

Fiscal Rules and the Management of Natural Resource Revenues: The Case of Chile

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Abstract

Over the past quarter-century, Chile has proven that the unthinkable is possible: A middle-income, natural resource-producing nation can have a fiscal policy that is both stable and sustainable. The core of this policy has been very simple: Act responsibly, design policy for the long run, and accumulate enough fiscal space so that fiscal policy can play a stabilizing role in the short run. The approach implies saving during periods of high copper prices and using those accumulated resources during a global economic crisis. Shifting from a procyclical to a mildly countercyclical fiscal stance has helped to smooth public investment and social expenditures across the cycle. One example of this countercyclical policy was Chile's reaction to the 2008–2009 world financial crisis. Thus, this article argues that Chile's approach contains ideas and practices that may be useful in the design of fiscal policies and institutions in other commodity-producing nations.

1. INTRODUCTION

Managing volatile fiscal revenues is never easy. The task is particularly challenging for natural resource-producing nations, in which revenues linked to those resources can be large (relative to the size of the economy) and unusually volatile. Add to the mix complicated political struggles over these resources, and the result is seldom pretty. Many natural resource producers feature procyclical fiscal policies, in which a tax-and-spending pattern exacerbates external volatility instead of dampening it. Stop-and-go cycles, weak investment, and sputtering growth often follow.

One emerging nation that has arguably escaped the macroeconomic curse of natural resources is Chile. As the world's largest copper producer, Chile has become somewhat of a poster child for prudent macroeconomic management. By the time the world financial crisis erupted in 2009, not only was Chile the newest member of the OECD, but it had arguably the best fiscal performance in the OECD. Chile's gross public debt was, by a large margin, the lowest in the group. In the previous four years, Chile had averaged the second-largest overall fiscal surplus in the OECD, second only to oil-producing Norway's.

Chile's fiscal discipline was not born overnight. Since the return of democracy in 1990, the country has consistently achieved fiscal surpluses and strengthened fiscal institutions. The administration of Ricardo Lagos (2000–2006) introduced the key practice of constructing budgets on a cyclically adjusted basis and of setting explicit targets for structural budget balance. In turn, the administration of Michelle Bachelet (2006–2010) crafted and passed the 2006 Fiscal Responsibility Law, which formalized the structural approach to fiscal policy and set up two sovereign wealth funds (SWFs) to hold and invest the resulting fiscal savings.

What are the lessons from the Chilean experience? Could elements of Chile's fiscal and macroeconomic framework be usefully adopted by other producers of natural resource?¹ This article explores answers to these and related questions.

We begin by reviewing what the theoretical literature has to say about the cyclical behavior of fiscal policy. In particular, we are interested in stories that could explain why fiscal policy could be procyclical (instead of countercyclical, as common sense and standard macro theory prescribe). We show that plausible political economy explanations, coupled with the inherent procyclicality of financial markets, can help rationalize the observed pattern of taxes and expenditures in natural resource producers. We then briefly summarize recent related literature on the cyclicity of fiscal policy in commodity-rich nations subject to large terms-of-trade shocks.

Next we explain what Chile did and how it did it. We describe Chile's so-called structural approach to fiscal policy, the asset dynamics it implied, and the funds that were created to manage these assets in an efficient and politically legitimate way. The emphasis is on the role of rules and institutions in adding predictability to fiscal policy.

What were the economic results to Chile's fiscal approach? Our basic conclusion is simple: Shifting from a procyclical to a mildly countercyclical fiscal stance has helped stabilize both relative prices and economic activity. It has also had important political effects, smoothing public investment and social expenditures across the cycle and shielding welfare programs and transfers to the poor from the vagaries of the copper market.

One example of this countercyclical policy was Chile's reaction to the 2008–2009 world financial crisis. The collapse of Lehman Brothers caught Chile with a tiny public debt, large cash reserves, and well-capitalized banks. As a result, the government put together a sizeable anticrisis

¹Such adoption has already begun. Since 2010, Colombia, Panama, Peru, Nigeria, Mongolia, Kazakhstan, and East Timor have adopted fiscal arrangements that are reminiscent of Chile's.

fiscal package while the Central Bank of Chile (CBC) slashed interest rates. Never before in Chile's history had such an aggressively countercyclical macro stance been feasible. The results were encouraging: The recession was shallow and short-lived, and the economy grew quickly from late 2009 to late 2013.

2. THE POLITICAL ECONOMY OF FISCAL POLICY: SOME EMPIRICS AND SOME THEORY

The empirical literature identifies two puzzling features of fiscal policy in many countries: deficit bias and procyclicality. Fiscal deficit bias is defined as the tendency of governments to allow deficit and public debt levels to increase. A procyclical fiscal policy involves higher (lower) government expenditure and lower (higher) tax rates in good (bad) times. This is procyclical policy because it tends to reinforce the business cycle.

Interestingly, these characteristics of actual fiscal policy implementation differ significantly from those of the optimal fiscal policy in standard macroeconomic models. In effect, the seminal papers by Barro (1979) and Lucas & Stokey (1983) argue that to smooth expenditure flows and tax distortions over time, governments should optimally run surpluses in good times (e.g., rapid economic growth, high commodity prices) and temporary deficits in bad times. In other words, the budget should not necessarily be balanced every year, but it should be in balance over the business cycle.

Put more technically, if the cost of postponing expenditure (the subjective rate of time preference) is not too different from the cost of debt (the real rate of interest), then there is little reason to shift expenditures (or taxes) across time. Therefore, the budget should be balanced over the business cycle.

Actual fiscal behavior, however, is often very different from what theory prescribes: Large and persistent fiscal deficits—causing significant reductions in government net assets and/or upsurges of public debt—are common even in countries that enjoy sustained economic expansions. And the evidence for many economies supports the observation that government expenditures tend to increase during good times and to be cut during bad times in a procyclical behavior pattern that differs significantly from the conventional prescription. What are the possible explanations for deficit bias and for the procyclicality of fiscal policy?

2.1. Deficit Bias

The simplest explanation for why governments exhibit persistent fiscal deficits along the business cycle is related to miscalculations: A government could have set its tax and spending decisions on the basis of one set of expected economic circumstances and then faced a different situation. But forecasting mistakes, by definition, should be random and short-lived, whereas systematic deficits (hence the label deficit bias) are neither. So that explanation will not do.

Politically motivated fiscal expansions are an alternative explanation. Nordhaus (1975) argues that governments stimulate economies before elections and get away with doing so because voters do not understand the government's budget constraint. Buchanan & Wagner (1977) suggest a similar argument: When voters are offered public programs financed by deficit spending, they overestimate the benefits of current spending and underestimate the cost in the future. In this line of argument, opportunistic politicians increase current expenditures more than taxes to get elected.

But is there a systematic bias in the mistakes committed by voters? Rogoff (1990) and Rogoff & Sibert (1988) provide explanations for why voters support politicians who run larger deficits. But Alesina & Perotti (1995) and Drazen (2000) are skeptical of the fiscal illusion under which voters who do not understand government budgets get bamboozled by opportunistic policy makers.

Intergenerational redistribution is a second explanation for persistent fiscal imbalances. Cukierman & Meltzer (1989) construct a model with two types of families: rich and poor. Rich families leave bequests, whereas poor ones would like to leave debt behind but cannot. The public debt acts as a substitute in this situation. Because rich families are indifferent, the aggregate social choice involves leaving debt behind for future generations to repay. Tabellini (1991) offers a related account, in which the political equilibrium also implies issuing debt.

Conflicts among policy makers provide a third possible explanation for debts and deficits. As Alesina & Tabellini (1990) stress, the stock of debt links past policies to present and future ones. Consider a political system with two parties (coalitions) that have different preferences about the composition of public expenditures. Party A values spending on national defense, whereas party B prefers spending on welfare. Suppose that party A is in power and that the outcome of an upcoming election is uncertain. If party A members decided to spend more on defense by issuing debt, they would leave party B with less ability to spend on welfare if elected, because B would need to pay down the debt. By committing future resources, party A reduces spending by future governments. This motivation for issuing debt means that too much debt is issued in equilibrium relative to what a benevolent planner would choose.

In a related paper, Persson & Svensson (1989) study the equilibrium size of the government in a situation in which politicians have different preferences and face uncertain prospects of re-election. In that model, low-spending incumbents run deficits when they expect to be replaced, whereas high-spending incumbents run surpluses in the same situation.

Conflicts over distribution have also been put forward as a reason for persistent deficits. Alesina & Drazen (1991) offer an example. Suppose that a permanent shock initially implies a larger fiscal deficit and thus the accumulation of public debt. A benevolent planner would react by increasing taxes (or reducing spending). But conflicts between social groups with respect to the distribution of the burden of adjustment delay its implementation and generate rising debt. Agreeing immediately to the adjustment increases welfare for all, but the adjustment is delayed if the costs of stabilization are not equitably distributed and if there is imperfect information about the cost of delay for the other group.

Similarly, Velasco (1999) shows that in a model with decentralized fiscal policy making (see the next sections for details), different kinds of spending benefit particular groups, whereas the costs are shared through debt that is to be repaid by all. In that setting, political conflict can cause a socially desirable fiscal adjustment to be inefficiently delayed. This type of explanation links institutional characteristics, the preferences of political parties, and fiscal deficits.

2.2. Procyclicality

Recall that, according to standard smoothing models, deficits should emerge during recessions, whereas surpluses should arise in booms. The reality, however, is that governments often save too little in booms or even dissave. Put differently, expenditures and taxes tend to behave procyclically (instead of countercyclically, as theory prescribes).

Procyclicality is a pervasive feature of many emerging markets economies rich in natural resources and open to both trade and capital flows. Latin America was an example during the 1970s, 1980s, and part of the 1990s, as Gavin & Perotti (1997) show. Cuddington (1989) argues that the commodity booms of the 1970s were associated with significant increases in government expenditures, which were not reversed when prices tumbled in the 1980s. Sinnott (2009) and Kaminsky (2010) provide evidence that fiscal policy in developing economies responds in a procyclical way to terms-of-trade shocks.

But not only commodity-linked revenues are procyclical; so are international capital flows. This reality in turn helps explain the procyclical behavior of fiscal variables. In bad times, governments, particularly those in emerging markets, are credit constrained. In good times, borrowing constraints are presumably relaxed, and governments are free to go on a debt-financed spending spree. Gavin et al. (1996), Talvi & Vegh (1996), Kaminsky et al. (2005), Mendoza & Terrones (2008), and Reinhart & Reinhart (2009) present evidence on the link between procyclical international capital flows and procyclical fiscal policy.

