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# FLOATING, OFFICIAL DOLLARIZATION, AND MACROECONOMIC VOLATILITY: AN ANALYSIS FOR THE CHILEAN ECONOMY

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**Resumen**

Este artículo compara la volatilidad de las principales variables macroeconómicas de una economía abierta y pequeña en dos contextos: un esquema de dolarización oficial (DO) y un régimen de tipo de cambio flexible (TCF). Un simple modelo dinámico, estocástico y de equilibrio general es calibrado para la economía chilena y usado como laboratorio para estudiar las implicaciones de estos regímenes en las desviaciones estándares de variables claves. Implicaciones de bienestar son también analizadas desde el punto de vista de un banco central que le preocupa la volatilidad del producto y la inflación. Los resultados muestran que la DO implica: mayor volatilidad real debido a la ausencia de una política monetaria contracíclica; menor volatilidad de la inflación como resultado de una menor volatilidad de la tasa de interés extranjera; y, que el régimen del TCF domine a la DO, cuando el banco central pondera significativamente las desviaciones de la inflación y del producto de sus respectivos estados estacionarios. Además, la DO implica tanto una mayor volatilidad del déficit fiscal debido a una recaudación tributaria más volátil; como una mayor reacción del producto ante shocks de términos de intercambio.

**Abstract**

This paper contrasts the volatility of the main macroeconomic variables of a small open economy in two environments: an official dollarization (OD) scheme and a flexible exchange regime (FER). A simple DSGE model calibrated for the Chilean economy is used as a laboratory to study the implications of these regimes on the standard deviations of key variables. Welfare implications are also analyzed for a central bank that it is concerned with output and inflation volatility. Our findings show that OD results in: higher real volatility due to the absence of countercyclical monetary policy; lower inflation volatility because of a less volatile foreign interest rate; and, from a welfare perspective, OD is dominated by a FER when the central bank weighs considerably the deviations of inflation and output from the steady state. Also, OD implies higher fiscal deficit volatility as a consequence of higher tax revenue volatility, and a higher reaction to terms-of-trade shocks.

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I thank an anonymous referee for helpful comments. The views expressed herein are my own and do not necessarily represent those of the Central Bank of Chile or its Board.
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## 1. Introduction

Full or official dollarization (OD), defined as one country's official adoption of the currency of another for all commercial and financial transactions, has been broadly discussed in recent years, especially after the latest international crises and the advent of the euro. In fact, some countries have adopted this regime, such as Ecuador and El Salvador,[1] and the possibility of adopting it has been raised in others, including Mexico, Argentina, Peru, and Central American countries. On the other hand, however, some central banks have opted for the other extreme, that is, a flexible exchange rate. That is the case of Chile and other emerging economies. Therefore, it seems advisable to analyze the advantages of both alternatives in a context of external shocks as those of the last years.

According to the literature, OD has important implications on the main macroeconomic variables and on fiscal and monetary management. Nevertheless, there is not a general agreement on the benefits and costs of OD (table 1). Probably, the only exception is a lower inflation rate.[2] Other benefits found in the literature are: fiscal discipline;[3] lower devaluation risk and, consequently, lower interest rates;[4] deeper financial integration;[5] lower transaction costs and less risk in trade;[6] and higher investment and growth.[7] On the other hand, the most important costs are: loss of seigniorage;[8] elimination of monetary or exchange rate policy (or loss of the exchange rate as an instrument to ameliorate external shocks);[9] and loss of the lender of last resort.[10]

**<Insert Table 1 about here>**

Besides, there are a few studies that analyze theoretically the effects of adopting OD in Latin America. So far as I know, the exceptions are Cooley and Quadrini (1999) and

[1] Not to mention Panama, an economy that has been fully dollarized for nearly a century.
[2] Goldfajn and Olivares, 2000; Dornbusch, 2000; Berg and Borensztein, 2000; Edwards and Magendzo, 2001.
[3] Savastano, 1999; Chang, 2000.
[4] Calvo, 1999a,b; Schuler, 1999; Berg and Borensztein, 2000; Chang, 2000.
[5] Calvo, 1999a,b; Schuler, 1999; Hausmann, 1999; Berg and Borensztein, 2000; Panizza et al., 2000; Mendoza; 2000, 2002.
[6] Panizza et al., 2000; Morandé and Schmidt-Hebbel, 2000.
[7] Berg and Borensztein, 2000; Lizano 2000; Mendoza, 2002.
[8] Savastano, 1999; Mendoza, 2002; Berg and Borensztein, 2000.
[9] Rojas-Suárez, 1999; Berg and Borensztein, 2000; Mendoza, 2002; Schmitt-Grohé and Uribe, 2001a; Cooley and Quadrini, 1999.
[10] Berg and Borensztein, 2000; Gale and Vives, 2002.

