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The Chilean Fiscal Rule

Titel (Danish title)

Den chilenske finanspolitiske regel

Resumé (Danish summary)

Siden 2001 har den chilenske finanspolitik været baseret på en regel om strukturelt overskud. Med denne regel forpligter regeringen sig til at begrænse de offentlige udgifter til de strukturelle indtægter fratrukket målsætningen for det strukturelle overskud, hvilket er målt i forhold til BNP. Beregningen af den strukturelle balance afhænger af produktionstendensen, den langsigtede kobberpris samt den strukturelle indtægt fra Codelcos salg af molibdenum. Mens sidstnævnte beregnes med en referencepris lig med et historisk gennemsnit, afhænger de to førstnævnte af paneler bestående af uafhængige eksperter, som mødes en gang om året. Det faktum, at uafhængige eksperter har betydelig indflydelse på det offentlige budget, adskiller den chilenske finanspolitiske regel fra lignende regler anvendt i andre lande.

Opfyldelse af reglen er ikke fastsat ved lov, men derimod en frivillig handling fra regeringens side. Selvom om de offentlige indtægter, p.g.a. den kraftigt stigende kobberpris, er vokset hastigt de senere år, så har den strukturelle balance været holdt stabil på 1% af BNP. Som konsekvens heraf er den offentlige opsparing steget væsentligt. Denne opbevares i to fonde, som administreret af den chilenske centralbank.

The Chilean Fiscal Rule[*]

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Abstract

From 2001 the fiscal policy in Chile has been based on a structural surplus rule. Under this rule, the government is committing itself to maintain its expenditures equal to the structural revenue minus the target for the structural surplus, which is expressed in terms of the GDP. The calculation of the structural balance depends on trend output, the long-run copper price and the structural income from Codelco's molybdenum sale. While the latter is calculated with a reference price determined as the average of past prices, panels of independent experts, who meet once a year, determine the two former. The fact that independent experts have substantial influence on the fiscal budget makes the Chilean fiscal rule different from similar rules applied in other countries.

Compliance with the rule is not a legal obligation but a voluntary undertaking on the part of the government. Although the fiscal revenue has increased substantially in recent years due to a soaring copper price, the structural balance has remained stable at 1 % of the GDP. Hence, public saving has increased rapidly, accumulating in two sovereign wealth funds, which are administered by the Central Bank.

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1. Introduction

In the past decades, Chile and other Latin American countries have been subject to a high degree of macroeconomic volatility, which has resulted in big fluctuations in economic growth and the exchange rates and, in some cases, hyperinflation. One reason for this volatility has been large movements in international commodity prices—raw materials are important export articles for the region—combined with pro-cyclical macroeconomic policies. To move towards a countercyclical framework, in order to smooth economic fluctuations, Chile adopted in 2000 a structural surplus rule as the basis for the fiscal policy from 2001 onwards.[1]

Under this rule, the Chilean government undertakes to maintain nominal expenditures equal to the structural revenue minus the target for the structural surplus, which is expressed in terms of the gross domestic product (GDP) points. The indicator of the structural balance nets out the cyclical impact of economic activity, the long-run copper price and the structural income from the sale of molybdenum. The idea is that this indicator reflects the revenue that the central government would receive if the economy grew with the trend output rate, i.e. with full employment, and the prices of copper and molybdenum at their long-run levels.

Compliance with the rule is not a legal obligation but a voluntary undertaking on the part of the government.[2] To ensure the credibility and transparency of the rule, independent experts have a substantial influence in setting a ceiling to fiscal expenditures, which makes the Chilean fiscal rule unique in its application, compared with similar rules applied elsewhere. These panels of experts have since 2001 defined the reference long-run copper price and, since 2002, also the parameters used to calculate trend GDP. On the other hand, the government decides the target for the structural surplus.

There are several reasons for applying fiscal rules. Fiess (2002) mentions five: (1) to ensure macroeconomic stability, (2) enhance the credibility of the government's fiscal

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[1] A description of how the rule was developed can be found in Marcel et al. (2001).
[2] The government is, however, mandated by law to publish the annual structural surplus.

policy and help in debt consolidation, (3) ensure long-term sustainability of fiscal policy, (4) minimize negative externalities within a federation or an international arrangement, and (5) reduce the pro-cyclical bias in fiscal policy. Perry (2002) argues that pro-cyclical fiscal policy exacerbates the macroeconomic volatility in Latin American countries and that, in turn, excess volatility slows growth. Indeed, in Chile as well as in other Latin American countries, there is a high risk of pro-cyclical fiscal policy since a major part of the public revenue comes from copper exports.

The Chilean economy has arguably benefited in several aspects from implementing the structural balance policy. Rodríguez et al. (2007) state six principal advantages for Chile by adopting the fiscal rule, which are more or less consistent with the reasons for applying fiscal rules mentioned by Fiess (2002): (i) the rule has implied a counter-cyclical policy and, in turn, reduced the uncertainty of economic performance in the medium-term; (ii) there has been an increase in public savings during high-growth periods; (iii) interest rate volatility has been reduced, and, (iv) the government's credibility has increased, which is reflected in the sovereign risk premium it has to pay when it issues international debt. Advantage number (v) is that Chile's need for foreign financing has been reduced and, finally (vi), the fiscal rule has ensured financial sustainability of social polices.