However, time-varying credit constraints are not enough to explain fiscal procyclicality. That a government can borrow during a boom does not mean that the government will want to borrow during that boom. For borrowing to occur, an additional justification—perhaps political in nature—is necessary.

One political economy explanation relies on the so-called voracity effect. Drawing on the model by Tornell & Velasco (1992), Lane & Tornell (1996) and Tornell & Lane (1999) construct a theory in which fiscal policy is decided in a decentralized way, with many interest groups competing for their share of fiscal resources. These researchers show that in that context, temporary, positive income shocks are spent completely so that governments save too little during booms. The voracity of groups wishing to spend more in good times causes a breakdown of standard smoothing behavior.

The specific results of any political economy explanation depend on the type of political arrangements involved. For instance, Stein et al. (1999) and Lane (2003) find that political systems in which power is diffused among a number of agents produce a higher degree of fiscal procyclicality relative to centralized systems. In contrast, Arezki & Brückner (2012) find that increases in the international prices of exported commodity goods lead to higher government spending, external debt, and default risk in autocracies but have smaller such effects in democracies.

3. A DISTRIBUTIONAL MODEL OF DEFICIT SPENDING AND PROCYCLICALITY

Next we focus on a particular theory of deficit spending and procyclicality based on Velasco & Parrado (2012). Consider the following decentralized mechanism for deciding upon spending. There are n symmetric groups, indexed by i , $i = 1, 2, \dots, n$. Each group can be thought of as a particular constituency or recipient of government resources. Public expenditure on group i can be interpreted as subsidies to its members or spending on a public good that benefits only members in this group. That expenditure, denoted by g_i , can be financed out of a constant stream of government income τ .

Any excess of expenditure over revenues is financed by borrowing in the world capital markets at a constant gross real rate $1 + r$. We assume a small and open economy, so r is exogenous. Accumulated debts are a joint liability of all n groups, as would be the case with the national debt in any country.

This policy-making regime can be interpreted in one of several ways. First, spending pressures may arise from sectoral ministers or parliamentary committees with special interests (see von Hagen 1993, von Hagen & Harden 1995, and Alesina et al. 1999). Second, transfers may be determined by money-losing state enterprises facing soft budget constraints. Third, spending may be set by decentralized fiscal authorities representing particular geographical areas, as in Weingast et al. (1981), who argue that congressmen with a geographically defined support base overestimate the benefits of public projects in their home district relative to the costs of financing these projects, which are borne by the entire nation. Our setup

provides a dynamic version of the account by Weingast et al. (1981). The government budget constraint is

$$b_t = (1 + r)b_{t-1} + \tau + \varepsilon_t - \sum_{i=1}^n g_{it}, \quad (1)$$

where b_t is the stock of the internationally traded bond held by the government at time t , earning the interest rate r , and ε_t is a shock to government income, assumed i.i.d. with mean zero and finite variance. We also impose the solvency condition

$$\lim_{t \rightarrow \infty} b_t(1 + r)^{-t} \geq 0. \quad (2)$$

Each group i has the logarithmic utility function

$$U = \sum_{s=t}^{\infty} \log(g_{is})(1 + r)^{-(s-t)}. \quad (3)$$

This setup provides a simple account of distributional conflict among the n groups. Because each receives the benefit (in terms of utility) of its own expenditure, but costs are shared by all, there is the potential for inefficiency in the interaction among the groups.

3.1. Planner's Solution

One can easily show that, if a planner solves the problem on behalf of the n groups, treating each of them symmetrically, the optimal spending rule is

$$g_{it} = \frac{1}{n} \left(rb_{t-1} + \tau + \frac{r}{1+r} \varepsilon_t \right). \quad (4)$$

Each group spends a share $1/n$ of permanent income $rb_{t-1} + \tau$ plus a portion $\frac{r}{1+r}$ of the transitory shock ε_t . Aggregate spending is given by

$$g_t = ng_{it} = rb_{t-1} + \tau + \frac{r}{1+r} \varepsilon_t. \quad (5)$$

Using this rule in the budget constraint of Equation 1, we have

$$b_t - b_{t-1} = \frac{\varepsilon_t}{1+r}. \quad (6)$$

There is a budget surplus, and government assets are accumulated whenever the shock ε_t to fiscal income is positive, and vice versa. That is, the government saves (dissaves) whenever it experiences a positive (adverse) income transitory income shock. This is in accordance with the smoothing theory of Barro (1979).

3.2. Political Equilibrium

Now suppose that each of the n fiscal groups acts independently, and each sets the path $\{g_{it}\}_{t=0}^{\infty}$ through lobbying or another political mechanism. All interest groups still share the same budget constraint, enjoying common access to government resources.

3.3. Solving the Game Among the n Groups

Focus on a simple class of Markovian strategies in which spending is a function of the state variable only.² In this log-linear setting, one can postulate a linear policy rule for each player,

$$g_{it} = \phi \left(b_{t-1} + \frac{\tau}{r} + \frac{\varepsilon_t}{1+r} \right), \quad (7)$$

where ϕ is a parameter to be endogenously determined. This rule says that each group spends a constant share of available resources. Such resources (defined as $b_{t-1} + \frac{\tau}{r} + \frac{\varepsilon_t}{1+r}$) play the role of state variable.

Now, suppose that group i expects that all other groups will employ the rule in Equation 7. Then, assets evolve according to

$$b_t = [(1+r) - (n-1)\phi] \left(b_{t-1} + \frac{\tau}{r} + \frac{\varepsilon_t}{1+r} \right) - g_{it}. \quad (8)$$

Group i 's best response is therefore the solution to the problem

$$V(b_{t-1}) = \max_{g_{it}} E_t \left\{ \log(g_{it}) + (1+r)^{-t} V(b_t) \right\}, \quad (9)$$

subject to Equation 8. The Euler equation that corresponds to the solution to this problem is

$$E_t g_{it+1} = [1 - (n-1)\phi] g_{it}. \quad (10)$$

Combining Equations 8 and 10 and imposing symmetry, we have

$$g_{it} = \left(\frac{1+r}{1+nr} \right) \left(r b_{t-1} + \tau + \frac{r}{1+r} \varepsilon_t \right). \quad (11)$$

That is, each group spends a share $\frac{1+r}{1+nr} > \frac{1}{n}$ of permanent income $r b_{t-1} + \tau$ plus a portion $\frac{r}{1+r}$ of the transitory shock ε_t .

Therefore, aggregate spending is

$$n g_{it} = g_t = \left(\frac{n+nr}{1+nr} \right) \left(r b_{t-1} + \tau + \frac{r}{1+r} \varepsilon_t \right). \quad (12)$$

The equilibrium budget surplus or deficit is

$$b_t - b_{t-1} = \frac{\varepsilon_t}{1+nr} - \frac{n-1}{1+nr} (r b_{t-1} + \tau). \quad (13)$$

3.4. Overspending, Procyclicality, and Deficit Bias

How do the planner's solution and the political outcome differ? First, contrast the dynamics of spending. Under the political equilibrium, aggregate spending is larger $\left(\frac{n+nr}{1+nr} > 1 \right)$, because $n > 1$). The share spent of permanent income $r b_t + \tau$ is larger. That is, too much (relative to the optimum) is spent out of permanent income.

²A state variable is one that moves gradually through time, in this case as a result of government saving or dissaving.

The portion that is spent out of the transitory income shock ε_t is also larger than in the planner's solution. Or, put differently, under the political equilibrium a smaller share of the income shock ε_t is saved via a budget surplus: $\frac{1}{1+r}$ under the planner's solution and $\frac{1}{1+nr}$ under the political equilibrium. And when ε_t is negative, the dissaving is too small. Fiscal policy is not as counter-cyclical as it ought to be. This is a violation of optimal smoothing. It is also a result reminiscent of the voracity effect in Lane & Tornell (1996) and Tornell & Lane (1999).

What about the evolution of government assets? Under the planner's solution, experiencing no shock ($\varepsilon_t = 0$) implies a balanced budget (recall Equation 6 above). Under the political equilibrium, in contrast, $\varepsilon_t = 0$ does not imply a balanced budget. Actually, there is a trend deficit of size $\frac{n-1}{1+nr}(rb_{t-1} + \tau)$.

To summarize, relative to the planner's solution, the decentralized political equilibrium implies (a) overspending, (b) an inadequate reaction to shocks, and (c) inefficient budget deficits and asset decumulation. The intuition behind these results is very simple: Property rights are not defined over government assets. A portion of government wealth not spent by one group will be spent by another group. This behavior creates an incentive to raise spending above the collectively efficient rate.

Another way to see this situation involves the return to saving. The return on government wealth accruing to each group is $(1+r) - (n-1)\phi$. Because this return is below the rate of time discounting $(1+r)$, each group has incentives to draw down government assets.

Where does a fiscal rule come in? We think of the rule as a way of overcoming the inefficiencies associated with the decentralized political equilibrium. For the rule to play this role, it has to include mechanisms for dealing with the tendency toward overspending and deficits, as well as with the insufficient saving displayed in response to temporary, positive income shocks.

4. BUSINESS CYCLE REGULARITIES AND TERMS OF TRADE

Shocks to fiscal revenues play a significant role in the political equilibrium of fiscal policy discussed above. If shocks to fiscal revenues are large, then fiscal policy may reinforce the volatility of the business cycle. A primary source of shocks to fiscal revenues, directly and indirectly as discussed below, comes from variations in the terms of trade.

Mendoza (1995) examines the relationship between terms-of-trade shocks and the business cycle by using a three-sector general equilibrium model. The model is calibrated to match business cycle regularities of 7 industrialized countries and 23 developing countries. The results derived from the model indicate that terms-of-trade disturbances can account for approximately one-half of GDP variability.

Kose (2002) extends Mendoza's (1995) framework by enriching the production structure that differentiates among domestically produced capital goods, imported capital goods, and imported intermediate inputs as factors of production, which makes the model more realistic. Consistent with Mendoza's results, Kose finds that world price movements account for approximately one-half of the output volatility in developing countries.

Focusing on the seven larger Latin American economies (LAC7), Izquierdo et al. (2008) analyze the relevance of external factors to the behavior of quarterly GDP growth between 1990 and 2006. The external factors considered in the analysis include the larger industrialized economies' output, the US high-yield-bond spreads, and terms of trade. The relationship is modeled by using a vector error correction model. The authors document that external factors account for a significant share

of the variance in LAC7 GDP growth and that increases in terms of trade are associated with long-run increases in LAC7 GDP.

