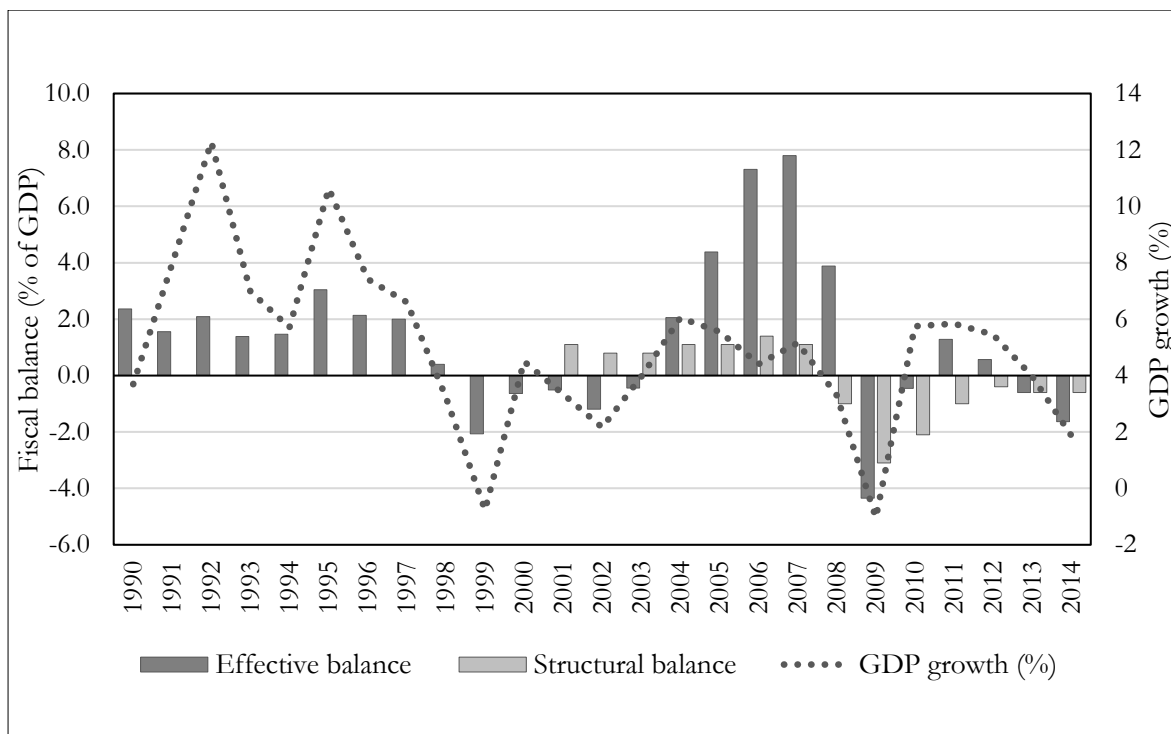
Figure 1: Gross domestic product (GDP) growth, investment, and real copper price, 1960–2015
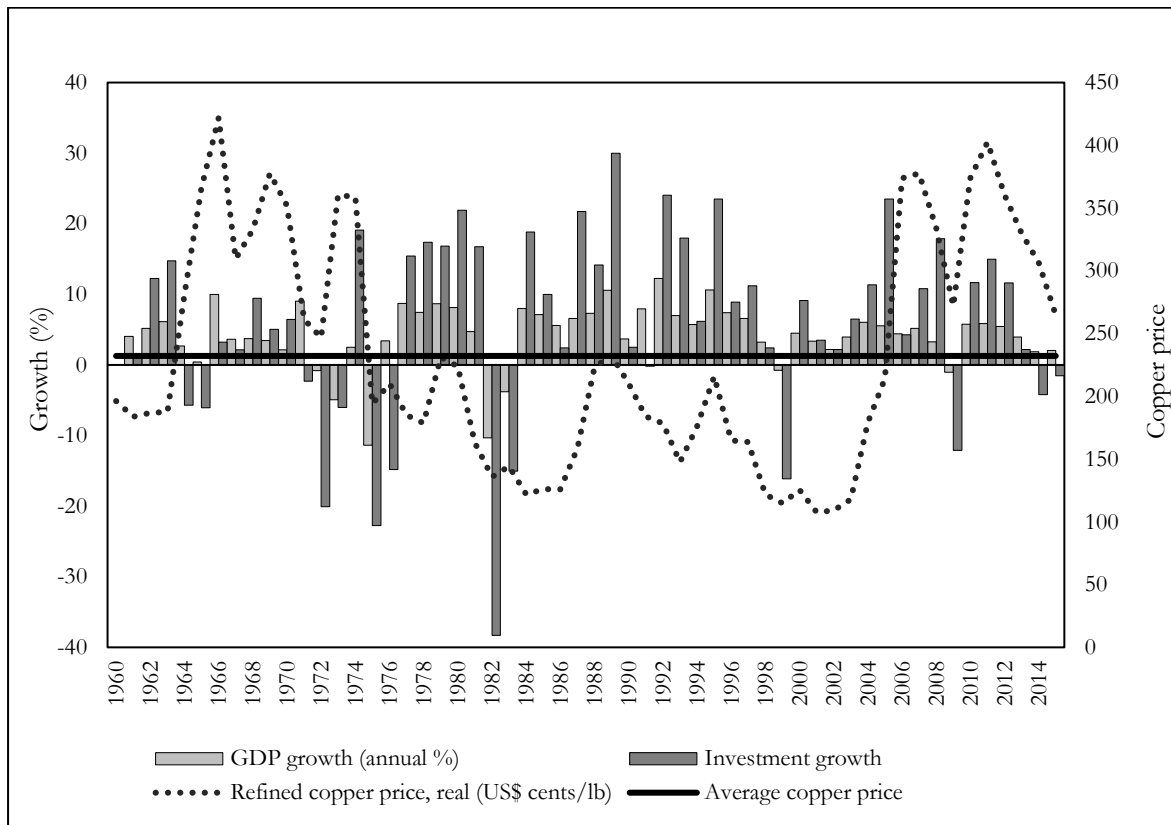
Notes: Deflator: US producer price index (all commodities)

Source: Authors' elaboration based on World Development Indicators, Central Bank of Chile, and Cochilco (2016).

Figure 2: Fiscal balance, 1990–2014

Source: Authors' elaboration based on DIPRES (2015a).