Schmitt-Grohé and Uribe (2001a) for the case of Mexico, Ghironi and Rebucci (2002) for Argentina, and Duncan (2003) for Peru. Therefore, this work seeks to assess the possible implications of an OD scheme on the volatility of the main macroeconomic variables of the Chilean economy. A simple stochastic dynamic general equilibrium model is used as laboratory to study these issues. Two regimes are analyzed and simulated for a small open economy that faces external (via terms of trade) and domestic (via technological and fiscal and monetary policy) shocks. The first regime is a floating exchange rate, and the second is the full dollarization of the economy. Simulation exercises are performed to compare the behavior of key variables (such as output, inflation rate, and fiscal deficit) in both environments and their welfare implications for a central bank that is concerned with output and inflation deviations from steady-state equilibria.

The structure of this study is as follows. Section 2 presents a dynamic stochastic general equilibrium model with two alternative exchange rate regimes: floating and OD. Section 3 describes their parameterization, solution, main findings, and next steps for future research. Section 4 concludes.

## 2. The Model

Households

Consider an economy that is inhabited by an infinitely-lived representative agent that optimizes an utility function that depends positively on real private consumption $c_t$, real domestic money balances $m_t$, and leisure $l_t$:

$$E_t \left\{ \sum_{t=0}^{\infty} \beta^t u[c_t, l_t, m_t] \right\}, \tag{1}$$

where $0<\beta<1$ is the subjective discount factor and $E\{.\}$ is the expectation operator.

The representative household's constraint is:

$$c_t + i_t + b_t + b_t^* + m_t + \Psi(\pi_t) \le (1-\tau)\left(w_t L_t + r_t K_t + q_t y_2\right) + T_t + \frac{m_{t-1}}{1+\pi_t} + \\ + \frac{(1+R_t)\, b_{t-1}}{1+\pi_t} + \frac{(1+R_t^*)(1+e_t)\, b_{t-1}^*}{1+\pi_t} + D_t, \tag{2}$$

where $i_t$ denotes real investment in period $t$, $b_t$ is the real stock of assets in domestic currency, $b^*_t$ is the real stock of assets in foreign currency, $\tau$ is the (constant) income tax, $w_t$ is real wage, $L_t$ is the level of employment, $r_t$ is the real cost of capital, $K_t$ is the stock of physical capital that follows a typical (deterministic) law of motion (see details in appendix A), $q_t$ is the exogenous relative price of exportable goods to importable goods, or the terms of trade, $T_t$ denotes real lump-sum transfers, $\pi_t$ is the inflation rate, $\Psi(\pi_t)$ is the cost of price adjustment,[11] $e_t$ is the nominal depreciation rate, $R_t$ is the domestic (net) interest rate, $R^*_t$ is the foreign (net) interest rate,[12] and $D_t$ are firm profits (see appendix A for the detail of the laws of motion.)

I assume the household to be endowed each period with one unit of time, which is divided between leisure ($1-L_t$) and work ($L_t$). As mentioned before, the function $\Psi(\pi_t)$ measures the cost of altering prices, and thus represents the degree of price rigidity. It is assumed to be strictly convex in the inflation rate, and it is zero in steady-state equilibrium. Particularly, I assume that $\Psi(\pi_t) = (\rho_i/2)(\pi_t - \pi_{ss})^2$, and that there are two goods produced in the economy. The first good ($y_1$, or importable good) is produced domestically and can be imported, but the second ($y_2$, or exportable good) is not consumed domestically and is constant.

For simplicity, I assume that the utility function depends on the logs of consumption, money balances, and employment:

$$u\left(c_t, m_t, l_t\right) = \log c_t + \phi \log m_t + \eta \log\left(1 - L_t\right). \tag{3}$$

[11] Similar to Schmitt-Grohé and Uribe (2001a).

[12] In this theoretical framework, the foreign interest rate is defined as the interest rate that US-dollar deposits yield in the domestic banking system, which can be different from the international interest rate.

Firms

On the other hand, the representative firm maximizes its profits given by equation (4),

$$D_t = y_t - w_t L_t - r_t K_t \tag{4}$$

subject to a returns-to-scale technology:

$$y_{1t} = F(K_t, L_t, z_t) = A_0 K_t^{\alpha} L_t^{1-\alpha} e^{zt} \quad ; \qquad A_0 > 0, \quad 0 < \alpha < 1, \tag{5}$$

where $z_t$ is a technological shock that follows an autoregressive process (see appendix 1 for details).