Céspedes & Velasco (2012), using commodity price boom-and-bust episodes, show that commodity price shocks have a significant impact on output and investment dynamics. The episodes considered in this analysis correspond to large deviations in commodity prices from trend. A transitory improvement in the terms of trade generates an income effect that increases the demand for tradable and nontradable goods, tending to spur economic activity. Therefore, higher terms-of-trade volatility may increase the volatility of GDP.

To illustrate the connection between terms-of-trade volatility and GDP volatility, we compare a group of Latin American economies, a group of non-Latin American developing economies, and a group of developed economies that are commodity exporters. For all these countries, commodity exports represent a significant fraction of total exports. **Table 1** documents the importance of commodity exports for total exports for these economies, which are strong candidates to experience significant impacts from terms-of-trade shocks.

We use two different measures of economic volatility: the standard deviation of the GDP growth rate and the average of the absolute value of the output gap. As **Table 2** shows, the volatility of developed economies is significantly lower than that of developing economies. In particular, the volatility of developing economies is almost two times that of the developed economies under analysis. Moreover, from 1996 to 2008, the different measures of business cycle volatility are between three and four times higher in developing economies than in developed economies.

The higher volatility of the business cycle in developing economies may indeed be explained by higher terms-of-trade volatility. **Table 3** presents two different measures for the terms-of-trade volatility, consistent with the two measures we use to compute the business cycle volatility. For the whole period, the terms-of-trade volatility is higher in developing economies than in developed economies. In particular, this volatility in developing economies is between 2 and 2.5 times the one in the developed economies under analysis. In the first period (1980–1995), the ratio of the different measures of terms-of-trade volatility among the different groups of countries is similar to the ratio of the different measures of the business cycle among the different group of countries. Nonetheless, in the second period (1996–2008), the ratio of business cycle volatility among the different groups is significantly higher than the ratios of terms-of-trade volatility among the different groups of countries. These findings suggest that certain features of developing economies amplify the effects of terms-of-trade shocks.

Terms-of-trade shocks are transmitted to the economy through different channels. Those channels may amplify the impact of terms-of-trade shocks to the economy. One of these channels is fiscal policy. To illustrate the connection between terms of trade and output volatility through the fiscal policy channel, we compare fiscal outcomes and business cycle indicators for the sample of countries presented in the previous analysis.

Consider one measure of cyclical policy for fiscal policy: the correlation between the cyclical component of GDP and the cyclical component of the fiscal variable of interest. The cyclical component of GDP is obtained by using the Hodrick-Prescott filter. This component is correlated with the fiscal balance as a percentage of GDP, the cyclical component of government expenditure, and the cyclical component of fiscal revenues (both of the latter two are obtained by using the Hodrick-Prescott filter).

Table 4 presents the results for the correlation between the cyclical component of GDP and the fiscal balance. The table shows that the fiscal balance tends to react strongly to the business cycle in developed economies. In particular, during the good times, these economies tend to exhibit a fiscal surplus. When the sample is divided into two periods, Latin American countries tend to exhibit

Table 1 Commodity exporters

Country	Commodity exports as a percentage of total exports
Latin America (LA)	
Argentina	41
Brazil	35
Chile	58
Colombia	40
Mexico	15
Peru	69
Uruguay	32
Average	41.4
Non-LA developing	
Bangladesh	56
India	31
Indonesia	43
Malaysia	13
Thailand	16
South Africa	39
Average	33
Developed	
Australia	54
Canada	16
New Zealand	36
Norway	63
Average	42.3

Data from Cashin et al. (2004).

a relatively higher fiscal countercyclicality in the period 1996–2008. This tendency toward a higher countercyclicality is particularly strong in the case of Chile, which in recent periods exhibited a fiscal behavior similar to the fiscal behaviors of the developed economies in our sample.

What happened to these correlations over time? Did nations improve the cyclical properties of their fiscal policies? Frankel et al. (2013) document that, during the past decade, approximately 24 developing countries, including Brazil, Chile, and Botswana, became countercyclical. The analysis is carried out through the examination of correlations between the cyclical component of government spending and the output gap.

Table 2 Volatility of the business cycle

Country	Average deviation of the output gap			Standard deviation of GDP growth		
	1980–1995	1996–2008	1980–2008	1980–1995	1996–2008	1980–2008
Latin America (LA)						
Argentina	3.8	6.7	5.1	5.9	6.6	6.2
Brazil	3.5	1.7	2.7	4.1	1.9	3.2
Chile	4.9	2.2	3.7	6.3	2.0	4.8
Colombia	1.9	3.5	2.6	1.5	3.0	2.3
Mexico	2.6	1.6	2.2	3.8	2.2	3.2
Peru	6.8	3.7	5.4	7.9	3.3	6.3
Uruguay	3.8	5.6	4.6	4.9	6.2	5.5
Venezuela	3.7	5.6	4.5	4.9	7.8	6.3
Average	3.9	3.8	3.9	4.9	4.1	4.7
Non-LA developing						
India	1.2	2.4	1.7	1.6	2.0	1.9
Indonesia	2.9	4.8	3.8	1.8	5.3	4.0
Malaysia	4.4	3.1	3.8	3.3	4.3	3.9
Philippines	3.2	1.7	2.5	4.2	2.1	3.6
Thailand	5.5	4.4	5.0	2.7	4.7	4.4
South Africa	1.8	1.3	1.6	2.5	1.4	2.3
Average	3.2	2.9	3.1	2.7	3.3	3.4
Developed						
Australia	2.0	0.5	1.3	2.3	0.9	1.8
Canada	2.4	1.3	1.9	2.5	1.6	2.1
Norway	2.0	1.0	1.6	1.9	1.3	1.6
New Zealand	2.1	1.3	1.7	2.5	1.6	2.1
Average	2.1	1.0	1.6	2.3	1.3	1.9

Data from Céspedes & Poblete (2011).

In a related paper, Céspedes & Velasco (2014) study the issue of fiscal procyclicality in commodity republics, i.e., countries for which commodity-linked revenues represent a large portion of government revenue. Given that the behavior of commodity prices is plausibly a main driver of fiscal policy outcomes in these countries, Céspedes & Velasco focus on the behavior of fiscal variables across the commodity cycle.

Céspedes & Velasco (2014) identify commodity boom episodes: periods of significant increases in commodity prices from 1900 to 2010. They find that most of the countries under study exhibit two boom episodes: one taking place in the 1970s and early 1980s and another in the years immediately prior to 2008. Characterizing the behavior of fiscal variables around times of commodity booms, these authors provide unconditional evidence that suggests that

Table 3 Volatility of terms of trade

Country	Average deviation of terms-of-trade gap			Standard deviation of terms-of-trade growth		
	1980–1995	1996–2008	1980–2008	1980–1995	1996–2008	1980–2008
Latin America (LA)						
Argentina	8.4	3.0	6.1	14.6	5.2	11.3
Brazil	8.1	5.1	6.9	13.3	4.1	10.3
Chile	7.7	9.9	8.7	9.7	13.6	12.0
Colombia	7.0	4.0	5.7	12.6	6.1	10.3
Mexico	9.0	2.2	6.0	12.3	2.4	10.0
Peru	6.9	10.0	8.2	10.0	10.1	10.4
Uruguay	7.4	2.7	5.4	10.1	5.0	8.1
Venezuela	9.6	12.9	11.0	16.6	22.3	20.3
Average	8.0	6.2	7.3	12.4	8.6	11.6
Non-LA developing	1980–1995	1996–2008	1980–2008	1980–1995	1996–2008	1980–2008
India	6.8	6.5	6.7	11.3	11.6	11.3
Indonesia	8.3	8.0	8.2	10.8	17.3	14.2
Malaysia	5.2	2.0	3.8	8.9	2.5	7.0
Philippines	10.3	6.4	8.6	11.7	6.4	9.5
Thailand	3.4	2.8	3.2	5.8	4.0	5.0
South Africa	3.6	3.4	3.6	5.2	4.1	4.9
Average	6.3	4.8	5.7	9.0	7.6	8.7
Developed	1980–1995	1996–2008	1980–2008	1980–1995	1996–2008	1980–2008
Australia	4.2	4.8	4.4	5.9	5.5	6.1
Canada	2.1	2.3	2.2	2.8	3.5	3.2
New Zealand	3.4	2.2	2.9	4.1	3.6	3.8
Norway	6.7	8.0	7.3	8.0	14.3	11.9
Average	4.1	4.3	4.2	5.2	6.7	6.3

Data from Céspedes & Poblete (2011).

the conduct of fiscal policy in times of commodity booms has become more countercyclical in recent years. In particular, Céspedes & Velasco show that the average fiscal balance during the episodes that occurred before the 2000s was worse than the fiscal balance before the beginning of the boom episode. Nonetheless, in the case of the most recent commodity boom episodes, the fiscal balance improved on average compared with the fiscal balance before the beginning of the episode.

So both Frankel et al. (2013) and Céspedes & Velasco (2014) show that fiscal policy has become less procyclical in recent years. Now, a crucial question is, what is behind this change in the cyclicity of fiscal policy? Frankel et al. (2013) show that one of the most important drivers of this transformation is the institutional quality. Céspedes & Velasco (2014) present evidence that

Table 4 Cyclical correlation between fiscal balance (percent of GDP) and GDP gap

Latin America (LA)	1980–1995	1996–2008	1980–2008
Argentina	0.3	−0.1	0.0
Brazil	−0.3	0.5	−0.2
Chile	0.6	0.7	0.6
Colombia	0.3	0.4	0.3
Mexico	0.2	−0.1	0.1
Peru	0.1	0.4	0.1
Uruguay	0.2	0.5	0.3
Venezuela	−0.3	0.2	0.0
Average	0.1	0.3	0.2
Non-LA developing	1980–1995	1996–2008	1980–2008
India	−0.2	0.2	0.0
Thailand	0.6	0.4	0.3
Malaysia	−0.3	0.5	0.4
Philippines	−0.1	0.6	0.3
Thailand	0.6	0.5	0.5
South Africa	0.5	−0.3	0.3
Average	0.2	0.3	0.3
Developed	1980–1995	1996–2008	1980–2008
Australia	0.6	0.2	0.5
Canada	0.8	0.5	0.7
New Zealand	0.4	0.6	0.5
Norway	0.4	0.5	0.4
Average	0.6	0.5	0.5

Data from Céspedes & Poblete (2011) and own estimations.

indicates that improvements in institutional quality have led to a more countercyclical fiscal policy stance in some countries. Céspedes & Velasco also present evidence that suggests that fiscal rules also seem to have made a difference: Countries that used them displayed a larger shift toward fiscal countercyclicality between the two episodes. Finally, along the lines of Tornell & Velasco (2000), Céspedes & Velasco also present evidence that indicates that the movement in exchange rate regimes, mostly from fixed rates to flexible rates, may also have affected the cyclical behavior of fiscal policy.