3   The evolving institutional framework of the mining sector: the cycle of foreign ownership, nationalization, and de-facto privatization

Historically, the institutional framework ruling the copper sector in Chile has been affected by the dominant role played by foreign corporations (mainly American) in the mining sector. Arrangements affecting prices, taxes, royalties, and other factors did not always benefit the Chilean nation. In fact, following the Second World War (1939–45) and at the start of the Korean War (1950–53), the American government decided, unilaterally, to fix the copper price (at 24.5 cents/lb), which was a level less than half the market price (54.5 cents/lb). As the United States was the main buyer of Chilean copper this led to losses of export earnings and was a major concern for the Chilean authorities (Millán 2006). A commission was sent to Washington DC to claim retribution for this decision and a Washington Agreement was signed in 1951. This arrangement allowed the Chilean State, through the Central Bank, to dispose of 20 per cent of copper production by buying it from American companies in Chile at the fixed price and then selling it at its market price to other countries.[5] This unfavourable agreement did not appease Chilean demands and in 1955 the New Deal law was established in order to promote copper production and to regulate the tax structure of mining industry. The shortcomings of this agreement in the following years paved the way for the Chilenización del Cobre ('Chilenization of copper') adopted under the Christian Democrat President Eduardo Frei Montalva (1964–70). The Chilenization law no. 16.425 of January 1966 created copper public–private joint companies in which the Chilean state would buy 51 per cent of the property of the copper mines over a period of 15 years. This was the first serious, albeit cautious, attempt to recover Chile's natural resources base for national development.

In 1970, the political winds had changed in Chile and a socialist president, Salvador Allende, was elected by popular vote (despite active Nixon–Kissinger covert destabilization efforts, now documented by official United States Congress records). Once in government, Allende sent to Congress a law to nationalize copper mines. In July 1971, the country's Constitution was modified with the unanimous support of representatives of all political parties, from conservatives to communists, and copper mines were nationalized.[6]

On 11 September 1973, the Allende government was ousted by a bloody military coup led by General Augusto Pinochet (appointed as chief commander of the army by Allende in August 1973). Once in power, the military junta started talks with copper companies in the United States (Anaconda and Kennecott) to rapidly compensate American corporations affected by nationalization approved by the previous parliament (that had been closed by the army after the military coup). Friendly policy towards foreign investment in the copper sector and other activities started to develop, although the nationalization of copper mines was not officially reversed by the military government (Solimano 2012). As mentioned before, in 1976 CODELCO was established and given the mission of managing the copper companies that were nationalized in the Allende period. Contrary to what happened to other public companies, CODELCO was not included in the several massive privatization programmes undertaken during Pinochet's dictatorship (also see Box 1). That same year, a highly controversial secret law dating from 1958—the Copper Restricted Law—directed to fund the acquisition of military equipment and weapons out of copper sector

---

[5] Copper exports were allowed in those years of the cold war only to countries that were not considered 'enemies of democracy' as defined by the United States government.

[6] A technical commission of the Chilean government made an assessment that accumulated earnings of foreign mining companies since their creation were 'excessive' and the Chilean government refused American demands for further compensation. This action reinforced Richard Nixon's determination to destabilize the Allende government.

profits was modified. As noted before, the new copper law (maintaining its secret status) stated that '10 per cent of gross revenues of CODELCO' were to be directed to finance military purchases by the Chilean armed forces *without* the standard overseeing (formal accountability) by parliament and the general comptroller of the country. A minimum annual transfer of US$90 million was set at that time. This copper law at the time of this writing is still in force. In 2015, the total annual defence budget of Chile, according to the Swedish International Peace Research Institute, is over US$5 billion.[7]

Box 1: Nationalization and privatization in the copper sector

The legal framework governing the copper/mining sector contains somewhat conflicting provisos. On the one hand, the regulations of the 1971 nationalization were incorporated in the constitution of 1980 (approved during the Pinochet regime). On the other hand, very corporate-friendly supplementary legislation was passed in 1982–83, known as the Organic Law of Mining Concessions (1982) and the Mining Code (1983), in order to promote overseas investment in mining. The contradictory nature of this overlapping of constitutional provisions and subsequent laws is apparent if we read Article 24 of the ruling Constitution stating that 'the State has absolute, exclusive, inalienable and imprescriptible domain over all mines and resources underneath Chilean soil' (reflecting the flavour of the 1971 nationalization). However, at the same time the 1980 constitution gives priority to private property rights (over social rights) and mining concessions (leasing arrangements granted by the state) can be extended indefinitely without limit with the holders of leasing rights (concessioners) having the priority to renew them—even over claims of the Chilean state—by paying very small fees (less than US$10 per hectare per year according to specificities of the surface). In addition, if the Chilean state were to nationalize private mining companies (either national or foreign), it would have to compensate private companies with a monetary sum equal to the present discounted value of the estimated future cash flows of the project. In practice, the pro-private companies mining code has dominated and the copper sector has been progressively denationalized/privatized with the property of mines concentrating increasingly in private companies that enjoy an incumbent status. As they have priority to renew the leasing arrangements (at an extremely low cost) this has also discouraged the entry of new competitors.[8]

It is important to note that, owing to its corporate governance and tax regime, CODELCO—as with all the public companies—is subject to an extra 40 per cent tax over profits which represents an extra extraction of its net revenues besides the resources transferred to the armed forces through the secret copper law. Currently, with low copper prices, this framework has turned CODELCO into a company with a potentially vulnerable financial situation that is affecting its ability to undertake its investment planning in future years. Despite its huge profits, CODELCO's debt grew by 247 per cent between 2004 and 2015 as it transferred to the state treasury an accumulated amount of US$56,000 million in the same period (the highest financial transfer in CODELCO's history).

The history of the mining sector legislation since the military regime included, as indicated, DL 600 established in 1974, and ruling today, that allows unlimited repatriation of profits by foreign investors and the option of an invariant tax structure to investments made under this regulation. Tax invariability and loopholes have made Chile one of the most attractive mining destinations for foreign investors. In response, foreign direct investment in mining started to pick-up a few years after the return to democracy (rather than during the period of authoritarian rule itself) and the

---

[7] Currently, several previous commanders-in-chief of the army and high-rank generals are under investigation, accused of illicit and corrupt management practices of funds coming from the secret copper law.

[8] For more detail on the effects of the mining code, see Cochilco (2013).

post-Pinochet governments have maintained, on the whole, the mining legislation enacted by the General.[9]

In 2003, the Chilean Congress appointed a special commission to study the possibility of introducing new private-sector mining taxation arrangements in response to a series of allegations of persistent practices of tax avoidance and after a decade of massive foreign investment into the mining sector.[10] This congressional special commission identified various legal mechanisms used by private corporations to declare negative profits such as transfer pricing, fraudulent forward manipulations, accelerated depreciation, and debt interest payments After extended political discussion and lobbying by the mining companies, in 2005, the specific mining tax (SMT)—that taxed profits but not the value of sales or physical production as the traditional concept of royalty—was passed into a law.[11] Unfortunately, this royalty (SMT) contributed only about 1 per cent of total fiscal revenues and 5 per cent of total mining taxes between 2006 and 2015 (Table 2). The fact that the royalty is levied on profits rather than on the value of production along with practices of diminishing profits may account for this meagre revenue.