Monetary and Fiscal Policy

The model considers two alternative monetary policies: (i) flexible exchange rate with an interest rule, and (ii) OD which will be modeled as a fully credible currency board where depreciation is zero. So, in the first case, I suppose the following autoregressive interest rate rule:

$$R_{t+1} = (1-\theta_1)R_0 + \theta_1(\pi_t - \pi_{ss}) + \theta_2(y_t - y_{ss}) + \theta_3 R_t + \varepsilon_{Rt+1}; \tag{6a}$$

where $y_t$ denotes current total output, $y_{ss}$ is total output in steady state, and $R_0$ is the long-run (or steady-state) domestic interest rate. The parameters $\theta_j$ are all positive constants, for $j$=1,2,3. Specifically, a positive $\theta_2$ denotes that the central bank follows a countercyclical monetary policy. In this case, exchange rate is endogenous.

In the second case, similar as Schmitt-Grohé and Uribe (2001a), OD implies:

$$e_t = 0, \quad \forall t \geq 0 \tag{6b}$$

In this context, the interest rate becomes an endogenous variable.

On the other hand, the government budget constraint is:

$$g_t + T_t = \tau y_t + m_t - \frac{m_{t-1}}{1+\pi_t} + b_t - \frac{(1+R_t)b_{t-1}}{1+\pi_t} + b_t^* - \frac{(1+R_t^*)(1+e_t)b_{t-1}^*}{1+\pi_t} \tag{7}$$

where $g_t$ is the exogenous government spending (see appendix A). The government is assumed to finance its deficit (government spending net of tax revenues) through seigniorage, bonds denominated in domestic and foreign currency, and US dollars from the central bank (international reserves).[13]

External Environment

To finalize the description of the economy, I assume exogenous terms of trade and foreign interest rate (see appendix A). To perform a fair comparison I will assume the same deterministic steady-state equilibrium in both monetary regimes (see appendix B for the steady-state equilibrium of the model).

The agent's problem consists of maximizing utility in (1) subject to equations (2)-(5), (7), the laws of motion presented in appendix A (equations 8-13), and the monetary regime (6a for floating or 6b for OD). Based on this problem, first-order conditions are obtained (appendix B, equations 14-22). The solution of the model is achieved around the steady-state equilibrium (appendix C, expressions 23-31).

## 3. Calibration and Results

To solve the model we need the values of the parameters. This section describes briefly the method solution, parameterization, and the main results obtained in terms of the series' volatilities and welfare implications.

[13] The assumption is that the central bank has enough international reserves to satisfy demand for US-dollar money whenever necessary.

### 3.1. Method of Solution and Parameterization

The model is solved using a perturbation method developed by Schmitt-Grohé and Uribe (2001). This method consists of a first-order approximation to the policy functions of the dynamic equilibrium model. Once the models were solved, series of 5,000 observations were generated in each monetary regime to allow a comparative analysis. To perform an appropriate comparison I calibrate the model to achieve the same steady-state values for the variables under both regimes.

I assume three criteria to assign values to each parameter of the models. The first criterion is to use some of the standard parameter values given in earlier literature, especially for the Chilean economy (table 2). There are several works that attempt to calibrate dynamic equilibrium models for Chilean data. Table 3 summarizes the (monthly) parameter values and their corresponding criterion of choice.

**<Insert Table 2 about here>**
**<Insert Table 3 about here>**

The second criterion is to find the parameter value necessary to match some steady-state values for the Chilean economy (such as steady-state consumption as a percentage of GDP, the steady-state inflation rate, and so on). The last criterion is to adjust the parameter values to allow the model to match the volatilities of real output and inflation.

### 3.2. Main Results

In this section, I use the simulated variables from the economy with flexible exchange rate and the fully dollarized economy to compare the performance of the OD scheme in terms of macroeconomic volatility.

#### Real and Nominal Volatility

The fully dollarized economy generates higher real volatility expressed in higher standard deviations or variation coefficients of output series. Particularly, the standard deviation of output increases around 8.5% (of the one from the flexible exchange regime) (table 4). This finding is associated with the absence of the (countercyclical) monetary policy that can be endogenously used in the floating regime to mitigate real shocks. The lack of this instrument in the fully dollarized economy could be causing the higher real volatility.

**<Insert Table 4 about here>**

To confirm the results, I also tested for equality of variances between series under both regimes, the null of equality is rejected verifying that OD means (statiscally significant) higher real volatility but lower inflation volatility.[14]

Other Implications: Fiscal Deficit Volatility and Reaction to External Shocks

Some authors have stated that OD implies higher fiscal discipline (table 1). Although it is quite difficult to measure fiscal discipline in this case, I will try to approximate it through the volatility (standard deviation) of the public deficit. The estimation of this statistic for both models indicates that the regime with flexible exchange rate causes a slightly lower volatility on the fiscal position than does full dollarization (table 4).[15] That is, "fiscal discipline" can be higher in a flexible exchange rate regime than in a fully dollarized economy. This result can be explained by the fact that output is more volatile and so are income-tax revenues.