The evidence indicates that Chile is one of the countries that exhibited a more significant change in the cyclicity of fiscal policy. Interestingly, this shift occurred in a period of significant volatility of commodity prices, which was one of the main drivers of the business cycle in Chile.

5. THE CHILEAN FISCAL RULE

Next we turn to the fiscal experience of Chile. We review the application of the fiscal rule and then provide empirical evidence on the effects of the fiscal rule in Chile and on the response of fiscal policy to the global financial crisis of 2008–2009.

To start, we review the mechanics and application of that rule. This fiscal policy based on a structural balance rule, used earlier by a handful of industrialized economies,³ was a significant innovation in Chile. During the 1990s, Chile's fiscal policy was prudent, but public spending remained very sensitive to the revenue cycle, which was dependent on the economic cycle. There was no explicit rule or framework to guide behavior and expectations concerning fiscal performance.

Then, in 2001, Chile introduced a structural surplus rule—at the start self-imposed, and not a legally binding requirement—to guide the central government budget. Under this rule, annual fiscal expenditure has a ceiling that is equal to (or close to) the central government's long-term or structural revenue, irrespective of income fluctuations caused by cyclical fluctuations in economic activity, in the price of copper, or in other variables that determine effective fiscal income. Thus, the government saves during upswings and dissaves during downturns. In this way, it can avoid the two problems that have long plagued Latin American fiscal policies: (a) surges in spending when commodity prices rise and the economy picks up and (b) drastic tightening of fiscal spending when commodity prices drop and the economy slows.

To arrive at a definition of long-term or structural income, the Chilean fiscal rule uses the long-term price of copper, the long-term price of molybdenum, and the trend growth of GDP. To avoid any political biases in the estimation of these values, since the 2002 and 2003 Budget Laws, the estimations of the long-term price of copper and the GDP trend have been entrusted to independent committees of experts. In the case of the copper price, each committee member submits estimates of the average price of copper for the next ten years. To arrive at the final figure, these estimates are averaged, with the minimum and maximum estimates excluded.

Similarly, to calculate the value of the GDP trend, each committee member submits estimates of gross fixed capital formation, of the labor force, and of total factor productivity for the next five years. For each of the three variables, the trimmed mean is calculated for each year, eliminating the minimum and maximum. By using these variables, series for capital stock and hours worked (adjusted for education) are constructed. The filtered series of hours and total factor productivity, plus the unfiltered series of capital stock, are used as inputs in a Cobb-Douglas production function whose parameters are estimated by the Ministry of Finance on the basis of information from National Accounts and the National Statistics Bureau. With this production function and inputs above, the Budget Office calculates the trend GDP for the period.

The system began operating with the 2001 budget bill, sent to Congress in September 2000. From the start, the rule involved a structural surplus target set at 1% of GDP. Thus, expenditures were lower than structural income by 1% of GDP. There were three main reasons for this particular situation. First, the public sector was still a net debtor in an amount equal to 11% of GDP. Second, there was a potentially large stock of contingent liabilities—associated with minimum pension guarantees and public works concessions—as well as external vulnerabilities associated with currency mismatches and potential borrowing constraints. Third, the CBC's financial position, weakened by the 1982–1983 bank bailout, remained delicate, with the bank showing in the late 1990s an operating deficit of approximately 1% of GDP. Larger public savings could provide the resources to tackle all three of these issues.

³See IMF (2009).

Largely due to the implementation of the fiscal structural balance rule, the public sector accumulated net assets and eventually became a net creditor. The risks associated with currency mismatches were reduced, and the contingent liabilities of the Treasury were identified and quantified. Finally, the financial situation of the CBC improved. These developments would eventually allow the government to reduce the structural balance target to 0.5% of GDP, starting with the 2008 Budget Law.

5.1. The Political Economy Behind the Rule

Our theoretical discussion above suggests that there are two potential political conflicts in the elaboration and approval of a budget: one among spending ministers who do not fully internalize the social costs of additional expenditure and one among parliamentarians who, representing individual constituencies, value the local benefits of additional spending but do not fully internalize the costs. The introduction of the fiscal rule in Chile helped to ameliorate both problems.

First, in the early phase of budget preparation, the rules for the negotiation among ministers are key. One alternative is to channel individual spending requests first and then let the spending limit emerge from the simple aggregation of those petitions. Another alternative is for a ceiling to be preset and then within that ceiling allow spending ministers to bargain over their spending shares. The latter system is clearly superior because it encourages individual players to internalize the aggregate budget constraint. But how is the spending ceiling to be determined? The fiscal rule provides the answer. In this case, the government can spend only approximately its long-term cyclically adjusted income, and windfalls must be saved. For the ceiling to be politically legitimate, the regime for setting that ceiling has to be simple and predictable, and the Finance Minister must be capable of explaining it intuitively (for instance, in terms of saving the windfalls for rainy days).

The rule also improves the relationship between Executive and Legislature in the process of amendment and approval of the proposed budget. Recall that in Chile, Congress does not have the power to increase spending autonomously on any given item. But negotiations may take place, with groups of parliamentarians withholding support for some items in an attempt to get other items funded. Having a preset and objectively chosen ceiling gives these discussions a measure of discipline, with individual players understanding that additional spending demands cannot be too large because they have to be funded by cuts elsewhere. The existence of a publicly acknowledged system also helps individual congressmen explain to their constituencies why a particular spending item may not receive as much funding as the constituency might have desired.

Why is the rule a political equilibrium? If the rule is not externally imposed (and recall that in Chile it was self-imposed and not legally binding for its first five years of operation), why is it a useful and credible disciplining device? One answer is that the ceiling provided by the rule is a natural coordinating device or focal point. In other words, agents may understand that, in the absence of such a coordinating device, spending demands would mount, and eventually costs would be paid by all. No agent wants to be the first to unilaterally reduce its spending claims. But if others are expected to do so because of the existence of a spending ceiling, then each agent may individually wish to do so as well.

For the rule to play this role, the ceiling need not be based on a cyclical adjustment or on any other particular criterion. Rather, the main point is that a simple, legitimate, and intuitive rule can improve the political economy of fiscal policy by virtue of disciplining bargaining interactions both within and outside the Executive. In turn, eliminating procyclicality (and even introducing

some mild countercyclicality) can improve the macro properties of fiscal policy. In this context, the Chilean fiscal policy rule has been successful so far.

5.2. The Chilean Rule in Practice: Asset Dynamics

How did the rule operate in practice, and what kind of dynamics did it imply for government assets and liabilities? If one uses the same notation as before, and if the surplus target is s_t , the rule mandates that spending follow

$$g_t = E_{t-1}(rb_{t-1} + \tau + \varepsilon_t - s_t) = rb_{t-1} + \tau - s. \quad (14)$$

The law of motion for assets is

$$b_t = (1 + r)b_{t-1} + \tau + \varepsilon_t - g_{t-1}. \quad (15)$$

Combining the two previous equations, we have

$$b_t - b_{t-1} = s_t + \varepsilon_t \quad (16)$$

so that asset accumulation fluctuates with the realized shock. Expressing Equation 16 as shares of income, we have

$$b'_t - b'_{t-1} = s' - \left(\frac{\gamma}{1 + \gamma} \right) b'_{t-1} + \varepsilon'_t, \quad (17)$$

where $x'_t = x_t/y_t$, y_t is GDP, γ is the rate of growth of GDP, and the surplus target is assumed to be fixed as a share of GDP. The intuition behind this equation is simple: The government accumulates assets as a result of the surplus target (because $s' > 0$) and if and when the random shock is beneficial ($\varepsilon > 0$). Thus, in the absence of a sequence of bad shocks, net assets should grow with time (or net debt should fall).

In steady state, the last equation becomes

$$b' = \left(\frac{1 + \gamma}{\gamma} \right) s' \quad (18)$$

so that long-term asset holdings (as a share of national income) are a multiple of the surplus target: the larger the target, the larger the stock of net assets toward which the government should expect to converge.

6. CHILEAN SOVEREIGN WEALTH FUNDS

The application of the Chilean fiscal rule gave rise to substantial fiscal savings, which had to be managed somehow. Hence the Fiscal Responsibility Act of 2006, which created the legal framework for the application of the fiscal rule and created two SWFs as vehicles for managing the surplus resulting from the application of the rule. The Pension Reserve Fund (PRF) was designed to help fulfill fiscal obligations in the areas of pensions and social security. Specifically, the fund prefunds the government's guaranteed minimum old-age and disability pensions for low-income pensioners. The Economic and Social Stabilization Fund (ESSF) was created to finance fiscal deficits that may occur during periods of weak growth and low copper prices. It can also be used to repay debt or to fund the PRF.

6.1. Capital Contributions

The minimum annual amount that must be transferred to the PRF is 0.2% of the previous year's GDP. If the fiscal surplus exceeds this amount, the contribution may reach a maximum of 0.5% of GDP. Under the Fiscal Responsibility Act, the government is also authorized to recapitalize the CBC for five years from 2006 for an annual amount of the difference between government contributions to the PRF and the fiscal surplus cash, an upper limit of 0.5% of GDP. In 2006, 2007, and 2008, the recapitalization was equivalent to 0.5% of GDP.

The 2006 law specified that the remainder of the effective surplus, after payment into the PRF and capitalization of the CBC, must be deposited in the ESSF. However, repayments of public debt and advanced payments into the ESSF during the previous year can be subtracted from this contribution (see Figure 1).

6.2. Governance and Institutional Framework

Investments of the assets held by the PRF and ESSF require a clear and transparent institutional framework to design and carry out investment policy and to monitor and control risk. This framework was established in the Fiscal Responsibility Act. The Ministry of Finance acts as the representative of Chilean citizens, who are the owners of the resources accumulated in the Chilean SWFs. In addition, in 2006 the Ministry of Finance appointed the CBC—subject to the approval of its governing board—as the fiscal agent for the management of both funds and established the general framework for their administration. Finally, in 2007 the Ministry of Finance created the autonomous Financial Committee, whose role is to advise the Minister of Finance on all matters relating to the investment of the PRF and ESSF (see Figure 2).