The present paper describes the functioning of the Chilean fiscal rule and the way it is applied. In the next section the rule is described along with a demonstration of how it depends on three important factors: the trend output, the long-term copper price and the structural public revenue from the sale of molybdenum. While the latter is calculated as an average of historical prices, independent experts determine the other two. How this is done is described in the third section. The final section of this article briefly describes the experience with the fiscal rule.

2. The Fiscal rule

The fiscal rule is formulated in terms of the structural balance. Unlike the current balance, the structural balance reflects the fiscal outlook in the medium term and it is

defined as the difference between the fiscal income net of the impact of the economic cycle and the expenditure that is compatible with this income.

In general terms, the fiscal rule states that

Structural revenue – fiscal expenditure = X% of the GDP,

where *X* is the target of the structural surplus. Until 2007 *X* = 1 and from 2008 *X* = ½. In other words, the fiscal expenditure in 2008 must, according to the rule, not exceed the difference between the structural revenue and 0.5% of the GDP of the same year.

A surplus of 1% of the GDP was at the time considered sufficient to ensure accumulation of financial assets in order to finance future public commitments, in particular the guaranteed minimum pension and old-age benefit. Furthermore, a surplus seemed appropriate since the Central Bank of Chile had a structural operating deficit as well as a negative net worth due to losses related to the bailout of the private banking system in 1982 and accumulation of international reserves in the 1990s. In 2007, the target was revised and it was decided to reduce it to 0.5% from 2008 (see appendix A).[3]

An indicator for the Chilean structural balance is calculated by netting out the cyclical impact of the economic activity and deviations from long-run prices of copper and molybdenum. Because of heavily rising molybdenum prices (figure 1), the public revenue from this metal was included in the fiscal rule in 2005. In Chile, copper is the main product for exportation and it accounts for more than 50% of the total exported (figure 2). As illustrated in figure 3, a great part of the public revenue comes from the mining sector in the form of royalties, taxes and direct transfers from the largest of the mining companies, Codelco, which is publicly owned (see appendix B).

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[3] Engel et al. (2007) find it reasonable to reduce the target but to maintain it above 0%. Velasco et al. (2007) conclude that reducing the target for the structural surplus to ½% of GDP is advisable and also fiscally responsible.

Figure 1. Export prices

(index, 2003=100)
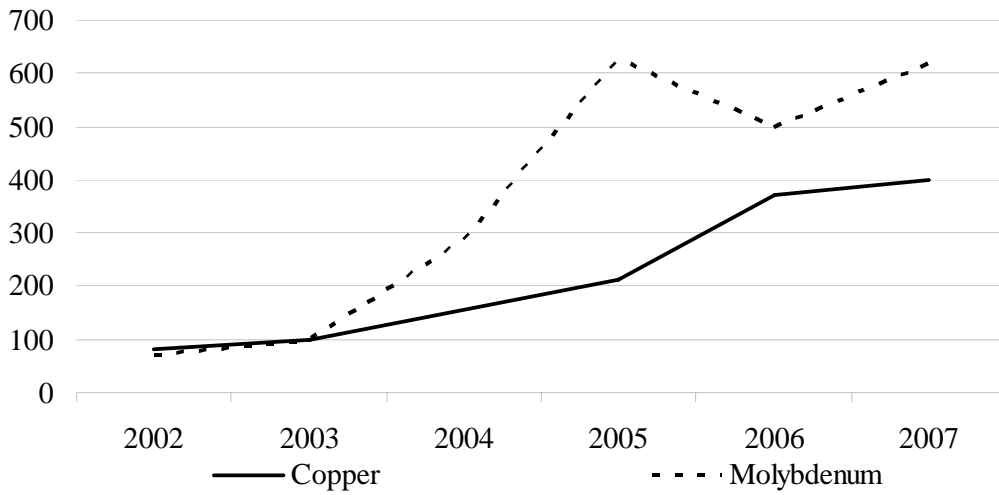
Source: Own calculations based on data from the Central Bank of Chile.

Figure 2. Exportations

(billions of USD, fob)
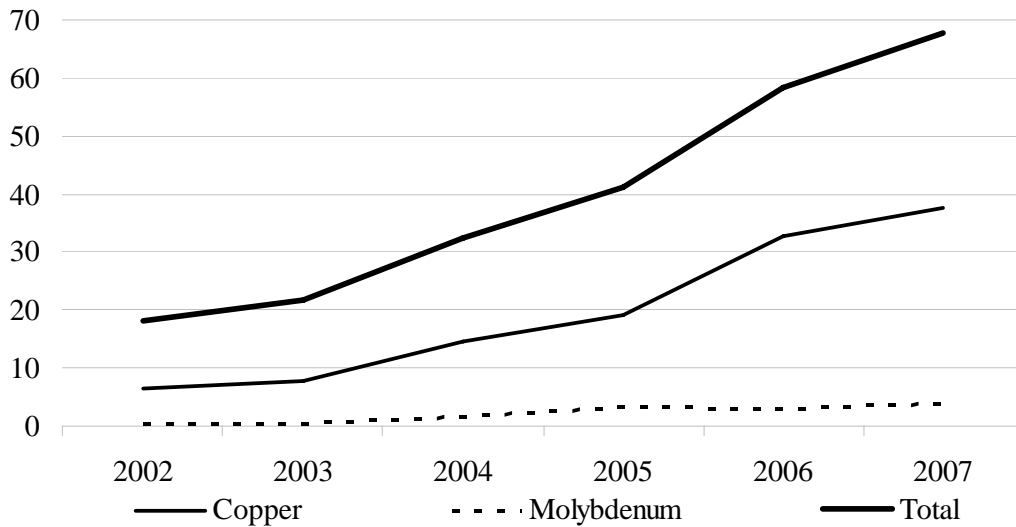
Source: Central Bank of Chile.