Table 2: Parametric changes in relevant variable and effects on effective and structural fiscal incomes by sector, 2014

Variable	Unit of change	Effective income		Structural income	
		US$ million	Percentage of effective income	US$ million	Percentage of structural income
CODELCO					
Copper price (CODELCO)	1 cent (US$)	−36.1	−1.5	−0.1	0.0
Copper production	1% change	−17.0	−0.7	−21.7	−0.7
Nominal exchange rate	1 peso (CLP$)	−4.2	−0.2	−5.7	−0.2
Production cost per unit	1 cent (US$)	−36.1	−1.5	−36.1	−1.1
Reference copper price	1 cent (US$)	0.0	0.0	−36.0	−1.1
GMP-10					
Copper price (BML)	1 cent (US$)	−11.4	−0.5	0.3	0.0
Copper production	1% change	−34.3	−1.4	−33.5	−1.5
Nominal exchange rate	1 peso (CLP$)	−4.3	−0.2	−4.5	−0.2
Production cost per unit	1 cent (US$)	−5.1	−0.2	−5.1	−0.2
Reference copper price	1 cent (US$)	0.0	0.0	−11.8	−0.5

Source: Authors' elaboration based on DIPRES (2016).

4   A macroeconomic perspective: orthodoxy, fiscal rule, and stabilization funds

Chile's economic performance in recent decades is often presented as a case of sound macroeconomic management by international financial institutions such as the World Bank and the International Monetary Fund (IMF) and the international financial community. The policies in place provide an almost textbook example of macroeconomic orthodoxy combining inflation targeting, a fiscal rule, a free-floating exchange rate, and an open capital account. The Fiscal

---

[9] Accounting schemes (non-penalized) have been used for purposes of tax avoidance. Very favourable conditions for foreign investors embedded in DL 600: 'Is too good to be true, and the companies know it,' said Radomiro Tomic, a copper expert, former Chilean ambassador to the United States, and a prominent political leader who happened to be the Christian Democratic party's presidential candidate in the 1970 elections running against Salvador Allende and Jorge Alessandri, to the *Washington Post* in 1982 to reflect the business climate of those years (Diehl 1982).

[10] According to former Senator Jorge Lavandero Illanes (former head of the Mining Commission in Congress), only 2 of 47 private copper companies paid taxes to the government between 1995 and 2002 (Lavandero Illanes 2003).

[11] Specifically, the specific mining tax is not a royalty because it taxes profits rather than revenues. Therefore, there is a double incentive to underestimate revenues and to overestimate costs.

Responsibility Law of 2006 is supported by the fiscal rule and two formal SWFs (to manage the budget surplus generated at the time of copper price booms): the ESSF that has accumulated, by mid-2016, near US$16 billion and the PRF, running a surplus of US$8.3 billion.[12] A third, relatively hidden fund is constituted by the surplus accumulated by the (secret) copper law aimed to benefit the armed forces that has accumulated near US$5 billion. Thus, over US$30 billion are held in the three stabilization funds, not a minor amount for a US$300 billion GDP economy.

The literature evaluating these arrangements suggests that they have succeeded in reducing economic volatility stemming from terms of trade shocks and other internal and external shocks affecting the macro economy. For example, Franken et al. (2006) show that the reduction in GDP volatility between 1991 and 2003 was associated with a reduction in the volatility of the monetary and fiscal stance. Larraín and Parrado (2008) find that roughly 60 per cent of GDP volatility reduction is related to the fiscal rule and the prevailing flexible exchange rate regime. Furthermore, De Gregorio and Labbé (2011) show that the Chilean economy has become increasingly resilient to copper price shocks since 1985, and especially since the 2000s owing to its macroeconomic framework. Céspedes et al. (2014) show that the policy mix adopted by Chile allowed a strong *countercyclical* fiscal response to the global financial crisis of 2008–09 (the countercyclical fiscal stance was not pursued after the decline in copper prices since 2013).

An early attempt to manage the impact of the volatility in copper prices was the Copper Revenue Compensation Fund (CRCF) created in 1987. This fund aimed at preventing the occurrence of fiscally induced economic cycles at the time of upward movements in international copper prices (e.g. governments have a propensity to pro-cyclically increase public spending at times of enhanced fiscal revenues). The CRCF was set to accumulate resources (savings) when the copper price was higher than a long-term reference price (set by the fiscal authorities); in turn, accumulated resources could be spent when the copper price was lower than the reference price. According to the Chilean budget office (DIPRES 2016), the CRCF was successful in managing price booms by reducing external debt and unsustainable government spending. The resources of the CRCF were used after the Asian crisis (1998–2003) and before that in 1993 and 1994.

Despite a prudent fiscal policy during the 1990s, a more sophisticated framework was later adopted to tie the hands of fiscal authorities. In 2001, the administration of President Ricardo Lagos created a fiscal rule that implied the calculation of a 'structural balance' (SB). This was intended to operate as a self-imposed policy of fiscal restraint. The idea behind the structural fiscal rule is simple but not without problems of implementation: fiscal spending should follow 'long-run' (*permanent*) values of the price of copper, GDP growth, and other key parameters affecting the budget. However, determining what is permanent can be tricky, particularly in the case of copper prices (a variable with a strong random component), and nor is potential GDP growth a simple concept to define and forecast.[13] It is apparent that a main role of the fiscal rule is of a political–economic nature: it provides a (scientific) disciplinary device, supported by the wisdom of economic experts and aided by the principles of inter-temporal macroeconomic theory, for governments to contain social and political demands for higher public spending, particularly in a very inegalitarian society as Chile.

---

[12] The Economic and Social Stabilization Fund (ESSF) is an amended and extended legal formalization of the Copper Revenue Compensation Fund established in 1987. The Pension Reserve Fund (PRF) is a special fund dedicated exclusively to guarantee the sustainability of state-funded pension payments.

[13] Expert committees were appointed and asked to determine the permanent values of key parameters to be used by fiscal authorities.

The Fiscal Responsibility Act was approved under the first administration of President Michelle Bachelet in 2006. The SB rule improved its methodology of income measurement and in 2011, under the administration of President Sebastián Piñera, a second generation methodology was applied, giving rise to the cyclically adjusted (fiscal) balance (DIPRES 2011). Again, an advisory fiscal council was convened in 2013 to monitor the operation of the new rule.