On the other hand, it has been also contended that OD implies higher output responses to external shocks, such as terms-of-trade fluctuations. Figure 1 shows the impulse-response function of a (-10%) terms-of-trade shock on output in both regimes. It can be seen that the output response is higher for the full dollarization regime than the floating regime. That is, the lack of domestic monetary policy (and, perhaps, nominal exchange rate) in a fully dollarized economy implies that terms-of-trade shocks cause higher output reactions when compared to the output response from an economy with flexible exchange rate. This finding contradicts Calvos' (1999a,b) argument that instead of nominal exchange rate, prices and wages would adjust to terms-of-trade shocks in a fully dollarized economy.

[14] The results of the test are available upon request.

[15] This fact was also verified through the calculation of tests for equality of variances. The null of equality between fiscal deficit variances from each regime is rejected at conventional levels of significance.

**<Insert Figure 1 about here>**

A Welfare Comparison

In order to evaluate the welfare implications of these alternative regimes, I will use a simple welfare criterion. I will assume that the central bank seeks to minimize an expected social loss function. This function takes the form:

$$L_t = \chi_1 \left(y_t - y^{ss}\right)^2 + \chi_2 \left(\pi_t - \pi^{ss}\right)^2 \tag{32}$$

Taking unconditional expectations, the loss function becomes:

$$E[L_t] = \chi_1 Var(y_t) + \chi_2 Var(\pi_t) \tag{33}$$

where *Var*(*y)* and *Var*($\pi$) are the unconditional variances of domestic output and inflation, respectively. In particular, following Parrado and Velasco (2002), I begin assuming that the parameters $\chi_1$ and $\chi_2$ take the values 0.5 and 1.5, respectively. As can be seen in table 6, the flexible exchange rate regime dominates OD in all the cases, except when the parameters are very low, that is, when the central bank does not weigh the deviations from steady-state output and inflation significantly. However, these results must be taken carefully because the comparison might be sensitive to the degree of cyclicality of the monetary policy.

**<Insert Table 6 about here>**

3.3. Sensitivity Analysis and Future Research

The results are virtually insensitive to changes in parameter values such as the ones related to consumers' preferences and firms' technology. Further analysis can be done considering other utility function specifications. However, results are sensitive to the nature of monetary policy. The countercyclical monetary policy–expressed in an interest rule that depends positively on output deviation from steady state—plays a key role. A less countercyclical monetary policy produces less difference on output and inflation volatility between both regimes[16].

Therefore, in an economy with price rigidities (and flexible exchange rate), OD implies higher real volatility due to the loss of a countercyclical monetary policy.[17] On the other hand, in an economy with price flexibility, full dollarization does not increase real volatility. Even in this case, the absence of monetary policy shocks could imply lower standard deviation of real output since a source of volatility is eliminated in the economy.

## 4. Concluding Remarks

This paper seeks to assess the possible implications of an OD scheme on the volatility of the main macroeconomic variables of the Chilean economy. I use a simple stochastic dynamic general equilibrium model as laboratory to study these issues. Two regimes are formulated and simulated for a small open economy that faces external and domestic shocks. The first environment represents an economy with floating exchange rate, and the second represents a fully dollarized economy. Simulation exercises are performed and their welfare implications are analyzed for a central bank that is concerned with output and inflation deviations from steady state.

The results show, first, that OD implies higher real volatility due to the absence of countercyclical monetary policy in an economy with price rigidities. Second, in contrast, OD generates less inflation volatility because of a less volatile foreign interest rate. Third, from a welfare perspective, OD is dominated by a FER when the central bank weighs significantly the deviations of inflation and output from the steady state. Fourth, a conclusion related to the first one is that OD implies higher fiscal deficit volatility as a consequence of higher tax revenue volatility. Finally, OD produces a higher reaction to

[16] Alesina and Barro (2001) also contend this idea.

[17] I also performed a sensitivity analysis considering different degrees of price stickiness ($\rho_i$). As long as the degree of price stickiness reduces, the difference between output volatility from the flexible exchange rate regime and the one from the fully dollarized regime becomes lower. In the extreme case when $\rho_i$ is zero, the difference approaches zero. This result signals the crucial role of price stickiness.

terms-of-trade shocks, since there is not the possibility of performing countercyclical monetary policy in that context.

## References


Acuña, A., and C. Oyarzún. 2001. "Money and Real Fluctuations: Calibrating a Cash-in-Advance Model for the Chilean Economy." Unpublished paper. Universidad de Concepción.

Alesina, A. and R. Barro. 2001. "Dollarization." AEA Papers and Proceedings 91(2).

Bennett, H. and R. Valdés. 2001. "Terms of Trade in Chile." Working Paper 98. Central Bank of Chile.

Berg, A. and E. Borensztein. 2000. "Full Dollarization: The Pros and Cons." IMF Policy Discussion Paper. Washington DC.

___________ and P. Mauro. 2002. "An Evaluation of Monetary Regime Options for Latin America." Central Bank of Chile: Working Paper 178, August.