Figure 3. Public revenues
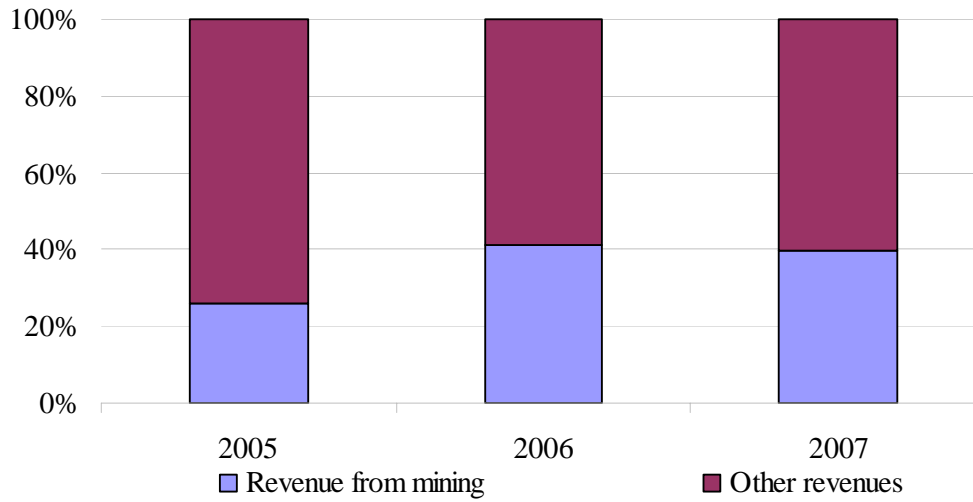
Source: Own calculations based on data from the Ministry of Finance.

Note: The data before 2005 do not allow for a separation of the total revenue from the mining sector.

The structural balance indicator can be expressed as (Rodríguez et al., 2007):

$$B_t = b_t + T_t^{NM} + T_t^{M} + I_t^{C} + I_t^{M}, \tag{1}$$

where B_t is the structural balance at time t, b_t is the effective balance (accrued), T_t^{NM} is the difference between structural and actual net non-mining tax revenue and social security in-payments, T_t^{M} is the difference between structural and actual income from taxes on private mining companies, I_t^{C} is the difference between structural and effective transfers from Codelco on account of copper sales, and I_t^{M} is the difference between structural and effective transfers form Codelco on account of molybdenum sales.

For the calculation of the non-mining income gap, T_t^{NM}, the structural part is adjusted according to the level between trend GDP and projected effective GDP:

$$T_t^{NM} = \left(T_t^{NM*} \left(\frac{Y_t^{*}}{Y_t} \right)^{\varepsilon} \right) - T_t^{NMa},$$

where T_t^{NM*} and T_t^{NMa} are, respectively, structural and actual net non-mining tax revenue and social security in-payments, Y_t^* and Y_t are trend and effective GDP, while ε is the GDP elasticity of tax revenue (estimated at 1.05). The cyclical adjustment of non-mining tax revenue, T_t^{NM*}, is calculated with the output gap:

$$T_t^{NM*} = f(Y_t - Y_t^*, Z_t),$$

where the vector Z_t includes other variables relevant for the calculation of the non-mining tax revenue.

Due to strong growth in tax revenues from private mining companies (an annual average growth rate of more than 200% in 2003-06 according to Rodríguez et al. (2007)), in 2005 it was decided to separate tax revenues from the non-mining and the mining sectors. The fiscal revenue from private mining companies consists of provisional monthly payments, which are later adjusted, and an additional tax payment on the profit remittances of foreign-owned companies. The two depend on the copper price and hence the structural tax revenue from private mining companies can be expressed as

$$T_t^{M*} = g(P_t - P_t^*, X_t),$$

where P_t and P_t^* are, respectively, the spot copper price and long-term copper price at time t, and the vector X_t includes other variables relevant for the calculation of the tax revenue from private mining companies.[4]

The structural income from Codelco's copper sale also depends on the long-run reference price on copper. Thus, the structural fiscal revenue from this source can be expressed as

$$I_t^{C*} = h(P_t - P_t^*, V_t),$$

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[4] For details, see Rodríquez et al. (2007).

where the vector V_t includes variables such as quantity sold and cost of production.

Finally, the cyclical income from Codelco's sale of molybdenum is calculated as

$$I_t^{M*} = S_t(P_t^M - P_t^{M*})*2204.62,$$

where S_t is Codelco's sale of molybdenum measured in metric tons, P_t^M is Codelco's average selling price and P_t^{M*} is the reference price calculated as a historical average (five years of data were used for the calculation in 2007). The two prices are measured in US dollars per pound and the last term of the equation is used to convert the prices from pounds to metric tons.