In Figure 2, we can observe the evolution of the SB rule (based on the fiscal balance evaluated at the estimated long-run values of copper prices and GDP) over the business cycle. We can observe, as expected, that the evolution of the SB is smoother than that of the current (effective) balance. The changes (deterioration) in the current (effective) balance were significant during the Asian financial crisis of 1997 (at that time there was only the CRCF) and also during the global crisis of 2008. In 2009, an aggressive countercyclical fiscal expansion was adopted by the fiscal authorities.[14] Between 1990 and 2008, there had been, on average, a surplus in the effective fiscal balance in Chile of 1.9 per cent of GDP. However, by contrast in 2009 the budget ran an effective deficit of 4.4 percentage points of GDP as a consequence of the cyclical decline in revenues and the effect of a large fiscal expansion.

It can be argued that the fiscal rule prevented an unsustainable increase in public expenditure in the period of the copper price boom through 2007, and before the global turbulence of 2008–09. In fact, between 2003 and 2007, when the copper price increased by 220 per cent in real terms, the structural fiscal balance averaged 1.1 per cent of GDP whereas the effective surplus was 4.2 per cent of GDP in the same period. This means that around 3 percentage points of GDP were saved by the Chilean state in the SWFs during 2003 and 2007.[15]

As mentioned previously, after the global financial crisis, a combination of countercyclical fiscal policy and expansive monetary policy was adopted in Chile. According to Céspedes et al. (2014), close to US$4 billion from the ESSF (2.8 per cent of GDP) was assigned to the economic recovery in January 2009 (later during that same year more money was spent) with several measures driven by the Central Bank, such as stopping the accumulation of reserves, easing collateral requirement of repo operations, and temporarily loosening rules regarding bank reserves. As we can see in Figure 2, the SB has remained consistently negative since then.

The structural fiscal balance rule allows government spending expansions only when there is an increase in structural incomes driven by long-term copper prices and potential GDP growth (see Box 2 and Table 2). If the target for the structural budget is set at 1 per cent of GDP, this means that expenditure for the next year will be 1 per cent of GDP lower than structural income. To obtain structural estimates of potential GDP and long-run copper prices, members of expert teams provide their estimates to the Ministry of Finance. When the effective balance is larger than the SB, the surplus is saved in the ESSF. When the effective balance is smaller than the SB, the deficit is covered with funds from the ESSF. However, the exact value set for the SB in the fiscal rule is still discretional and largely depends on the appraisal of relevant macroeconomic conditions by the Ministry of Finance. The first surplus target for the SB was set by the authorities at 1 per cent of GDP during the period 2001–07. Three arguments to choose this number were given at that time: (i) the public sector was a net debtor (11 per cent of GDP); (ii) there were potential increases in future fiscal liabilities related with pension guarantees, infrastructure investment needs, and

---

[14] It is worth noting that the International Monetary Fund at that time was recommending countries with fiscal space to adopt expansionary fiscal policies.

[15] Between 2003 and 2007, average GDP growth was 5 per cent (average GDP growth declined to 3.4 per cent in the period 2008–15).

potential borrowing constraints; and (iii) it was decided that the Central Bank needed to be recapitalized.[16] Because of progress in funds accumulation during the previous period, the surplus target was diminished to 0.5 per cent of GDP for 2008 and again to 0 per cent in January 2009 to provide fiscal space for a fiscal expansion to counteract the effects of the global financial crisis. This value has been maintained since then.[17]

> **Box 2: Fiscal sensitivity to changes in copper prices and copper production**
>
> Chile's fiscal position is strongly affected by changes in both copper price and copper production. Small changes in relevant variables have a significant impact on effective fiscal incomes. However, the use of a medium-term reference price prevents the effects of cyclical shock in structural fiscal incomes. The budget office (DIPRES) simulations show that a change of 1 cent (US$) in the copper price reduces fiscal revenues by US$37.5 million. The reference price is useful to deal with uncertain global conditions, but structural fiscal incomes also depend on internal copper production. A reduction of 1 per cent in copper production of CODELCO has an impact of US$17 million on structural fiscal incomes. The same change in private mining production can reduce fiscal incomes by US$34 million. Production is affected not only by international demand through price changes but also by local conditions such as rising energy costs, water availability, the decreasing ore grade of minerals, and increasing social and environmental issues as a consequence of natural resources activities (see Table 2).

In February 2010, a major earthquake followed by a tsunami struck the centre-south of Chile, causing hundreds of deaths and major physical destruction of housing and infrastructure. Reconstruction became the first policy priority of the nation, and public expenditure grew by 5.5 per cent in real terms in 2010. The Piñera administration nonetheless committed to reduce the structural deficit, and a −0.6 per cent of GDP was achieved by the end of the Piñera government in 2014. Since then, the authorities have expressed their intention to return to structural surpluses but predictions are that this may not be achieved before 2020 because of the expected lower price of copper and slower GDP growth.

4.1 Asset management of SWFs

Because of the copper price boom of 2002–07, the ESSF and PRF both increased their savings in that period although the government later drew near US$9 billion from the ESSF throughout 2009 to finance the fiscal expansion of that year. Figure 3 presents the accumulation pattern of ESSF and PRF and also the average annual rate of return of each fund. In fact, we can observe that despite its good profitability before the global financial crisis, negative results have been realized in the more recent years, mainly in the ESSF. Overall, the total return since 2007 has been in line with a fixed income portfolio with a nominal rate of return of 2.28 per cent for the PRF and 3.14 per cent for the ESSF.[18]

---

[16] Because of the crisis of 1982–83, one of the most severe in Chile, several banks went to bankruptcy and the government had to bailout banks with a cumulative fiscal cost equivalent to approximately 35–40 per cent of GDP.

[17] The structural balance achieved −3.1 per cent of GDP (deficit) in 2009 and the effective balance was −4.4 per cent of GDP (deficit).

[18] Rate of return is calculated based on the time-weighted rate of return methodology devised by the Ministry of Finance.