Bergoeing, R., P. Kehoe, T. Kehoe, and R. Soto. 2001. "A Decade Lost and Found: Mexico and Chile in the 1980s." Documento de Trabajo 107. Santiago: Central Bank of Chile.

Bergoeing, R. and R. Soto. 2002. "Testing Real Business Cycle Models in an Emerging Economy." Unpublished paper.

Bloch, C. and J. Chiriaeva. 2002. "On Dollarization and Credibility." University of Aarhus. Unpublished paper, June.

Bogetic, Z. 2000. "Official Dollarization: Current Experiences and Issues." *Cato Journal*, 20(2): 179-213.

Bufman. G. and L. Leiderman. 1992. "Simulating an Optimizing Model of Currency Substitution." *Revista de Análisis Económico* 7(1): 109-24.

Calvo, G. 1999a. *On Dollarization*. University of Maryland. Unpublished paper, April 20.

___________. 1999b. *Testimony on Full Dollarization*. Presented Before a Joint Hearing of the Subcommittees on Economic Policy and International Trade and Finance. Washington, DC, April 22.

___________ and C. Reinhart. 1999. "When Capital Inflows Come to a Sudden Stop: Consequences and Policy Options." Unpublished paper. University of Maryland, June.

Carrera, J., M. Féliz, D. Panigo, and M. Saavedra. 2002. "How does Dollarization Affect Real Volatility? A General Methodology for Latin America." Unpublished paper. April.

Chang, R. 2000. "Dollarization: A Scorecard." Federal Reserve Bank of Atlanta. Economic Review, Third Quarter.

___________ and A. Velasco. 2002. “Dollarization: Analytical Issues.” NBER Working Paper 8838, March.

Chumacero, R. and R. Fuentes. 2002. “On the Determinants of the Chilean Economic Growth”. Working Paper 134. Central Bank of Chile.

Cohen, B. 2000. “Political Dimensions of Dollarization.” Working Paper, Federal Reserve Bank of Dallas, March..

Cooley, T. and G. Hansen.1995. “Money and the Business Cycle.” In: *Frontiers of Business Cycle Research*, edited by T. Cooley. Princeton, New Jersey: Princeton University Press.

_________ and V. Quadrini. 2001. “The Costs of Losing Monetary Independence: The Case of Mexico.” *Journal of Money, Credit, and Banking*, 33(2): 370-97.

Corbo, V. 2002. “Monetary Policy in Latin America in the 1990s.” In: *Monetary Policy: Rules and transmission Mechanisms*, edited by N. Loayza and K. Schmidt-Hebbel. Central Bank of Chile: Series on Central Banking, Analysis, and Economic Policies.

Dornbusch, R. 2000. “Fewer Monies, Better Monies.” Unpublished paper. December.

Drew, A., V. Hall, J. McDermott, and R. St. Clair. 2001. “Would Adopting the Australian Dollar Provide Superior Monetary Policy in New Zealand?” Reserve Bank of New Zealand Discussion Paper 03, August.

Du Bois, F. and E. Morón. 1999. “Los Riesgos y Oportunidades de Dolarizar la Economía Peruana”. Unpublished paper, October.

Duncan, R. 2002. “How Well Does a Monetary Dynamic Equilibrium Model Account for Chilean Data?” Central Bank of Chile Working Paper 190, November.

_________.2003.“Exploring the Implications of Official Dollarization on Macroeconomic Volatility.” Central Bank of Chile Working Paper 200, February.

Edwards, S. 2001a. “Dollarization Myths and Realities” *Journal of Policy Modeling* 23: 249-65.

___________.2001b. “Dollarization and Economic Performance: An Empirical Investigation.” NBER Working Paper 8274, May.

___________ and I. Magendzo. 2001. “Dollarization, Inflation and Growth.” NBER Working Paper 8671, December.

Eichengreen, B. 2000. “When to Dollarize?” University of California, Berkeley. Unpublished paper, February.

___________. 2001. "What Problems Can Dollarization Solve?" University of California, Berkeley. Unpublished paper, January.

Gale, D. and X. Vives. 2002. "Dollarization, Bailouts, and the Stability of the Banking System." *Quarterly Journal of Economics* CXVII (2): 467-502.

Gavin, M. 1999. "Hearing on Official Dollarization in Latin America". Prepared Testimony in *Hearing on Official Dollarization in Latin America*. U.S. Senate, Washington, DC.

Ghironi, F., and A. Rebucci. 2002. "Monetary Rules for Emerging Market Economies." IMF Working Paper 02/34.

Goldfajn, I. and G. Olivares. 2000. "Is Adopting Full Dollarization the Solution? Looking at the Evidence." Pontificia Universidade Católica do Rio de Janeiro.