As demonstrated above, for the calculation of the structural balance (1) several variables, which are unobservable by nature, need to be estimated. Firstly, to calculate non-mining tax revenue, which is included in T_t^{NM}, it is necessary to have an estimate of trend GDP. Secondly, for the calculation of the structural income from mining companies, which is included in T_t^M and I_t^M, an estimate of the long-term copper price is needed. The following section contains a description of how the independent expert panels determine each of these variables.

3. The independent expert panels

With the purpose of improving the transparency of the conduct of the fiscal policy, the Chilean government decided in 2001-02 to have panels of independent experts decide two of the important parameters of the fiscal rule described above: trend output and the long-term copper price. This section describes the work of the two panels and the methodologies occupied.

3.1. The trend output expert panel

The members of the trend output expert panel are selected on a personal basis and do not represent the institutions with which they are associated. For example, three of the 15 members who participated in the panel in 2007 were also members of the central bank's board. In the six years from 2002 to 2007, the panels have consisted of between 14 and 17 members. The meetings were held in months of June, July or August and the minutes of the meetings were published shortly after.

Prior to the meeting, the members receive a methodological note with background information and historic data.[5] Based on this information the participants are asked to provide estimates of the growth rates of each of the three variables necessary for the calculation of the trend output for the following year: Total factor productivity (TFP), capital formation or investment, and the labor force. The members are required to make estimates for the following five years. For each year, the two most extreme observations (the highest and the lowest) are eliminated and an average of the remaining is used in the calculation of the trend output.

Trend GDP is, in the present context, thought of as the theoretical level of output, had the economic resources been used with a "normal" intensity with the productivity being the normal trend. To calculate it, the aggregate output function is assumed to be Cobb-Douglas type with constant returns to scale:[6]

$$Y_t = A_t K_t^{\alpha} L_t^{(1-\alpha)},$$

where A_t is TFP, K_t is the level of capital input in production, L_t is the level of labor input in production, α is the production elasticity of capital and, hence, 1- α is the production elasticity of labor. Recently, the coefficient α is estimated at 0.48 based on information reported by Restrepo and Soto (2006).[7]

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[5] The one for the 2007 meeting can be found in Ministry of Finance (2007d).
[6] The methodology applied to calculate the structural balance is similar to those of the International Monetary Fund (IMF) and the Organization for Economic Co-operation and Development (OECD); see Hagemann (1999) and Giorno et al. (1995).
[7] Restrepo and Soto (2006) find that labor participation in the GDP has averaged 52% using employment and salary data from the National Institute of Statistics for the period 1990-2005.

<u>Labor input</u>

The labor input is estimated by adjusting employment with an indicator for the quality of work:

$$L_t = E_t H_t Q_t,$$

where E_t is the total employment in period t, H_t is the average number of hours worked in the same period, and Q_t is the quality indicator measured as the average numbers of years that the economically active part of the population have studied.

To calculate the trend output, the unemployed portion of the working force is assumed to be prepared to work the same numbers of hours as the employed counterpart, and that the quality indicator is constant at a level equal to the historic average. The members of the expert panel are asked to supply an estimate of the growth rate of the labor force for the following five years. Given an estimate of the natural unemployment rate (NAIRU), which is calculated as a historic average, the labor input is calculated.

Figure 4 illustrates the expert panel's forecasts of the labor force. During the first six years of the panel's existence, the estimates of the individual members have deviated with a maximum of 1.7 percentage points (in 2005) and with a minimum of 0.9 percentage point (in 2004).

Figure 4. Estimations of the labor force

(million persons)
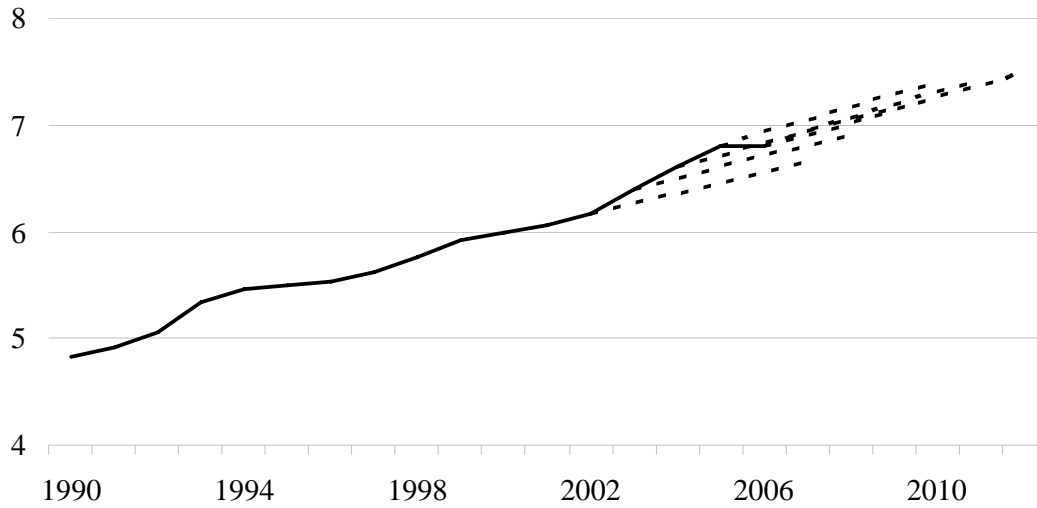
Capital input

The capital stock is constructed as

$$K_t = K_{t-1}(1-d_t) + CF_t, \tag{2}$$

where d_t is the annual depreciation rate and CF_t is gross fixed capital formation corrected for intensity of use, which is calculated as suggested by Solow (1957):