6.3. Investment Policy

Investment policy, defined when the PRF and ESSF were created, initially involved asset classes similar to those used by the CBC for international reserves. This choice was based primarily on the

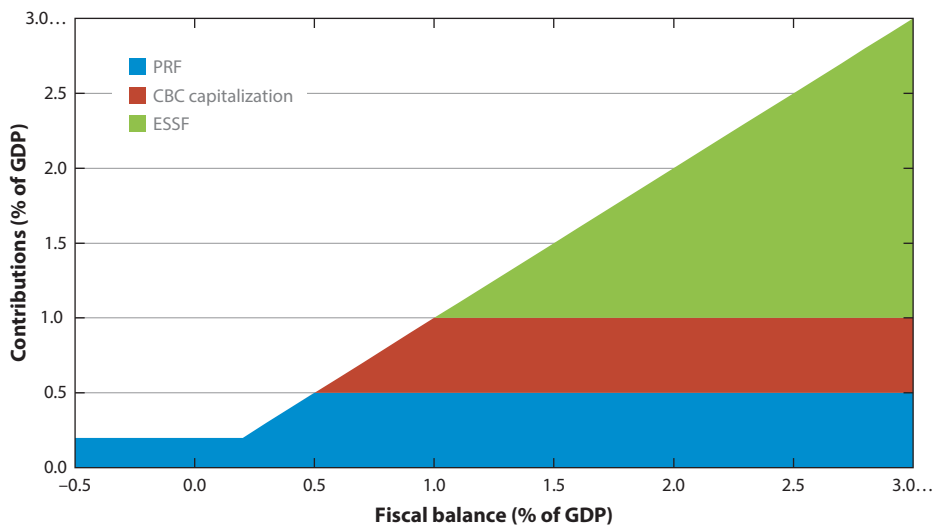


Figure 1

Fiscal savings rule. From Ministry of Finance of Chile.

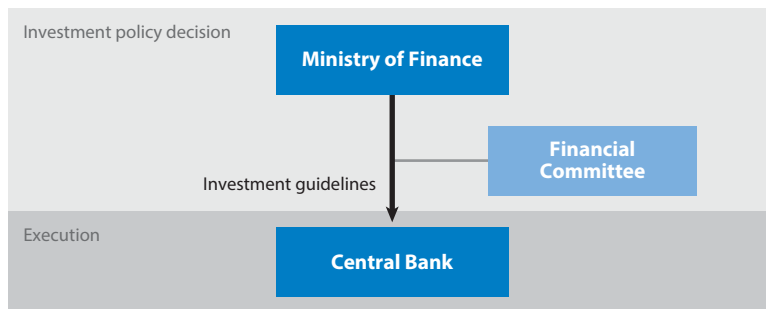


Figure 2

Institutional framework. From Ministry of Finance of Chile.

CBC's extensive experience in managing these asset classes. Under the original policy, 66.5% of fund assets were invested in nominal sovereign bonds, 30% were invested in money market instruments, and 3.5% were invested in government bonds indexed to inflation.

In the first quarter of 2008, a new investment policy was recommended by the Financial Committee and was accepted by the Ministry of Finance. The new investment policy included not only sovereign fixed income and money market instruments, but also equity and corporate bonds. Application of this new policy was postponed, on the recommendation of the Financial Committee, as a result of the global financial crisis of 2008–2009. During 2011, the Financial Committee again recommended a less conservative investment policy, but only for the PRF. The implementation of this policy began in January 2012, and by mid-March 2012 the new investment portfolio included 15% of equity and 20% in corporate bonds. External managers handle these riskier asset classes,⁴ whereas the CBC manages the rest. Most recently, the ESSF changed its original strategic asset allocation to include 7.5% of equity (see Figure 3).

An important point is that, above and beyond these changes, Chile's investment strategy involves placing all funds' assets in foreign currency and outside the country. This strategy may seem surprising, given that the bulk of the government's spending commitments is denominated in pesos. There are two reasons for this choice. First, an investment policy in foreign currency is a natural hedge that generates a countercyclical influence on government income. Given the negative correlation between the nominal exchange rate and the price of copper, the government tends to accumulate resources when copper is high and the peso is strong and to dissave whenever the opposite occurs.

Second, saving the resources abroad helps stabilize the real exchange rate. The potential conversion of copper revenues (which the government receives in US dollars) into local currency may result in a significant appreciation of the exchange rate, generating the so-called Dutch disease, despite the application of the structural balance rule. Keeping the savings in foreign currency helps avoid this danger.

The investment policy adopted by Chile's two SWFs was quite conservative, but this conservatism served the country well when the financial crisis hit. In 2008 the Chilean SWFs had among the highest returns of all the world's SWFs. In 2009, international markets displayed

⁴The external managers selected in 2011 are Mellon Capital Management Corporation and BlackRock Institutional Trust Company for equities and Rogge Global Partners and BlackRock Institutional Trust Company for corporate bonds.

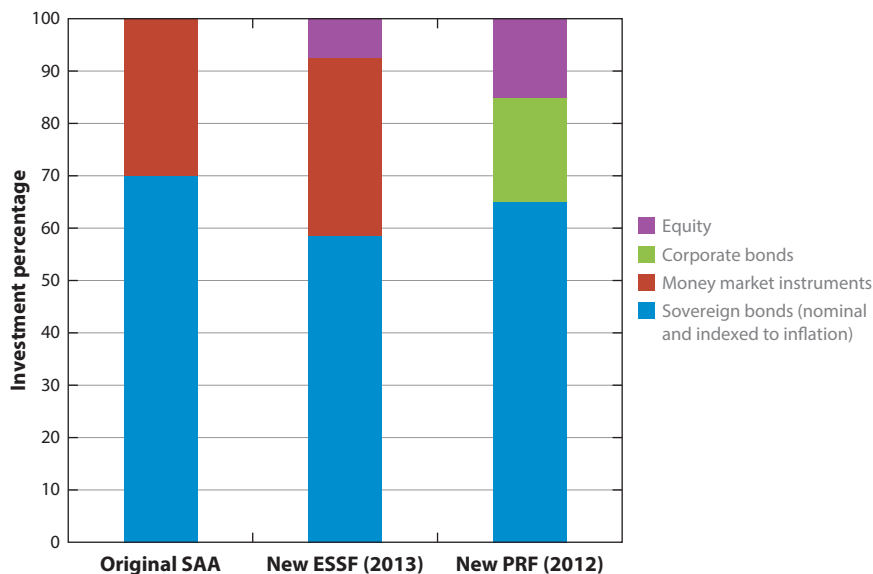


Figure 3

Investment policy. Abbreviations: ESSF, Economic and Social Stabilization Fund; PRF, Pension Reserve Fund; SAA, Strategic Asset Allocation. Data from Ministry of Finance of Chile.

a boom in riskier asset prices, so many SWFs enjoyed strong recoveries in their market values; meanwhile, Chile stayed with the same prudent portfolio, with consequent lower relative returns that year. On average, the rates of return of the Chilean funds in the 2007–2009 period were higher than those of their peers.

6.4. Transparency and the Santiago Principles

Since the creation of the Chilean SWFs, the government has been committed to transparency in their management. Transparency is a goal in itself but also a factor that supports the legitimacy of the fiscal savings process. The Ministry of Finance publishes monthly, quarterly, and annual reports on the financial status of the funds and all recommendations made by the Finance Committee, plus other relevant information produced by the Ministry of Finance.

This commitment to effective and opportune access to information was particularly important in 2008, when the global financial crisis meant increased demand for information about the financial soundness of institutions in which the funds’ assets were deposited as well as about the intermediaries and custody services used. Transparency helped dispel public nervousness over the safety of investments.

The Chilean government decided from the start to participate actively in the initiatives to establish a global framework for SWFs. The Ministry of Finance of Chile took an active role in the International Working Group of Sovereign Wealth Funds. This group concluded its deliberations with a broad agreement in the city of Santiago about best principles and practices for SWFs. This agreement is now known internationally as the Santiago Principles.

Chile was also active in the creation of a permanent forum for the exchange of views and information between SWFs and recipient countries. The International Forum of Sovereign Wealth Funds (IFSFWF) aims to exchange views on issues of common interest and to facilitate understanding of the Santiago Principles and the activities of such funds.

The Santiago Principles are based on the following guiding ideas for SWFs: (a) have in place a transparent and sound governance structure that provides for adequate operational controls, risk management, and accountability; (b) ensure compliance with applicable regulatory and disclosure requirements in the countries in which SWFs invest; (c) ensure that SWFs invest on the basis of economic and financial risk and return-related considerations; and (d) help maintain a stable global financial system and free flow of capital and investment.

More than five years after the Santiago Principles were adopted, these objectives have mostly been met. The Santiago Principles have contributed to financial stability and to an open investment climate. Measured transparency is much higher for members of the IFSWF, the group that formally implemented the Santiago Principles. Indeed, the Peterson Institute for International Economics Scoreboard registered a compliance of 65% for IFSWF members, whereas compliance for non-IFSWF members reached only 42%.⁵

In the case of Chile, the Peterson Institute has also recognized efforts to improve transparency. Indeed, the Chilean ESSF was awarded 91 points out of 100 in the 2012 SWF scoreboard, taking third place among 49 SWFs. Similarly, since 2009, Chile has earned a perfect score in the global ranking of the Sovereign Wealth Fund Institute in its indicator of transparency and good governance among SWFs.

7. MACROECONOMIC EFFECTS OF THE CHILEAN FISCAL RULE

Since the advent of the structural balance rule more than a dozen years ago, countercyclical fiscal policy has contributed to diminishing GDP volatility in Chile. The evidence shows that output volatility has dramatically decreased over the past decades, with a sharp decline in the beginning of the 1990s (see **Figure 4**). That period coincides with the beginning of the CBC's autonomy and with the informal application of an inflation-targeting regime. The data show that GDP volatility continuously dropped during the 2000s (except, of course, during the mild recession caused by the subprime crisis). GDP volatility declined from 2004 to 2008, despite the fact that between 2003 and 2008 the price of copper increased by more than 400%.