Hausmann, R. 1999. "Should There Be Five Currencies or One Hundred and Five?" CIAO Foreign Policy. Fall 1999.

Hinds, M. 1999. Hearing on Official Dollarization in Emerging-Market Countries. Prepared Testimony. (www.senate.gov/~banking/99_07hrg/071599/hinds.htm). Washington, DC.

Hochreiter, E., K. Schmidt-Hebbel, and G. Winckler. 2002. "Monetary Unions: European Lessons, Latin American Prospects." Central Bank of Chile Working Paper 167. July.

Klein, M. 2002. "Dollarization and Trade." NBER Working Paper 8879, April.

Lizano, E. 2000. "Dolarización es Inevitable para las Economías más Pequeñas de la Región." www.eldiario.cl..

McGrattan, E. 1994. "The Macroeconomic Effect of Distortionary Taxation." *Journal of Monetary Economics* 33(3): 573-601.

McKinnon, R. 1963. "Optimum Currency Areas". *American Economic Review* 53, 717-24.

McNelis, P. and C. Asilis. 1992. "A Dynamic Simulation Analysis of Currency Substitution in an Optimizing Framework with Transactions Costs." *Revista de Análisis Económico* 7 (1): 139-52.

Mendoza, E. 2000. "The Benefits of Dollarization when Stabilization Policy Lacks Credibility and Financial Markets are Imperfect." *Journal of Money, Credit, and Banking*. August.

___________. 2002. "Why Should Emerging Economies Give Up National Currencies: A Case for 'Institutions Substitutions'". NBER Working Paper 8950, May.

Morandé, F., and K. Schmidt-Hebbel. 2000. "Esquemas Monetarios Alternativos: Una Evaluación Favorable al Peso Chileno." Revista de Economía Chilena 3(1), April.

Mundell, R. 1961. "A Theory of Optimum Currency Areas". *American Economic Review* 51, 509-17.

Panizza, U., E. Stein, and E. Talvi. 2000. "Measuring Costs and Benefits of Dollarization: An Application to Central American and Caribbean Countries." Washington, DC: Inter-American Development Bank. Unpublished paper, September.

Parrado, E., and A. Velasco. 2002. "Alternative Monetary Rules in the Open-Economy: A Welfare-Based Approach." In: *Inflation Targeting, Design, Performance, Challenges,* edited by N. Loayza and R. Soto. Central Bank of Chile: Series on Central Banking, Analysis, and Economic Policies.

Pesaran, H., and Y. Shin. 1998. "Generalized Impulse Response Analysis in Linear Multivariate Models." Economic Letters, 58: 17-29.

Pereyra, C, and Z. Quispe. 2002. "Es conveniente una dolarización total en una economía parcialmente dolarizada." Banco Central de Reserva del Perú: *Revista de Estudios Económicos* 7, June.

Powell, A., and F. Sturzenegger. 2000. "Dollarization: The Link between Devaluation and Default Risk." Business School, Universidad Torcuato Di Tella, October.

Quiroz,. J. 1991. "Las regularidades empíricas del tipo de cambio real en Chile: un enfoque de ciclos de negocios reales." Revista de Análisis Económico 6 (2): 47-78.

_________, F. Bernasconi, R. Chumacero, and C. Revoredo. 1991. "Modelos y Realidad: enseñando economía en los noventa." *Revista de Análisis Económico* 6 (2): 79-103.

Rojas-Suárez, L. 1999. *Dollarization in Latin America?.* Prepared Testimony presented in *Hearing on Official Dollarization in Latin America*. U.S. Senate Banking Committee. Washington, DC. (www.senate.gov/~banking/99_07hrg/071599/ rojas.htm).

Savastano, M. 1999. Presentation prepared for the conference "Dolarizar la Economía Peruana: Riesgos y Oportunidades." Lima, 1999.

Schmitt-Grohé, S. and M. Uribe. 2001a. "Stabilization Policy and the Costs of Dollarization." *Journal of Money, Credit, and Banking*, 33(2): 482-509.

___________. 2001b. "Solving Dynamic General Equilibrium Models Using a Second Order Approximation to the Policy Function." *Discussion Paper* 2963. Centre for Economic Policy Research, London.

Schuler, K. 1999. Presentation prepared for the conference "Dolarizar la Economía Peruana: Riesgos y Oportunidades." Lima, 1999.

Sims, C. 2002. "Fiscal Consequences for Mexico of Adopting the Dollar." Princeton University. Unpublished paper, May.

Walsh, C. 1998. Monetary Theory and Policy. Cambridge: Massachusetts Institute of Technology.