$$CIU_t = \frac{1-U_t}{1-U_t^*},$$

where CIU_t is the coefficient for intensity of use, U_t is the unemployment rate and U_t^* is the NAIRU. Obviously, for the calculation of trend GDP, $CIU_t = 1$, so that no correction is needed. A model, using only the trend as explanatory variable, estimates the depreciation rate. In other words, the coefficients of the following regression are estimated:

$$d_t = c + \sum_{i=1}^{n} \lambda_i t^i + \varepsilon_t,$$

where c is a constant, n is determined in order to obtain the best fit and ε_t denotes the errors of the regression. According to Ministry of Finance (2007c), the equation estimated with data from the period 1985-2006 is:

$$d_t = 3,19 + 0,09t.$$

With the expert panel's estimate of the growth rate of capital formation, the capital stock is calculated according to (2). The panel's estimations are illustrated in figure 5. Often it seems like the estimates continue the recent historic trend, but there have been large differences between the individual member's estimations. The largest was recorded in 2006, where there was a difference of 16.3 percentage points between the smallest and the greatest estimates (the two observations eliminated before calculating the average used for the trend GDP). The smallest deviation was in 2003, at 4.5 percentage points.

Figure 5. Estimations of capital formation

(billions of CLP, 2003 values)
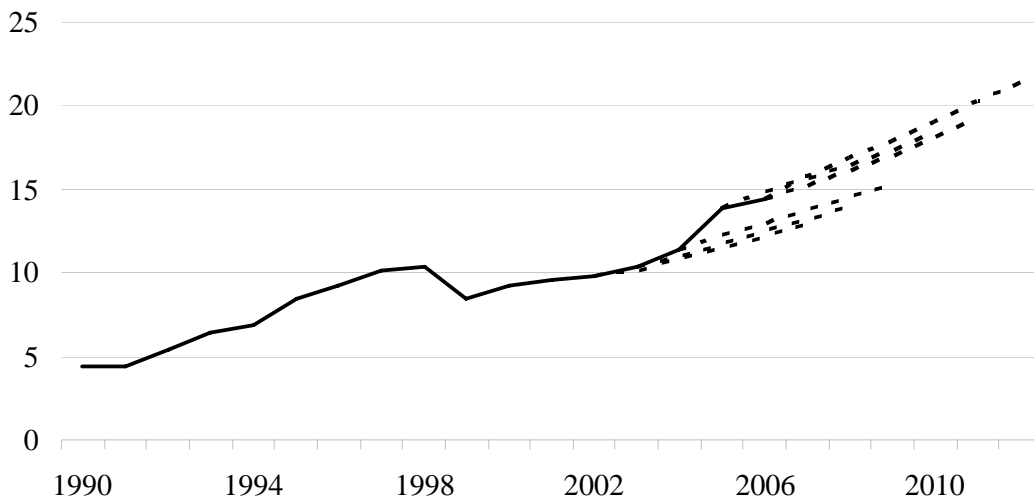
Source: Ministry of Finance (2002a, 2003a, 2004a, 2005a, 2006a, 2007a).

Note: Based on historical values reported in Ministry of Finance (2007d).

<u>Total factor productivity</u>

Total factor productivity (TFP), A_t, is calculated as the residual of the production function for known values of K_t and L_t. Letting lower-case letters express logarithms, the TFP is calculated as

$$a_t = y_t - \alpha k_t - (1-\alpha)l_t.$$

For the estimation of the future trend GDP, the expert panel is asked to estimate the growth rate of the TFP. The estimates from the year 2002 to 2007 are shown in figure 6. For this variable the individual members' estimates deviated 2.3 percentage points in 2003, the highest difference ever recorded while the lowest was 1.2 percentage points (in 2004 and 2005).

Figure 6. Estimations of total factor productivity

(index, 1960=100)

Source: Ministry of Finance (2002a, 2003a, 2004a, 2005a, 2006a, 2007a).

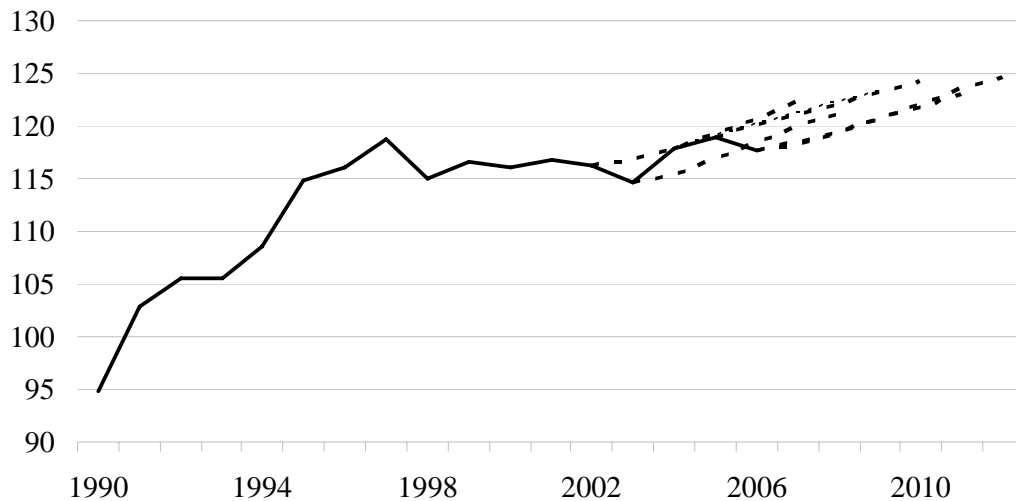Note: Based on historical values reported in Ministry of Finance (2007d).