Several authors stress the role played by the Chilean fiscal rule in reducing economic volatility. For instance, Larraín & Parro (2008) estimate that approximately 60% of the decline in GDP volatility is attributable to the fiscal rule and to a flexible exchange rate regime. De Gregorio & Labbé (2011) find that the Chilean economy has become increasingly resilient to copper price shocks, especially since the 2000s. This evidence shows that a flexible exchange rate, a rule-based fiscal policy, and a flexible inflation-targeting regime also play a central role in these results.

In a related paper, Franken et al. (2006) show that economic policy indicators—including measures of the fiscal stance—displayed the largest reduction in volatility, even larger than the volatility of the output gap. Indeed, the authors find that the volatilities associated with structural and monetary policies fell to nearly half their previous values, whereas the volatility of fiscal policy fell even more sharply (see **Figure 5**).

To measure resilience to external shocks—the most important type of exogenous shocks faced by the Chilean economy—Franken et al. (2006) compute the ratio of the volatility of external shocks to the volatility of the output gap. This ratio deteriorated markedly in the 1970s and 1980s and then improved sharply in the 1990s. This evidence suggests that the Chilean economy has become more resilient to external shocks, showing that policy actions can play a role as shock absorbers.

⁵See Bagnall & Truman (2013).

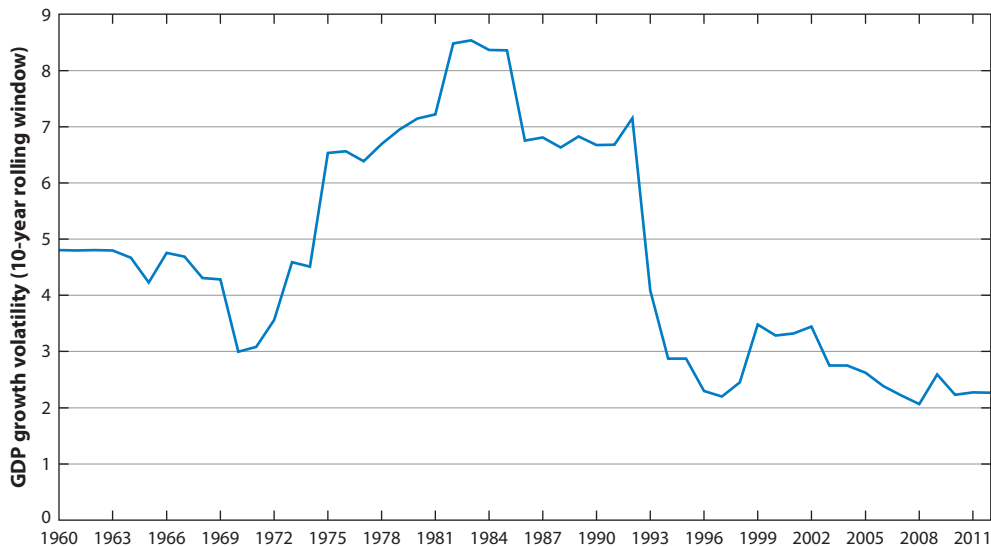


Figure 4
 GDP growth volatility (10-year rolling window). Data from Díaz et al. (2010) and Central Bank of Chile.

Overall, the strengthening of the Chilean policy framework in the last period of the sample went beyond the adoption of the fiscal rule to include the floating of the exchange rate and the refinement of the inflation-targeting framework. These factors also seem to have played a significant role in the capacity to withstand external shocks, as De Gregorio & Labbé (2011) point out.

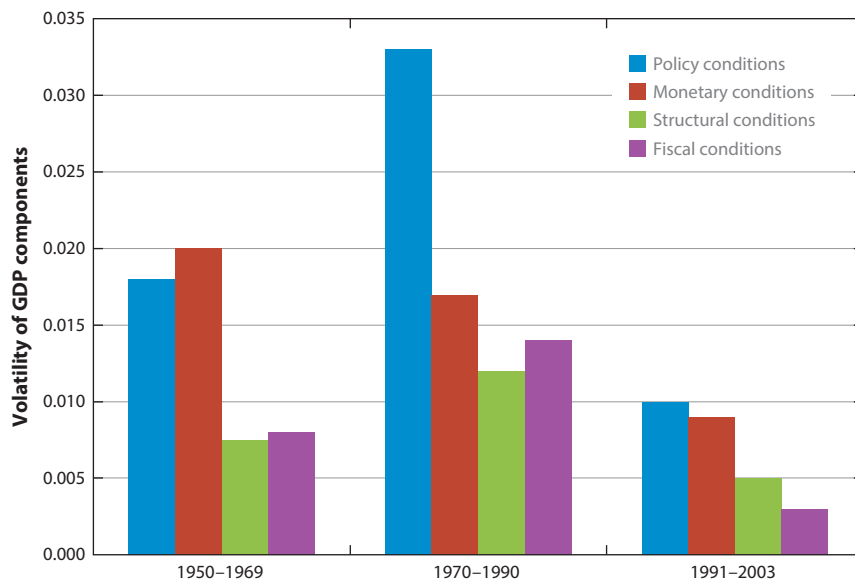


Figure 5
 Volatility of GDP components: policy conditions. Data from Franken et al. (2006).

In addition, a prudent fiscal policy has been central to preserving the external competitiveness of the Chilean economy in the presence of a surge in the terms of trade. In recent years, with high average copper prices, the application of the fiscal rule has reduced the effect on the real exchange rate. Despite the significant increase in the terms of trade in recent years, the real exchange rate was slightly below the average real exchange rate between 1990 and 2013 (see Figure 6).

8. IMPACT OF THE GLOBAL CRISIS IN 2008–2009

When the global financial crisis hit hard in 2008, Chile’s economy was in an excellent position to mitigate the effects of the crisis. The country’s preparedness was, to a great extent, the result of lessons learned from previous crises.

After a massive banking crisis in 1982, Chile began to implement prudent and modern financial regulations with high standards of supervision. This action allowed Chile to face the global credit crunch with a solid and well-capitalized financial system.

The 2008–2009 global financial shock was the first that Chile had confronted with a flexible exchange rate. That policy helped Chile to avoid building up currency exchange imbalances and facilitated the application of countercyclical policies. The inflation-targeting framework implemented by the CBC led naturally to an easing of monetary policy in the context of plummeting inflationary expectations. The flexible exchange rate provided a natural cushion to accommodate fluctuations in external conditions. The CBC also accumulated a prudent quantity of international reserves that, together with treasury assets, helped Chile face the liquidity restrictions that began to arise in the latter months of 2008.

Last but certainly not least, Chile had the fiscal resources with which to deal with the financial crisis. Public debt was negligible, and the Treasury was a net creditor for the first time in its history. This combination of factors endowed Chile with a so-called fiscal space in which to engage in

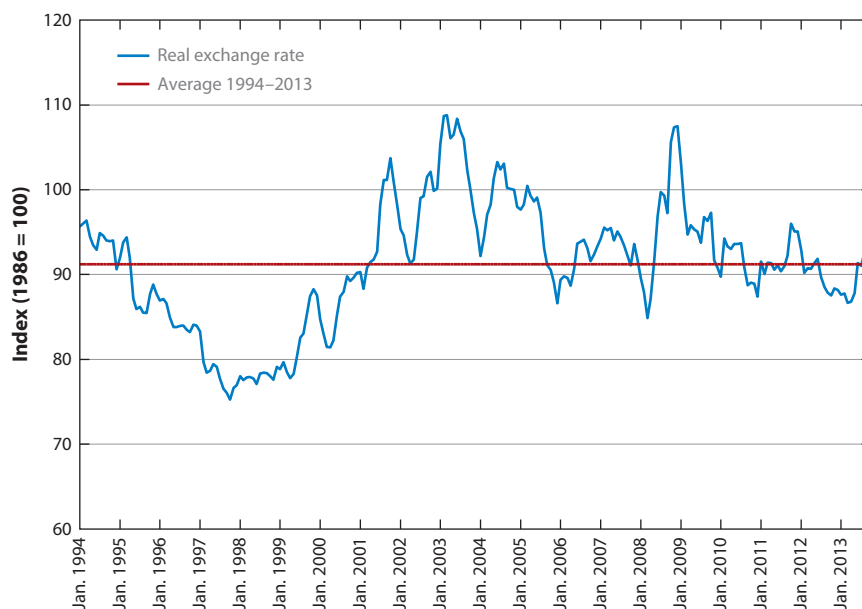


Figure 6

Real exchange rate. Data from Central Bank of Chile.

countercyclical fiscal policy that many other nations in the world—many of them in Europe—were sorely lacking.

When the crisis hit, the first priority was to avoid a liquidity crunch in the domestic financial system. In October 2008, the Ministry of Finance and the CBC implemented a number of measures to ensure the economy's liquidity in both national and foreign currencies. The CBC stopped buying US dollars to accumulate reserves; opened a window for US\$500 million auctions of currency swaps of 28 days, which it later expanded to 180 days; eased collateral requirements for repo operations; and temporarily loosened bank reserve rules. At the same time, the government auctioned off US\$1.05 billion of Treasury assets to be deposited in the local banking system.

Next came the fiscal response. Chile's government put in place opportune, substantial, and temporary fiscal measures. In January 2009, Chile became one of the first countries to react to the global crisis by announcing an extraordinary fiscal stimulus plan. Close to US\$4 billion, equivalent to 2.8% of GDP, was assigned to this package from the ESSF. At the time this 2009 fiscal plan was announced, it was the world's second largest as measured by resources committed relative to the economy's size.

To implement this expansionary fiscal policy, Chile opted for a diversified strategy, combining increases in public investment with transfers, employment subsidies, credit subsidies and stimuli, capitalization of state enterprises, and tax discounts. The government placed special emphasis on transitory measures, giving economic agents incentives to increase their demand to take advantage of these stimuli.

The logic behind this design was simple: In a situation of extraordinary uncertainty, with most components of private demand falling sharply, previous estimates of fiscal multipliers become unreliable because guessing how private spending will react to the fiscal expansion is nearly impossible. Given this uncertainty, simultaneously acting on many fronts is prudent and maximizes the chances that at least a subset of fiscal stimuli will have the desired effect.⁶ The fiscal plan was enhanced in March 2009 with 20 additional measures to stimulate the credit market—known as the Pro-Credit Initiative—and one month later with an unprecedented proemployment agreement among government, workers, and businesses.