**Appendix A**

**Laws of Motion**

$$K_{t+1} = (1-\delta)K_t + i_t \,, \tag{8}$$

$$q_t = \left(1-\rho_q\right) q_0 + \rho_q \, q_{t-1} + \varepsilon_{qt} \tag{9}$$

$$R_{t+1} = (1-\theta_1)R_0 + \theta_1(\pi_t - \pi_{ss}) + \theta_2(y_t - y_{ss}) + \theta_3 R_t + \varepsilon_{Rt+1}; \tag{10}$$

$$R^*_{t+1} = (1-\rho_R)R^*_o + \rho_R R^*_t + \varepsilon_{R^*t}; \tag{11}$$

$$z_t = \rho_z \, z_{t-1} + \varepsilon_{zt}, \tag{12}$$

$$g_t = \left(1-\rho_g\right) g_0 + \rho_g \, g_{t-1} + \varepsilon_{gt} \quad ; \tag{13}$$

where δ is the depreciation rate, $\varepsilon_{jt}$ is a zero-mean shock with variance $\sigma^2_j$, for all *j = q, R, R*, z, g*; and $\rho_i$ is a parameter between 0 and 1, for all *i = q, R, z, g.* All the intercepts are positive constants.

## Appendix B
## Equilibrium Conditions

Households

In a decentralized equilibrium, the agent maximizes (1) subject to (2)-(7).[18] Accordingly, the first-order conditions are:

$$\frac{1}{c_t} - \lambda_t = 0 \tag{14}$$

$$\frac{\phi}{m_t} - \lambda_t + \beta E_t\left(\frac{\lambda_{t+1}}{1+\pi_{t+1}}\right) = 0 \tag{15}$$

$$-\frac{\eta}{(1-L_t)} + \lambda_t(1-\tau)w_t = 0 \tag{16}$$

$$-\lambda_t + \beta(1+R_{t+1})E_t\left(\frac{\lambda_{t+1}}{1+\pi_{t+1}}\right) = 0 \tag{17}$$

$$-\lambda_t + \beta(1+R_{t+1}^*)E_t\left(\frac{\lambda_{t+1}(1+e_{t+1})}{1+\pi_{t+1}}\right) = 0 \tag{18}$$

$$-\lambda_t + \beta E_t\lambda_{t+1}\left[(1-\tau)r_{t+1} + (1-\delta)\right] = 0\,. \tag{19}$$

Firms

Firms maximize (14) subject to (15)-(16), obtaining the typical first-order conditions:

$$\alpha A_0\left(\frac{L_t}{K_t}\right)^{1-\alpha} e^{zt} - r_t = 0 \tag{20}$$

$$(1-\alpha)A_0\left(\frac{K_t}{L_t}\right)^{\alpha} e^{zt} - w_t = 0 \tag{21}$$

Economy

$$c_t + i_t + g_t + \Psi(\pi_t) = y_{1t} + q_t y_2. \tag{22}$$

[18] For simplicity, I assume the logarithm of the liquidity services function.

## Appendix C
## Steady-State Equilibrium

In steady state, the laws of motion (5), (6), (7), (17), and (21) imply the steady-state value of terms of trade, the interest rate denominated in domestic currency, the interest rate denominated in foreign currency, a technological shock, and government spending, respectively:

$$q_{ss} = q_0 \tag{23}$$

$$R_{ss} = R_0 \tag{24}$$

$$R_{ss}^* = R_0^* \tag{25}$$

$$z_{ss} = 0 \tag{26}$$

$$g_{ss} = g_0 \tag{27}$$

Substituting condition (24) in (17), the steady-state inflation rate is obtained:

$$\pi_{ss} = \beta\left(1 + R_{ss}\right) - 1 \quad , \tag{28}$$

Using condition (18) and expressions (25) and (28), the steady-state rate of depreciation (in the case of flexible exchange rate) would be:

$$e_{ss} = \frac{1 + \pi_{ss}}{\beta\left(1 + R_{ss}^*\right)} - 1 \quad , \tag{29}$$

Equations (3), (14), (16), (19), (20) and (22) yields:

$$L_{ss} = \frac{\omega_1\omega_3 + g_0 - q_0 y_2}{\omega_3\left(A_1 + \omega_1\right) - \delta\omega_2} \tag{30}$$

where:

$$\omega_0 = \left( \frac{\alpha A_0 \beta (1-\tau)}{1-\beta(1-\delta)} \right); \quad \omega_1 = \left( \frac{(1-\alpha) A_0 (1-\tau)}{\eta} \right); \quad \omega_2 = \omega_0^{\frac{1}{1-\alpha}}; \quad \omega_3 = \omega_0^{\frac{\alpha}{1-\alpha}}$$

Using expression (30) and equations (14) and (15), and rearranging, an expression for the steady-state consumption that depends on the steady-state employment is obtained:

$$c_{ss} = \omega_1 \omega_3 (1 - L_{ss}), \tag{31}$$

Similarly, the steady-state stock of capital can be found with the same equations:

$$K_{ss} = \omega_2 L_{ss}, \tag{32}$$

With equations (30) and (32) the steady-state total production is derived. Finally, equations (15), (24) and (31) generate the steady-state money balances in both currencies:

$$m_{ss} = \phi\, c_{ss} \left( \frac{1 + R_{ss}}{R_{ss}} \right) \tag{33}$$

The steady-state values of the variables in the fully dollarized model are the same as the ones in the model with flexible exchange rate. The only differences are that in the former the depreciation rate is zero and the domestic interest rate is endogenous.