Figure 3: Sovereign wealth funds
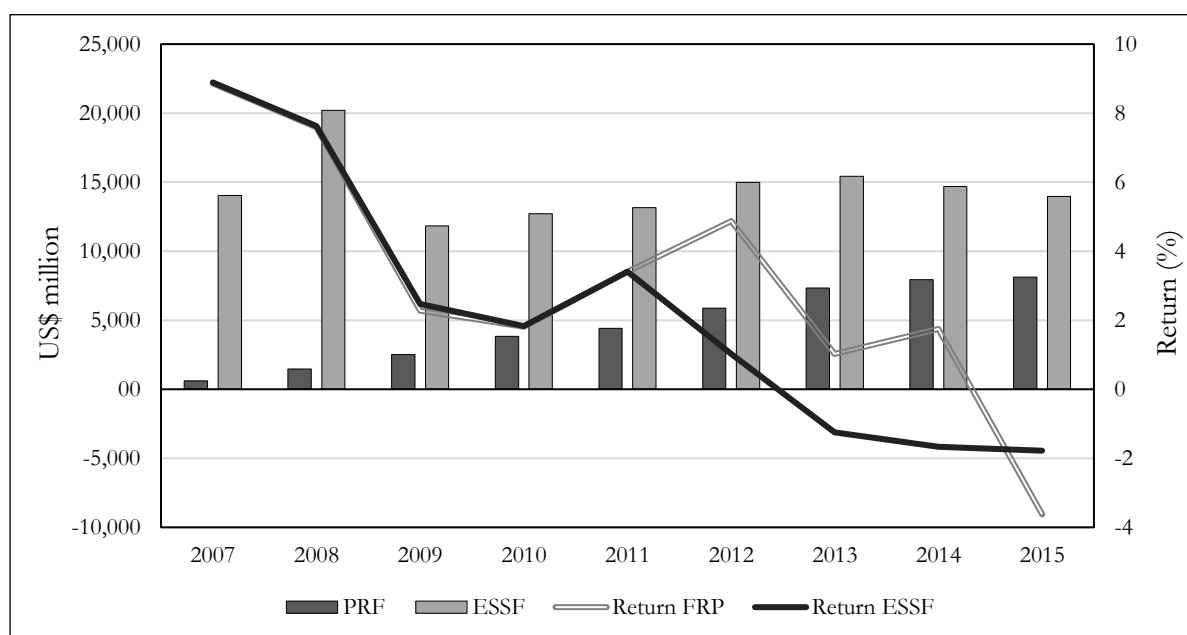
Source: Authors' elaboration based on DIPRES (2015b).

According to the Fiscal Responsibility Law, the Ministry of Finance is responsible for both funds and is assisted by a financial committee of experts to define the investment policy and structure of the funds.[19] In turn, the Central Bank, in its role of fiscal agent, is responsible for materializing the investment guidelines defined by the Ministry of Finance and choosing the actual asset allocation, the strategic composition of the funds, and managing the cost related with its administration (Boxes 3 and 4).[20]

> **Box 3: Transfers to the pension reserve fund (PRF) and the Central Bank**
>
> The Fiscal Responsibility Law establishes a minimum annual transfer to the PRF equivalent to 0.2 per cent of the previous year's GDP. If the overall fiscal surplus exceeds this number, the transfer may not exceed a maximum of 0.5 per cent of GDP. In addition, the government is authorized to recapitalize the Central Bank (that still holds debt issued at the time of the banking crisis of 1982–83) for an amount equivalent to the difference between government contributions to the PRF and the fiscal surplus with an upper limit of 0.5 per cent of GDP (in 2006, 2007, and 2008, the recapitalization of the Central Bank was equivalent to 0.5 of 1 per cent of GDP). If there is a surplus after payment into the PRF and capitalization of the Central Bank of Chile, resources must be deposited in the ESSF (repayments of public debt and advanced payments into the ESSF during the previous year can be subtracted from this contribution).

---

[19] Decisions and recommendations made by the financial committee are not mandatory for the Ministry of Finance. The president of the committee is chosen by the fiscal authority. The committee also reports to Congress about asset management of sovereign wealth funds.

[20] Referential buyers, benchmarks, limits, and investment constraints are also defined, and for more sophisticated investments such as equities. International administrators such as BlackRock and Mellon Capital Management perform various duties for a fee and the international custody of the funds' resources relies on JPMorgan.

Table 3: Sovereign wealth fund management costs (US$)

Item	PRF		ESSF	
	2010	2015	2010	2015
Custodian (JPMorgan)	252,787	1,639,504	622,071	1,295,073
Central Bank of Chile administration	153,600	947,984	506,400	957,404
International administration	—	1,884,965	—	622,359
Total costs	406,387	4,472,453	1,128,471	2,874,836
Securities lending	399,802	278,184	1,290,288	2,563,815

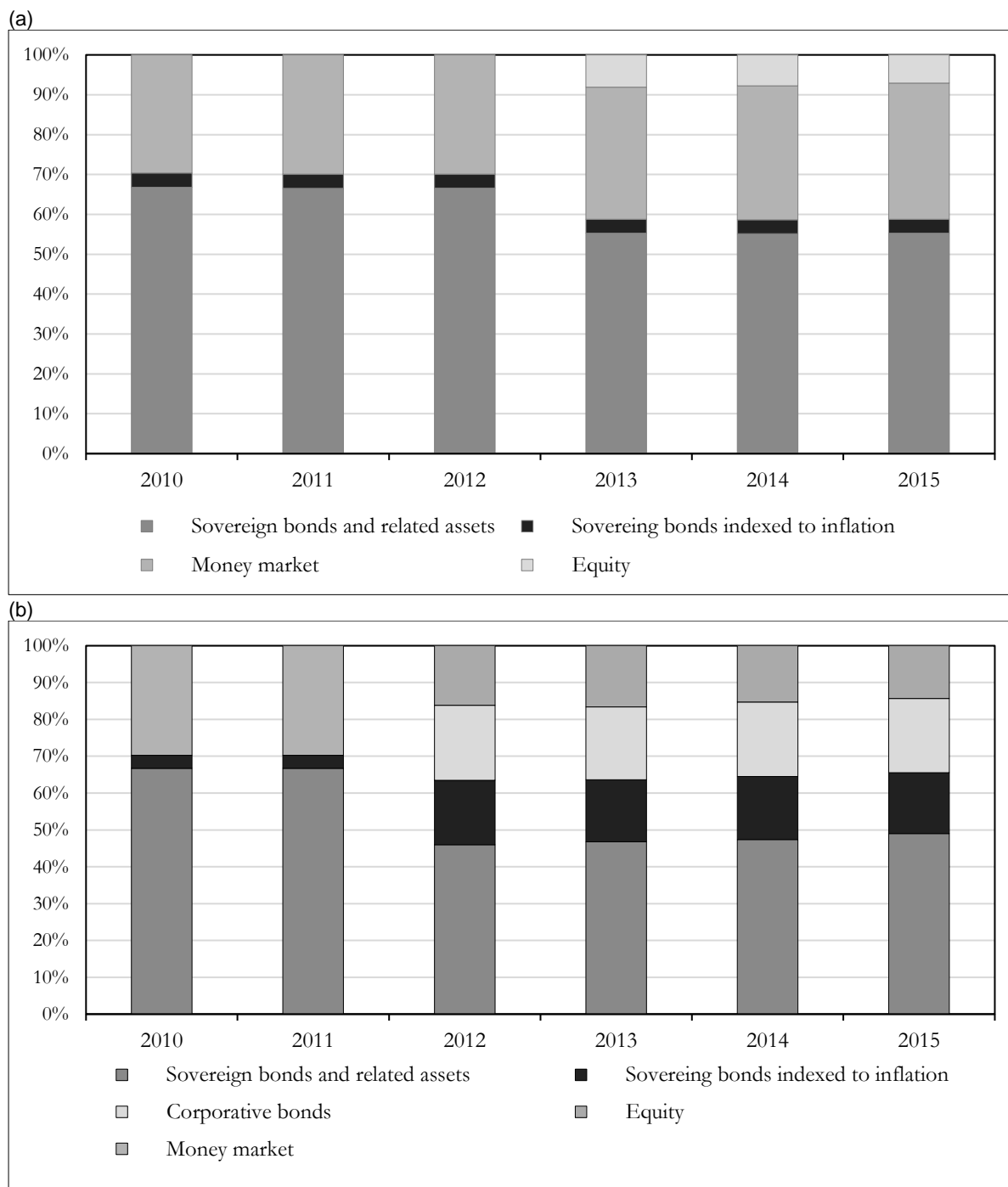Source: Authors' elaboration based on DIPRES (2015b).