<u>Trend output</u>

To calculate historical data of the trend output, a Hodrick-Prescott (HP) filter[8] is applied to calculate trend TFP and the labor input, which in turn is calculated with the NAIRU:

$$y_t^* = a_t^{HP} + \alpha k_t + (1-\alpha)(\ln(LF_t(1-U_t^*)))^{HP}, \tag{3}$$

where y_t^* is the logarithm of trend output, HP indicates that the series has been filtered with a HP-filter, LF_t is the labor force adjusted by a labor quality indicator, and U_t^* is the NAIRU, which is estimated by the historical average of recorded unemployment rates.

With the expert panel's estimates of the growth rate in the labor force, it is possible to calculate the last term on the right-hand side in (3). The second term is calculated with the estimated growth in capital formation using (2) and, finally, the TFP is calculated directly with the estimate of its growth rate. Figure 7 shows the estimated trend growth rates since 2002, which have been between 4% and 5%, broadly speaking.

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[8] To limit the effect of the well-known end-point problems of the HP-filter, the experts participating in the panel are asked to make forecasts for the next five years.

Figure 7. Estimations of trend output growth rates

(percentage)
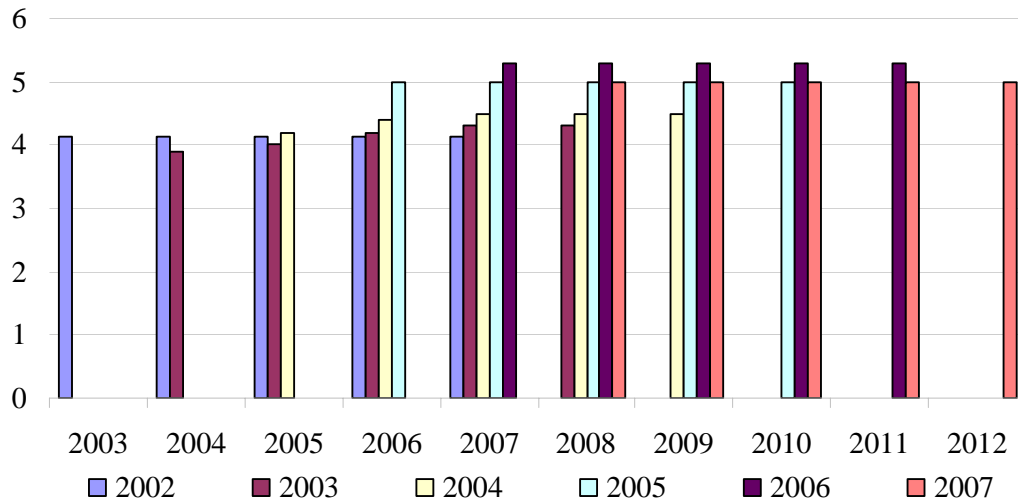
Source: Ministry of Finance (2002a, 2003a, 2004a, 2005a, 2006a, 2007a).

3.2. The copper price expert panel

In 2001 it was determined also invite independent experts to determine a reference price for copper. This panel has so far consisted of between eight and twelve members, and the meetings take place around the same time as the meetings of the trend output expert panel.

The panel is asked to provide an estimate of the average copper price in current US dollars for the following ten years. The two most extreme observations are eliminated and the average of the remaining is used in the calculation of the structural balance. Figure 8 shows the averages reported for the period 2002-2007 and the two most extreme observations, i.e. those excluded before calculating the average. The higher the reference price, the higher has been the difference between the highest and the lowest estimate. In relative terms, the difference between highest and lowest has increased from an average of 10% of the final reference price in the years 2002-2004 to 24% in the years 2005-2007.

Figure 8. Estimations of the reference copper price

(USD per pound, current year prices)
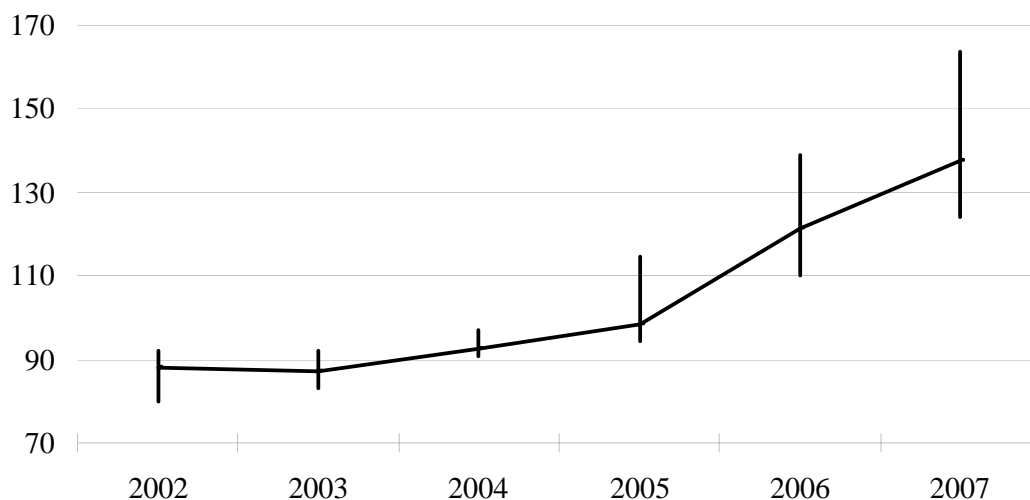
Source: Ministry of Finance (2002b, 2003b, 2004b, 2005b, 2006b, 2007b).