The sharp drop in aggregate demand hit fiscal revenues very hard. Over the course of 2009, Chile experienced deflation, with the CPI falling by 1.4%. Because expenditure is fixed in the budget in nominal terms, the deflation meant a higher-than-anticipated real increase in expenditure. The combination of sharply lower revenues and higher outlays meant that by the end of the year the fiscal deficit was higher than it had been estimated to be at the time of the launching of the fiscal stimulus. By the end of 2009, the actual total deficit reached 4.5% of GDP, and the structural deficit accounted for 1.3% of GDP, which was substantially higher than the structural balance that had been forecasted earlier in the year.⁷

The gap was financed by drawing down from the ESSF. The stimulus and the drop in tax collection led the government to use the ESSF again in June 2009, drawing down US\$4 billion on top of what had already been withdrawn in the first half of the year. Given the objectives of the funds, countercyclical fiscal policy triggered disbursements from the ESSF, and not from the PRF (see **Figures 7 and 8**).

⁶See Blanchard et al. (2008).

⁷That is the structural balance calculated by employing the methodology that was in use in 2009. In mid-2010, the new administration, following a preliminary report by the Advisory Committee (Ministry of Finance of Chile 2011), introduced some methodological changes that, if applied retroactively, would have enlarged the 2009 structural deficit. The bulk of the difference has to do with the treatment of temporary tax cuts, which, in the 2009 methodology, did not modify structural or permanent income.

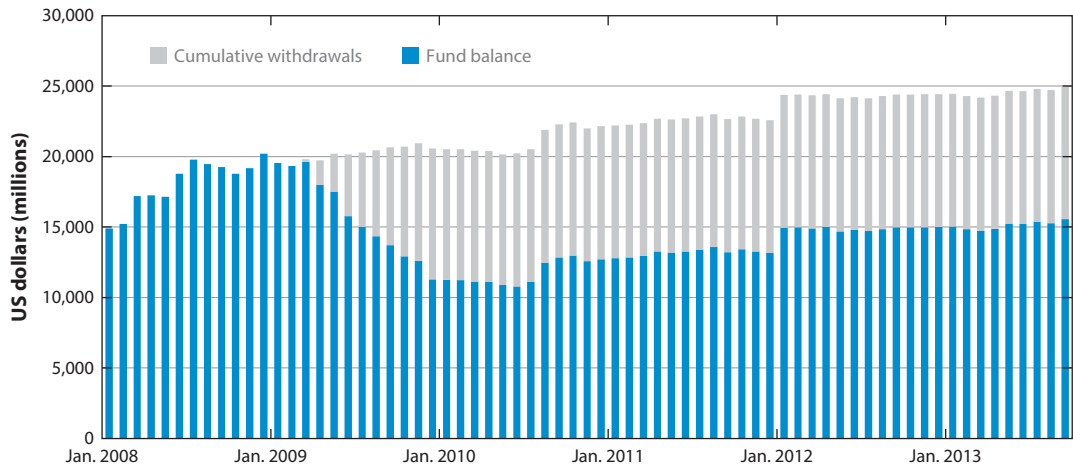


Figure 7

Economic and Social Stabilization Fund market value. Data from Ministry of Finance of Chile.

Expansionary countercyclical policies were complemented by an aggressive reduction in the CBC’s monetary policy rate, which reacted to lower inflationary perspectives and to a widening output gap. The 775-basis-point rate decrease over the course of 2009 brought the CBC’s interest rate to a historic low of 0.5%.

To enhance the monetary policy stimulus, in mid-2009 the CBC adopted unconventional monetary policy measures, mostly by establishing a term lending facility for the banking system at the current monetary policy rate. The CBC announced that monetary policy would remain at that level until at least the second quarter of 2010.

Chile deliberately attempted to coordinate its fiscal and monetary policies. It stood out as the country with the most aggressive countercyclical policies, with substantially eased credit conditions and a large fiscal stimulus (see Figure 9).

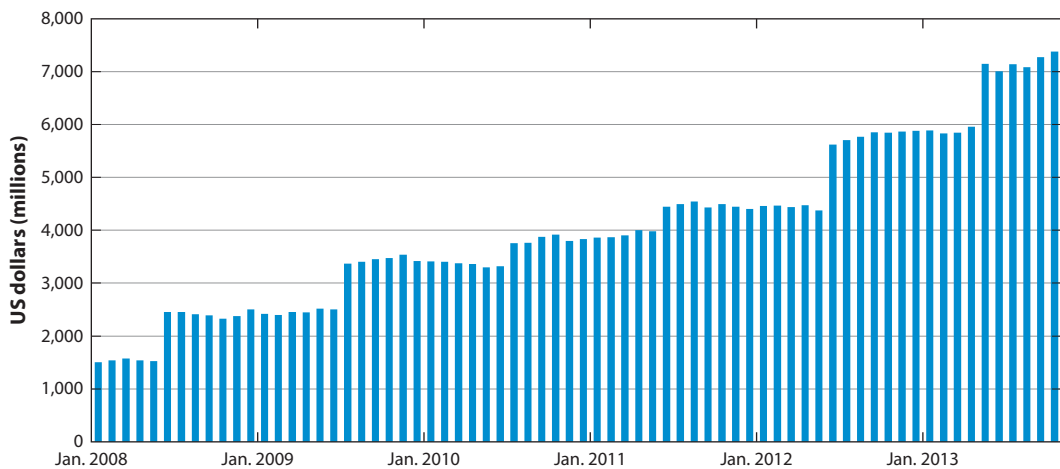


Figure 8

Pension Reserve Fund market value. Data from Ministry of Finance of Chile.

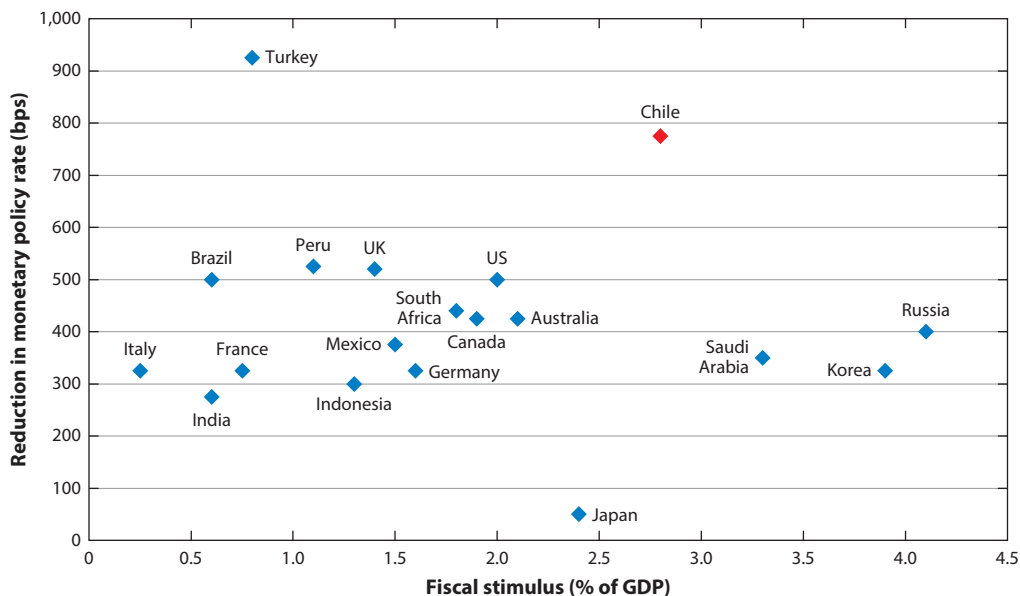


Figure 9

Fiscal and monetary policy stimuli. Basis points are denoted by bps. Data from IMF and Bloomberg.

These policies paid off. Given the magnitude of the shock, the contraction in output was relatively small and short-lived. **Figure 10** shows one proxy for the exogenous shock—the size in the drop of export values as a share of GDP—plotted against the fall in output from precrisis peak to trough. The figure shows that in a large sample of countries, both emerging and developed, only two (Norway and Canada) clearly outperformed Chile in the sense of having experienced both a larger export drop and a smaller output contraction.

In the end, real GDP fell by 1% in 2009, with the recovery in demand and output visible already beginning in the third quarter of 2009. A tremendous earthquake hit Chile in February 2010, causing substantial loss of life, a destruction of the capital stock of approximately US\$8 billion, and long-lasting production dislocations in the south-central portion of the country. But all this damage could not hold back the recovery: Chile grew 5.8% in 2010, with investment rising sharply both for cyclical reasons and to meet the needs of reconstruction, and growth averaged more than 5% in 2011–2013. These results suggest that the countercyclical fiscal and monetary policies were extremely effective: By limiting the size and the collateral damage of the 2009 demand collapse, they created the conditions for a strong recovery.

9. CONCLUSIONS

Over the past quarter-century, Chile has proven that the unthinkable is possible: A middle-income, natural resource–producing nation can have a fiscal policy that is both stable and sustainable. The core orientation of this policy has been very simple: Act responsibly, design policy for the long run, and accumulate enough fiscal space so that fiscal policy can play a stabilizing role in the short run. The approach implies saving during periods of high copper prices and using those accumulated resources during the global economic crisis.

This approach to fiscal policy also improved the political dynamics of budget design and approval. Structural income (minus the targeted surplus) provided a spending ceiling that helped

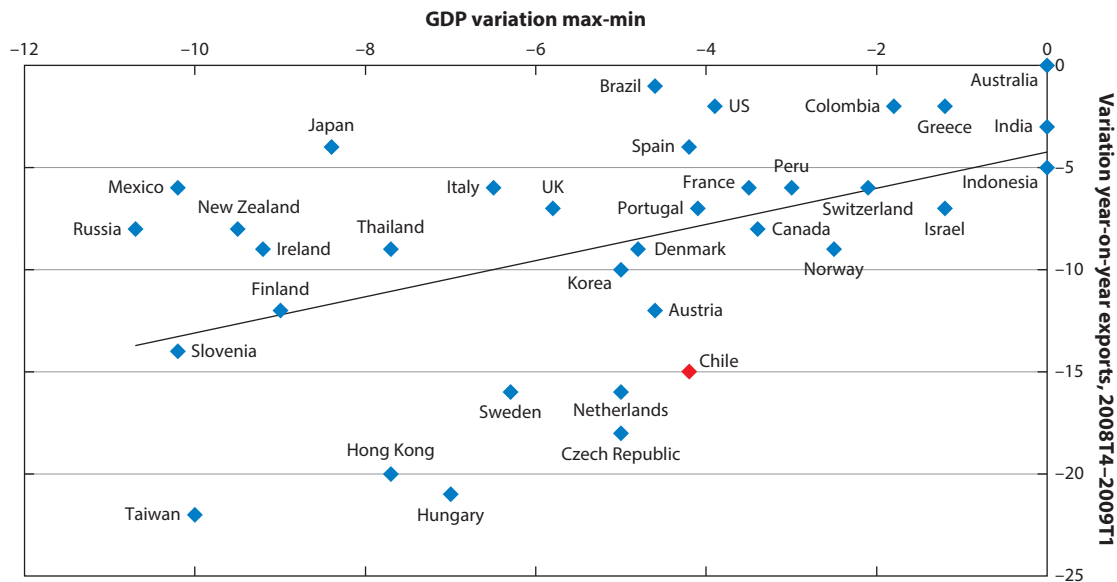


Figure 10

Output contraction and negative export shocks. Data from IMF and the World Bank.

discipline competing claims by spending ministers and parliamentarians. Chile's budget-making arrangements, initially stronger than those of many emerging markets, improved markedly.