The resources of the ESSF can be used at any time to complement current fiscal incomes in periods of fiscal deficits. They can also be used for the amortization of public debt and to capitalize the PRF by a discretionary decision of the Ministry of Finance.

The investment policy of the funds seeks to maximize their market value subject to a certain level of risk exposure. Portfolio composition is tailored to maintain high liquidity, low credit risk, and low volatility investments in order to accommodate future fiscal deficits and avoid losses for the funds. As we can see in Figure 4, the current investment policy of the ESSF and the PRF relies mainly on bonds and fixed-income instruments (which are in reserve currencies such as the Swiss franc, the yen, and the euro; the funds are denominated in US dollars).[22]

---

[21] The related consultancy costs are not shown in Table 3.

[22] Following the recommendation of the financial committee, since 2012 in the case of the PRF and 2013 for ESSF, equities have been part of both portfolios in order to increase profitability of funds but maintaining a significant part of the funds in sovereign bonds.

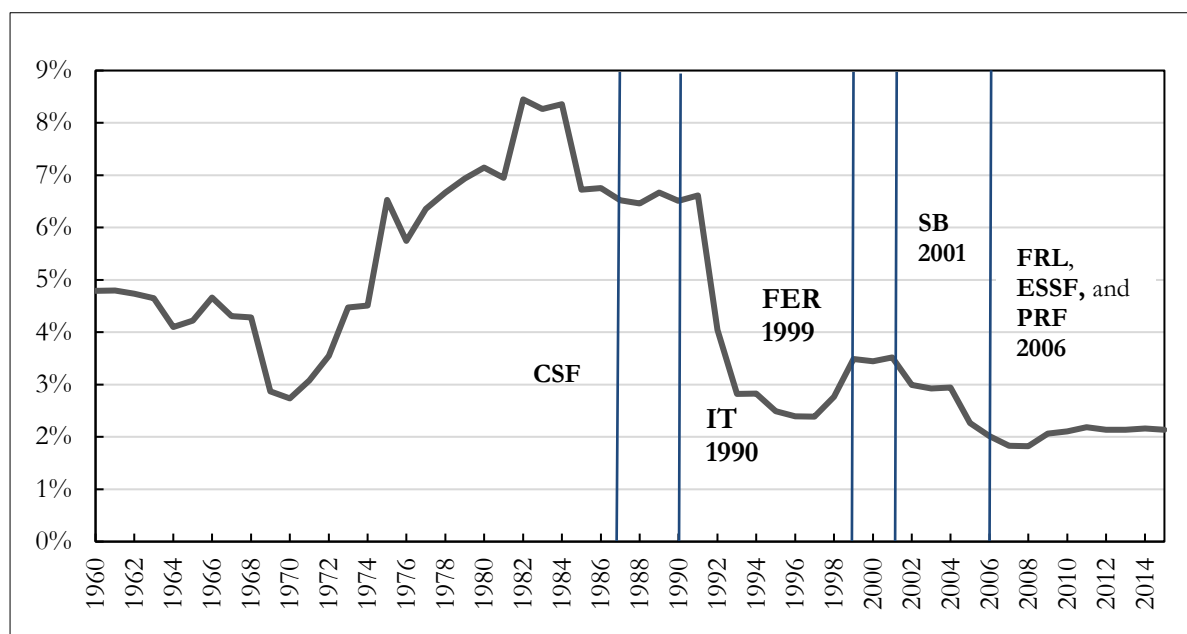Figure 4: (a) Economic and social stabilization fund; (b) pension reserve fund

(a)

(b)

Source: Authors' elaboration based on Central Bank of Chile data.

4.2 Macroeconomic effects: growth volatility and country risk reductions

As noted earlier, several authors have documented the fact that the macroeconomic framework of Chile has been successful in reducing output volatility since 1990. Indeed, as we can see in Figure 5, based on Céspedes et al. (2014), there is a significant reduction in GDP growth volatility since

1984 with a relatively stable period (lower output volatility) even after the global financial crisis of 2008–09.[23]

Figure 5: GDP growth volatility (10-year rolling window) and macroeconomic policies