Note: The highs and lows are the two observations that were excluded before calculating the average.

4. Experiences with the rule

In this last section, the experiences with the fiscal rule in Chile are briefly described.[9] Since law does not enforce the rule, a natural question would be if the government has conducted fiscal policy in accordance with the rule. The answer is "yes". According to the government's official numbers, the structural balance has been exactly 1% of the GDP in the years 2004-07, while the actual fiscal balance has been substantially higher (figure 9).

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[9] García et al. (2005) describe recent Chilean experiences with fiscal and monetary policy rules. The anchor of the monetary policy was changed in 2002 to inflation targeting, where the central bank is committed to "using the necessary instruments to keep annual CPI inflation around 3% most of the time, within a tolerance range of plus or minus one percentage point" (Central Bank of Chile, 2007, page 6).

Figure 9. Central government's balance

(percentage of GDP)
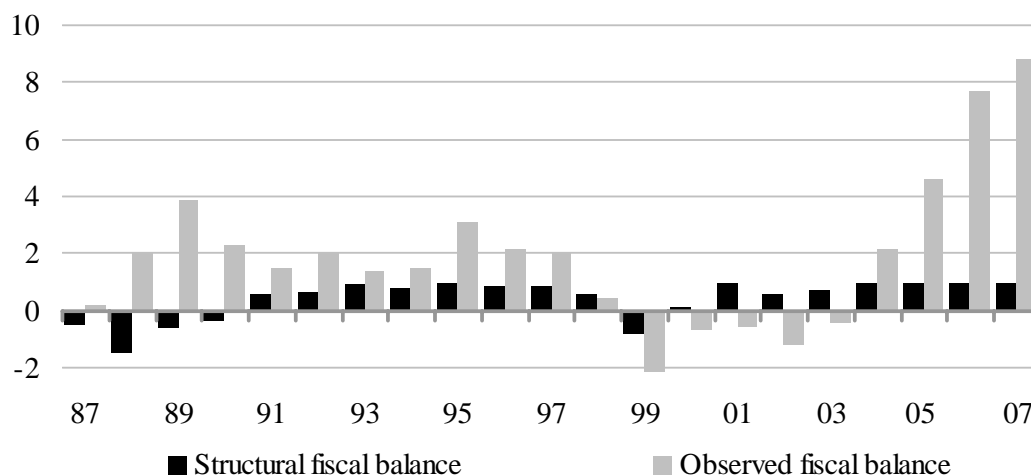
Source: Ministry of Finance.

Since there are only a few observations available, it may be too early to evaluate the counter-cyclical nature of the rule. However, in 2002 and 2003 Chile experienced relatively low growth rates and the effective central government balance was negative both years. As the economy grew faster the following years, so did the government's balance (table 1) suggesting that indeed the rule has demonstrated itself as counter-cyclical in the first six years of its existence.

Table 1. Central figures for the Chilean economy

(percentage of GDP)

	2002	2003	2004	2005	2006	2007
GDP growth	2.2	3.9	6.0	5.6	4.3	5.1
Effective central government balance	-1.2	-0.5	2.1	4.6	7.7	8.8
Gross public saving	2.2	2.8	5.2	7.7	10.7	12.0
Gross central government debt	15.7	13.0	10.7	7.3	5.3	4.1
Central government interest payments	1.2	1.1	1.0	0.8	0.7	0.6

Source: Central Bank of Chile and Ministry of Finance.

Mainly because of the high copper price, the conduct of fiscal policy according to the rule has implied an increase in public saving; from two percent of the GDP in 2002 to twelve percent in 2007. At the same time, the public debt has been reduced substantially

from more than 15 percent of the GDP in 2002 to four percent in 2007. Relative to the output, the government's interest payment has halved in the same period. Hence, since the introduction of the fiscal rule, the public financial situation has improved significantly and in 2006 the government created two sovereign wealth funds, the Economic and Social Stabilization Fund (ESSF) and the Pension Reserve Fund (PRF).