Chile's fiscal policy underwent two demanding tests. In the early years of the copper boom, the key was to show that the copper windfall could be saved, in spite of mounting political pressures to spend the windfall. During the financial crisis, the key was to demonstrate that accumulated fiscal resources could be used aggressively to cushion the impact on economic activity and employment. Chile's fiscal policy passed both tests, and with good results.

But success should not breed complacency. There are challenges ahead. The most important challenge has to do with the institutional structure of fiscal policy. Using external and independent committees to fix the long-term price of copper and the growth trend has proven to be very successful. There is room to build on this success and to provide more institutional structure for other aspects of the application of the structural approach: for instance, in determining what changes need to be made to the methodology for calculating structural or long-term fiscal income.

The methodology of cyclical adjustment needs to be continuously improved to reflect underlying structural change in the economy. A balance must be struck between precision and simplicity: Only a rule that is simple enough can be understood by the population and will remain legitimate and politically acceptable. At the same time, providing greater transparency and accountability over the fiscal framework is key. Markets demand such transparency and accountability, but more importantly, securing the political sustainability of the fiscal rule is indispensable.

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LITERATURE CITED

- Alesina A, Drazen A. 1991. Why are stabilizations delayed? *Am. Econ. Rev.* 81:1170–88
- Alesina A, Hausmann R, Hommes R, Stein E. 1999. Budget institutions and fiscal performance in Latin America. *J. Dev. Econ.* 59(2):253–73
- Alesina A, Perotti R. 1995. *The political economy of budget deficits*. Staff Pap., Int. Monet. Fund. (IMF)
- Alesina A, Tabellini G. 1990. Voting on the budget deficit. *Am. Econ. Rev.* 80(1):37–49
- Arezki R, Brückner M. 2012. Commodity windfalls, democracy and external debt. *Econ. J.* 122(561):848–66
- Bagnall A, Truman E. 2013. *Progress on sovereign wealth fund transparency and accountability: an updated SWF scoreboard*. Policy Brief PB13-19, Peterson Inst. Int. Econ.
- Barro R. 1979. On the determination of the public debt. *J. Polit. Econ.* 87:940–71
- Blanchard O, Cottarelli C, Spilimbergo A, Symansky S. 2008. *Fiscal policy for the crisis*. Staff Position Note 08/01, IMF
- Brückner M. 2010. Natural resource dependence, non-tradables, and economic growth. *J. Comp. Econ.* 38(4):461–71
- Buchanan J, Wagner R. 1977. *Democracy in Deficit*. New York: Academic
- Cashin P, Céspedes LF, Sahay R. 2004. Commodity currencies and the real exchange rate. *J. Dev. Econ.* 75(1):239–68
- Céspedes LF, Poblete S. 2011. Política fiscal en países exportadores de bienes primarios: la experiencia Chilena. In *Volatilidad macroeconómica y respuestas de políticas*, ed. JM Fanelli, JP Jiménez, O Kacef, pp. 125–64. Santiago: Com. Econ. Am. Lat. Caribe (CEPAL), U. N.
- Céspedes LF, Velasco A. 2012. Macroeconomic performance during commodity price booms and busts. *IMF Econ. Rev.* 60:570–99
- Céspedes LF, Velasco A. 2014. Was this time different?: fiscal policy in commodity republics. *J. Dev. Econ.* 106:92–106
- Cuddington J. 1989. Commodity export booms in developing countries. *World Bank Res. Obs.* 4:143–65
- Cukierman A, Meltzer A. 1989. A political theory of government debt and deficits in a neo-Ricardian framework. *Am. Econ. Rev.* 79(4):713–32
- De Gregorio J, Labbé F. 2011. Copper, the real exchange rate and macroeconomic fluctuations in Chile. In *Beyond the Curse: Policies to Harness the Power of Natural Resources*, ed. R Arezki, T Gylfason, A Sy, pp. 203–33. Washington, DC: IMF
- Díaz J, Lüders R, Wagner G. 2010. *La república en cifras*. Iniciat. Cient. Milen., EH Clío Lab. <http://www.economia.puc.cl/cliolab>
- Drazen. 2000. *Political Economy in Macroeconomics*. Princeton, NJ: Princeton Univ. Press
- Frankel J, Vegh C, Vuletin G. 2013. On graduation from fiscal procyclicality. *J. Dev. Econ.* 100:32–47
- Franken H, Le Fort G, Parrado E. 2006. Business cycle responses and the resilience of the Chilean economy. In *External Vulnerability and Preventive Policies*, ed. R Caballero, C Calderón, LF Céspedes, pp. 71–108. Santiago: Central Bank Chile
- Gavin M, Hausmann R, Perotti R, Talvi E. 1996. *Managing fiscal policy in Latin America and the Caribbean: volatility, procyclicality and limited creditworthiness*. Unpub. Pap., Inter-Am. Dev. Bank
- Gavin M, Perotti R. 1997. Fiscal policy in Latin America. *NBER Macroecon. Annu.* 1997 12:11–70
- IMF. 2009. *Fiscal rules—anchoring expectations for sustainable public finances*. Staff Pap., IMF
- Izquierdo A, Romero R, Talvi E. 2008. *Booms and busts in Latin America: the role of external factors*. Res. Dep. Work. Pap. 631, Inter-Am. Dev. Bank
- Kaminsky G, Reinhart C, Vegh C. 2005. When it rains, it pours: procyclical capital flows and macroeconomic policies. *NBER Macroecon. Annu.* 2004 19:11–82
- Kaminsky GL. 2010. Terms of trade shocks and fiscal cycles. *Proc. Conf.*, “Inflation in an Era of Relative Price Shocks,” Kirribilli, Aust., Aug. 17–18, pp. 231–50. Sydney: Reserv. Bank Aust.
- Kose A. 2002. Explaining business cycles in small open economies: How much do world prices matter? *J. Int. Econ.* 56:299–327
- Lane P. 2003. The cyclical behaviour of fiscal policy: evidence from the OECD. *J. Public Econ.* 87(12):2661–75
- Lane P, Tornell A. 1996. Power, growth and the voracity effect. *J. Econ. Growth* 1:213–41

- Larraín F, Parro F. 2008. Chile menos volátil. *Trimest. Econ.* 75(299):563–92
- Lucas R Jr, Stokey N. 1983. Optimal fiscal and monetary policy in an economy without capital. *J. Monet. Econ.* 12(1):55–93
- Mendoza E. 1995. The terms of trade, the real exchange rate, and economic fluctuations. *Int. Econ. Rev.* 36:101–37
- Mendoza E, Terrones M. 2008. *An anatomy of credit booms: evidence from macro aggregates and micro data.* NBER Work. Pap. 14049
- Ministry of Finance of Chile. 2011. *Propuestas para perfeccionar la regla fiscal.* Rep., Advis. Comm., Minist. Financ. Chile
- Nordhaus W. 1975. The political business cycle. *Rev. Econ. Stud.* 42:169–90
- Persson T, Svensson L. 1989. Why a stubborn conservative would run a deficit. *Q. J. Econ.* 104(2):325–45
- Poterba JM, von Hagen J, eds. 1999. *Fiscal Institutions and Fiscal Performance.* Chicago: Univ. Chicago Press
- Reinhart C, Reinhart V. 2009. Capital flows bonanzas: an encompassing view of the past and present. In *NBER International Seminar in Macroeconomics 2008*, ed. J Frankel, F Giavazzi, pp. 9–62. Chicago: Chicago Univ. Press
- Rogoff K. 1990. Equilibrium political budget cycles. *Am. Econ. Rev.* 80:21–36
- Rogoff K, Sibert A. 1988. Elections and macroeconomic policy cycles. *Rev. Econ. Stud.* 55:1–16
- Sinnott E. 2009. *Commodity prices and fiscal policy in Latin America and the Caribbean.* Unpub Pap., World Bank
- Stein E, Talvi E, Gristani A. 1999. Institutional arrangements and fiscal performance: the Latin American experience. See Poterba & von Hagen 1999, pp. 103–33
- Tabellini G. 1991. The politics of intergenerational redistribution. *J. Polit. Econ.* 99(2):335–57
- Talvi E, Vegh C. 1996. *Can optimal fiscal policy be procyclical?* Manuscr., Off. Chief Econ., Inter-Am. Dev. Bank
- Tornell A, Lane P. 1999. The voracity effect. *Am. Econ. Rev.* 89:22–46
- Tornell A, Velasco A. 1992. Why does capital flow from poor to rich countries? The tragedy of the commons and economic growth. *J. Polit. Econ.* 100:1208–31
- Tornell A, Velasco A. 2000. Fixed versus flexible exchange rates: Which provides more fiscal discipline? *J. Monet. Econ.* 45(2):399–436
- Velasco A. 1999. A model of endogenous fiscal deficits and delayed fiscal reforms. See Poterba & von Hagen 1999, pp. 37–57
- Velasco A, Parrado E. 2012. The political economy of fiscal policy: the experience of Chile. In *The Oxford Handbook of Latin American Political Economy*, ed. J Santiso, J Dayton-Johnson, pp. 68–99. Oxford, UK: Oxford Univ. Press
- von Hagen J. 1993. Monetary union, money demand, and money supply: a review of the German Monetary Union. *Eur. Econ. Rev.* 37(4):803–27
- von Hagen J, Harden I. 1995. Budget processes and commitment to fiscal discipline. *Eur. Econ. Rev.* 39(3–4):771–79
- Weingast B, Shepsle K, Johnsen C. 1981. The political economy of benefits and costs: a neoclassical approach to distributive politics. *J. Polit. Econ.* 89:642–64