Notes: CSF, copper stabilization fund; IT, inflation target; FER, flexible exchange rate; SB, structural balance; FRL, fiscal responsibility law; ESSF, economic and social stabilization fund; PRF, pension reserve fund.
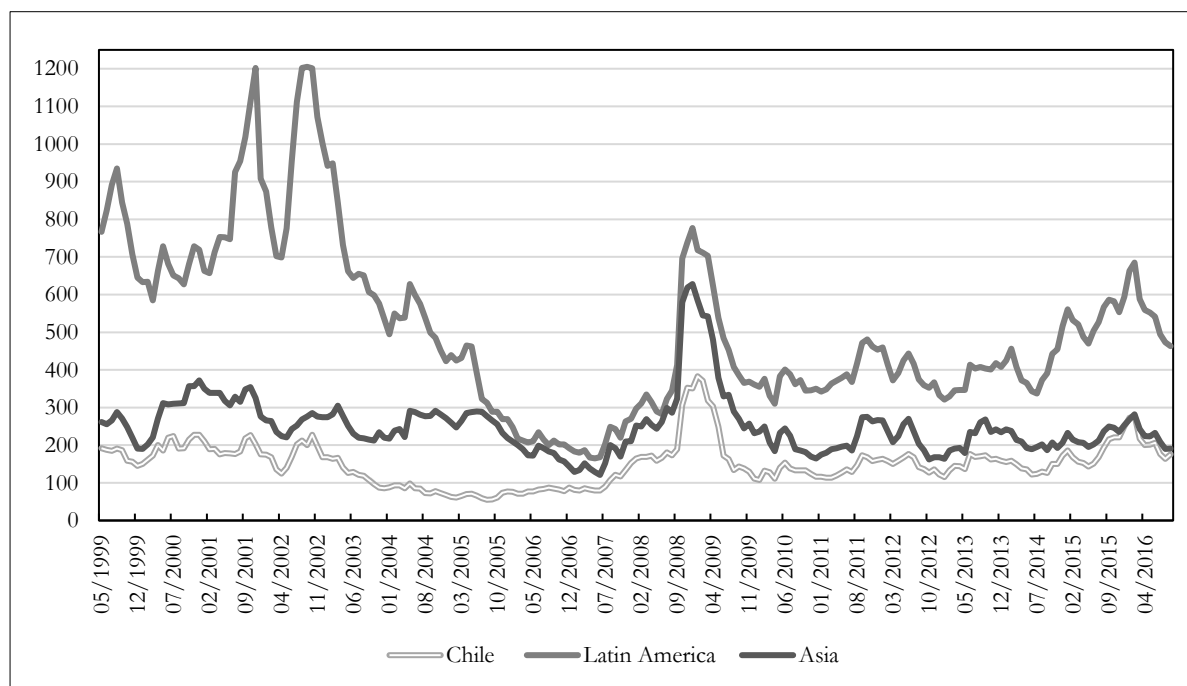
Source: Authors' elaboration based on Díaz et al. (2016) and Central Bank of Chile.

The combination of fiscal rules, two SWFs, flexible exchange rates, and an independent Central Bank is said to have contributed to lower output volatility in Chile—certainly relative to most other comparable countries. This may be true although it is not simple to ascertain the contribution of each component of the policy package to lower output volatility. In addition, it is fair to say that the actual fiscal and monetary policy decisions following the judgement of specific authorities—rather than the pure mechanical operation of supposedly impersonal policy rules—are likely to have contributed also to lower box output volatility.

Another benefit claimed in the literature on the Chilean fiscal rules and SWFs is their contribution to a reduction in the country risk (Larraín and Parrado 2008; Marcel 2010; Schmidt-Hebbel 2012). The argument posits that as the government develops its credibility through an independent Central Bank and a solid fiscal position—along with an important implicit source of collateral, namely the ESSF—the risk perception of the economic agents decreases. One manifestation of this, following Marcel (2010), is depicted in Figure 6 where we can observe that Chile's sovereign risk spreads have diminished in absolute terms and compared with Latin America and Asia. Although we cannot assume a causal relationship between the adoption of this set of macro rules and the reduction of sovereign risk spreads, we can observe a slight reduction in the sub-period previous to the global financial crisis, and a level considerably lower than in Latin America in the whole period. Moreover, we can notice that after the global crisis the level of Chile's country risk spreads returned more rapidly to pre-crisis levels, whereas Latin America continues with its pre-crisis levels.

---

[23] To measure volatility, Céspedes et al. (2014) compute the 10-year rolling window average of the standard deviation of GDP growth.

Figure 6: Country risk spreads (1999–2016, basis points)

Source: Authors' elaboration based on Central Bank of Chile.

5 Evaluation and conclusions

Historically, macroeconomic cycles in Chile have been led by fluctuations in the prices of its main mineral and agricultural commodities. To counteract this trend, for a period after the 1940s the country tried to boost import-substitution industrialization with a productive role attached to the state. However, these industrialization efforts were reversed in the second half of the 1970s as Chile embarked on a neoliberal development strategy (Solimano 2012). As the economy opened to foreign trade more aggressively in the 1970s and 1980s, the relative importance of copper exports in total exports declined from near 80 per cent in the early 1970s to around 50 per cent nowadays, reflecting the effects of export diversification and a sharp increase in total export volumes. However, in spite of diversification, copper has remained a critical source of fiscal revenues and foreign exchange. Since the 1980s, the authorities have developed various mechanisms to dampen the effects of shocks in the copper price on the domestic business cycle.

A CSF was created in 1987, and then a fiscal rule in 2001. The fiscal rule was expected to constrain possible spending propensities of the fiscal system and delink the domestic economy from the sometimes-disruptive effects of terms of trade shocks. In 2006, an ESSF and a PRF were established as part of a broader fiscal responsibility law. There is a relative consensus that these mechanisms have contributed to providing fiscal predictability and have also contained the impact of external shocks on fiscal spending and the business cycle. In addition, it is claimed that this macro framework has contributed to reducing output volatility, thereby reducing borrowing costs and lowering country risk premiums. The IMF and the international financial community often portray Chile as a successful case of the benefits of having fiscal rules, stabilization funds, inflation targeting, an independent Central Bank, and flexible exchange rates.

The analysis in this paper recognizes progress in these areas but also highlights loose ends in the operation of these funds and draws attention to some trade-offs not always recognized in the

laudatory evaluations of the Chilean case. In particular, we stress that rules leave substantial space for discretion and their implementation requires non-trivial judgements. Specific features need to be addressed by policymakers. First, the fiscal rule requires predicting, with accuracy, long-run (or permanent) values for key parameters such as copper prices, and potential GDP growth. This is not a simple task and has required a proliferation of expert committees and frequent revisions affecting the operation of these rules. Second, the value for the structural fiscal budget has been changed several times by the authorities since 2001, thereby reducing its anchoring role on expectations and policy predictability. Third, the stabilization funds (particularly ESSF) are asymmetric in their operation rules. On the one hand, there are clear rules of accumulation; on the other hand, no rules exist for *using* the resources of these funds, say to counteract an economic downturn or recession (tied, for instance, to the level of the output gap or the unemployment rate). As of now, the decision of drawing resources from the SWFs depends on the discretionary judgement of the fiscal authority. In addition, it is not possible to track where the resources are finally spent (e.g. on consumption or investment), and therefore to evaluate the efficacy of countercyclical fiscal policies and some of their long-run effects. Fourth, it is unclear what would be the optimal level of resource accumulation in various stabilization funds. Currently, the ESSF, PRF, and defence fund have assets of near 10 per cent of GDP (this does not include the international reserves held by the Central Bank, which would add, roughly, another 10 per cent of GDP). This raises the question of a possible tendency towards over-insurance in fiscal management. Fifth, Chile is a country whose levels of public spending in education, health, pensions, and other social sectors as a share of GDP are consistently below those of the OECD and other Latin American economies of middle and large size. This suggests an opportunity cost of over-investing in stabilization funds in terms of over-restricted social spending in a country with high indices of income and wealth inequality (Gini coefficients for income above 50 per cent and for wealth over 70 per cent; Solimano 2016).