The purpose of the PRF is to fund the government's pension obligations and to help pay for the projected increase in the minimum pension benefit take-up rate. The effective fiscal surplus of the previous year, with a minimum of 0.2% of the GDP and a maximum of 0.5%, is deposited in this fund until it reaches 900 million UF.[10] Estimations indicate that with annual contributions equal to 0.2% of the GDP it should take around 25 years to reach 900 million UF and that this amount should finance pension payments for 25 years. Every three years, the Ministry of Finance must evaluate the sustainability of the fund. After subtracting deposits in the PRF and capital contributions to the Central Bank[11], the remaining fiscal surplus is deposited in the ESSF. The main purpose of this fund is to smooth out the financing of fiscal expenditures, such that deposits are made in years with fiscal surplus and funds are withdrawn in years with deficit. Both funds are administered by the Central Bank.[12]

As a measure of the credibility of the fiscal policy, the sovereign spread[13] can give some indications. This has declined from more than 200 basis points in early 2001 to levels under 100 basis points in the first half of 2007. Recently, however, the spread has increased again and in May 2008 the average spread was recorded to be 159 basis points. With this evidence, there are some indications that the credibility of the Chilean fiscal policy has improved since the adoption of the rule, but given the recent volatility in financial markets it is, at the time of writing this, difficult to extract any clear signal from interest rates.

In general, international organizations agree that the implementation of the fiscal rule in Chile has been a success. For example, the executive summary of the IMF's article IV

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[10] The UF (unidad de fomento) is a CPI-indexed unit of account.
[11] See Ministry of Finance (2007c).
[12] An IMF assessment of the administration of the funds can be found in Flyvholm (2007).
[13] Measured by JP Morgan's EMBI global spread, which reflects the premium an investor requires to invest in bonds issued in dollars by, in this case, the Chilean government, instead of investing in US bonds.

report about the macroeconomic framework states "Successful implementation of this framework has created increasing room for addressing social priorities, which the authorities intend to pursue in an incentive-compatible manner, accompanied by further increase in transparency."[14] Another example is the IADB's 2007 report on economic and social progress in Latin America, where it is recognized that "the Chilean fiscal rule has worked well. While structural balances mimicked the actual balance before the adoption of the rule, since 2001 the average structural balance has been more or less constant."[15]

There is little doubt that the implementation of the structural surplus rule in Chile has benefited economic stability. It has been widely accepted as a credible and transparent commitment. From the beginning, the rule has been subject to continuous refinement and is at the core of fiscal credibility. This credibility is very important for a country that has been affected by a high degree of macroeconomic volatility in the last decades.

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[14] IMF (2007) page 3.
[15] IDB (2007) page 182.

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Appendix A

**Table A1. Main changes in the fiscal rule**

May 2000	President Lagos announces the adoption of the fiscal policy with a target of a structural surplus of one per cent of the GDP.
Aug. 2001	The expert panel of the long-run copper price is created.
Jul. 2002	The methodology of estimating potential GDP is revised.
Aug. 2002	The expert panel of the potential GDP is created.
Feb. 2004	Changes of the fiscal statistics to be in accordance with IMF (2001).
Aug. 2005	Incorporation of cyclical adjustment of taxes from private mining companies (income taxes) due to the important impact on the copper price.
Dec. 2005	Incorporation of cyclical adjustment of effects of the molybdenum price.
Dec. 2006	Incorporation of cyclical adjustment of additional taxes paid by the mining companies.
May 2007	President Bachelet announces a reduction of the structural surplus target from 1 to ½ percent of GDP in 2008.

Source: Velasco et al. (2007) and IMF (2007).

Appendix B

In 1971 a Chilean constitutional reform nationalized the copper mines and Codelco (Corporación Nacional del Cobre de Chile), as it is currently known, was formalized in 1976. This state-owned company is the world's largest producer of copper (1.83 million metric tons of refined copper in 2005), and it also has the biggest reserves with around 20% of the total of the planet. Codelco's most important market is Asia, which receives about 40% of the total sale, followed by Europe, North America and South America (figure B1).

Figure B1. Destinations of Codelco's copper sale (2005)

South America 10%
North America 17%
Asia 40%
Europe 33%
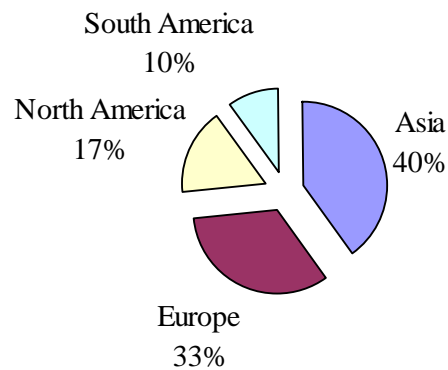
Source: Codelco.

Codelco is also a world leader of molybdenum production. In 2005 the total production of this metal, which is used primarily to make special steel alloys, was more than 36 thousand metric tons.

Because of the increase in the price of molybdenum, Codelco's nominal sale has almost quintupled between 2002 and 2006. At the same time, the contribution to the Treasury has grown substantially and in 2006 it was (in nominal terms) more than 25 times

higher than in 2002 according to table B2, which reports some main figures for Codelco.[16]

Table B1. Codelco, financial figures

	2002	2003	2004	2005	2006
Million USD					
Sales	3490	3782	8204	10491	17077
Income	369	606	3301	4901	9215
Contribution to Treasury	326	735	3009	4442	8334
Thousand tons of fine copper					
Copper production	1630	1674	1840	1831	1783
Persons					
Direct employment:					
Own personal	16906	16595	16778	17800	17936
Operational contractors	14140	17614	19929	24951	24028
Investment contractors	12450	9320	8683	7890	5678
USc/lb					
Copper price	70.6	80.7	130.1	167.1	305.3

Source: Codelco.

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[16] García et al. (2005) note that, on average, in the period 1995-2004, the income from Codelco accounted for 5.4% of the government's total budget.