Finally, we note that Chile maintains a very generous legislation towards foreign direct investment and domestic companies in the mining sector. This includes low royalties along with the perpetual renewal (at almost no cost) of licenses granting mining exploitation rights to incumbent private corporations at the expense of foregone revenues for the Chilean state. This has led to a highly privatized and denationalized copper sector. CODELCO, the state-owned mining company, lacking an important degree of financial autonomy from the treasury, is forced by law to provide 10 per cent of its gross revenues to the armed forces for the acquisition of military equipment and weapons. This arrangement affects the ability of CODELCO to finance its capital investment projects with its own internal resources and also reduces the availability of fiscal revenues (transferred from CODELCO to the treasury) that could otherwise be directed to social spending and public infrastructure. In our view, these arrangements need to be revised (eliminated?) by parliament.

References

Cariola, C., and O. Sunkel (1982). *Un Siglo de Historia Económica de Chile, 1830–1930. Dos Ensayos y una Bibliografía* [*A Century of Chilean Economic History, 1830–1930. Two Essays and a Bibliography*]. Madrid: Ediciones Cultura Hispánica.

Céspedes, L., E. Parrado, and A. Velasco (2014). 'Fiscal Rules and the Management of Natural Resource Revenues: The Case of Chile'. *Annual Review of Resources Economics*, 6: 105–32.

Cochilco (2013). 'Factores competitivos de la exploración minera en chile' ['Competitive Factord of Mining Exploration in China']. Santiago: Dirección de Estudios, Comisión Chilena del Cobre, DE/16/2013. Available at: http://www.cochilco.cl/descargas/estudios/tematico/exploracion/factores_competitivos_para_la_exploracion_minera_en_chile__26122013.pdf (accessed 20 August 2016).

Cochilco (2016). 'Yearbook: Copper and Other Mineral Statistics, 1996–2015'. Available at: http://www.cochilco.cl/descargas/estadisticas/anuarios/Anuario2016web.pdf (accessed 8 July 2016).

De Gregorio J., and F. Labbé (2011). 'Copper, the Real Exchange Rate and Macroeconomic Fluctuations in Chile'. In R. Arezki, T. Gylfason, and A. Sy (eds), *Beyond the Curse: Policies to Harness the Power of Natural Resources*. Washington, DC: International Monetary Fund, pp. 203–33.

Diehl, J. (1982). 'Exxon, Others Find Projects Awry in Chile'. *The Washington Post*, 3 October. Available at: https://www.washingtonpost.com/archive/politics/1982/10/03/exxon-others-find-projects-awry-in-chile/590c3c43-4470-4c0a-8751-09641436093c/ (accessed 8 February 2017).

DIPRES (2011). 'Una política fiscal de balance estructural de segunda generación para Chile' ['A Fiscal Policy of Structural Balance for Second Generation Chile']. Public Finance Studies Series 18. Chile: Ministerio de Hacienda. Available at: http://www.dipres.gob.cl/572/articles-81713_doc_pdf.pdf (accessed 8 February 2017).

DIPRES (2015a). *Informe de Finanzas Públicas: Proyecto de Ley de Presupuestos del Sector Público para el año 2016* [*Report of Public Finances: Project of the Law of Public Sector Budgets, 2016*]. Chile: Ministerio de Hacienda.

DIPRES (2015b). *Informe Anual de los Fondos Soberanos* [*Annual Report of the Sovereign Wealth Funds*]. Chile: Ministerio de Hacienda.

DIPRES (2016). 'Evolución, administración e impacto fiscal de los ingresos del cobre en Chile' ['Evolution, Administration and Fiscal Impact of Copper Revenues in Chile']. Public Finance Studies Series 23. Chile: Ministerio de Hacienda.

Díaz, J., R. Lüders, and G. Wagner (2016). *La República en Cifras. Chile 1810–2010* [*The Republic in Numbers. Chile, 1810–2010*]. Santiago: Ediciones Universidad Católica de Chile.

Frankel, J. (2011). 'A Solution to Fiscal Procyclicality: The Structural Budget Institutions Pioneered by Chile'. NBER Working Paper 16945. Cambridge, MA: National Bureau of Economic Research (NBER). Available at: https://www.hks.harvard.edu/fs/jfrankel/ChileBudgetRules2011AprNBER.pdf (accessed 8 February 2017).

Franken H., G. Le Fort, and E. Parrado (2006). 'Business Cycle Responses and the Resilience of the Chilean Economy'. In R. Caballero, C. Calderón, and L.F. Céspedes (eds), *External Vulnerability and Preventive Policies*. Santiago: Central Bank of Chile, pp. 71–108.

Larraín F. and Parrado E. (2008). 'Chile menos volátil' [A 'Less Volatile Chile']. *El Trimestre Económico*, 75(299): 563–96.

Lavandero Illanes, J. (2004). *Una política para el Cobre chileno* [*A Policy for Chilean Copper*]. Santiago: Impresos Prólogo. Available at: https://recuperaciondelcobre.files.wordpress.com/2011/04/una-polc3adtica-para-el-cobre-chileno.pdf (accessed 8 February 2017).

Marcel, M. (2010). 'The Structural Balance Rule in Chile: Ten Years, Ten Lessons'. Discussion Paper IDB-DP-289, June. Washington, DC: Inter-American Development Bank. Available at: http://services.iadb.org/wmsfiles/products/Publications/37889337.pdf (accessed 8 February 2017).

Meller, P. (2006). *Un Siglo de Economía Política Chilena (1890–1990)* [*A Century of Chilean Political Economy, 1890–1990*]. Santiago: Uqbar Editores.

Millán, A. (2006) *La minería metálica en Chile en el siglo XX* [*Metal Mining in Chile in the Twentieth Century*]. Santiago: Editorial Universitaria.

Schmidt-Hebbel, K. (2012). 'Fiscal Institutions in Resource-Rich Economies: Lessons from Chile and Norway'. Documento de Trabajo 416. Santiago: Instituto de Economía, Pontificia Universidad Católica de Chile. Available at: http://epge.fgv.br/conferencias/commodity-prices/files/KlausSchmidt-Hebbel.pdf (accessed 8 February 2017).

Solimano, A. (2016). *Global Capitalism in Disarray. Inequality, Debt and Austerity*. Oxford: Oxford University Press.

Solimano, A. (2012). *Chile: The Neoliberal Trap. The Post Pinochet Era*. Cambridge: Cambridge University Press.

Solimano, A., and M. Schaper (2014). 'The Paradoxes of Chilean Economic Development: Growth, Inequality, Deindustrialization and Sustainability Risks'. In A. Hansen and U. Wethal (eds), *Emerging Economies and Challenges to Sustainability*. London: Routledge.