## Table 1a. Benefits of Official Dollarization

| Benefits | In favor | Against |
|---|---|---|
| Lower Inflation | Savastano (1999), Goldfajn and Olivares (2000), Dornbusch (2000), Berg and Borensztein (2000), Edwards and Magendzo (2001) | |
| Fiscal Discipline | Savastano (1999), Chang (2000) | Goldfajn and Olivares (2000), Edwards (2001a,b) |
| Lower Devaluation Risk and Interest Rates | Calvo (1999a,b), Schuler (1999), Berg and Borensztein (2000), Chang (2000), Panizza *et al.*(2000), Dornbusch (2000), Mendoza (2002) | Savastano (1999)(?), Goldfajn and Olivares (2000)(?), Pereyra and Quispe (2002), Carrera *et al*. (2002) |
| Deeper Financial Integration | Calvo (1999a,b) Schuler (1999), Hausmann (1999), Berg and Borensztein (2000), Panizza *et al.*(2000), Mendoza (2000), Mendoza (2002) | Berg and Borensztein (2000)(?), Goldfajn y Olivares (2000) |
| Lower transaction costs and less risk in trade | Panizza *et al.*(2000), Lizano (2000), Morandé and Schmidt-Hebbel (2000) | Edwards (2001a,b), Klein (2002) |
| Higher Investment and Growth | Savastano (1999)(?), Berg and Borensztein (2000), Lizano (2000), Mendoza (2002) | Edwards (2001a,b), Goldfajn and Olivares (2000), Drew et al. (2001) |

The sign (?) denotes that the author compiles that benefit (or cost) from other author but does not necessarily support it.

## Table 1b. Costs of Official Dollarization

| Costs | In favor | Against |
|---|---|---|
| Loss of Seigniorage | Savastano (1999), Mendoza (2002), Berg and Borensztein (2000) | Calvo (1999a,b), Dornbusch (2000), Alesina and Barro (2001) |
| Elimination of Monetary or Exchange Rate Policy | Rojas-Suárez (1999), Berg and Borensztein (2000), Mendoza (2002), Schmitt-Grohé and Uribe (2001a), Cooley and Quadrini (1999) | Calvo (1999a,b) |
| Loss of the Lender of Last Resort | Berg and Borensztein (2000), Gale and Vives (2002) | Calvo (1999a,b), Dornbusch (2000), Gavin (1999) |
| Other Costs | | |
| Converting prices, computer programs, cash registers, legal and financial costs of revising contracts or refinancing | Bogetic (2000) | |
| Loss of a vital symbol of national identity. | Cohen (2000) | |

The sign (?) denotes that the author compiles that benefit (or cost) from other author but does not necessarily support it.

## Table 2. Main Features of DSGE Models Calibrated for the Chilean Economy

| Author | Theoretical Framework | Features of the Calibration | Data | Objective /Results |
|---|---|---|---|---|
| Quiroz et al (1991) | DSGE model. Infinitely-lived agent, 1-good, closed economy. Based on Kydland and Prescott (1982). Time-to-build restrictions were incorporated. | Filter: Not reported<br>Method of solution: Linear quadratic<br>Metric: Standard deviations, contemporaneous cross-correlations, and (first-third) auto-correlations.[1] | Quarterly data, 1977.1-1990.4 | Objective: To replicate regularities (several sample moments)<br>Good fit: volatility of output and investment, and first autocorrelation of investment. Difficulties to replicate: cross correlations and autocorrelations of output Contrary signs: third autocorrelations of output and investment. |
| Quiroz (1991) | DSGE factor model. Infinitely-lived agent, 2-good, small open economy. Four sectors and cost of adjustment of labor. Based on Corbo (1985). | Filter: Not reported<br>Method of solution: Linear quadratic<br>Metric: Standard deviations, contemporaneous cross-correlations, and (first-fourth) auto-correlations.[1] | Quarterly data, 1977.1-1990.4 | Objective: To replicate empirical regularities of the real exchange rate (volatility, contemporaneous cross-correlations, and auto-correlations).<br>Good fit: volatility of output and investment, and contemporaneous cross-correlation with wages, price of copper and foreign capital inflows. Difficulties to replicate: RER autocorrelations. |
| Acuña and Oyarzún (2001) | DSGE model. Infinitely-lived agent, 1-good, closed economy. Based on Cooley and Hansen (1989) cash-in-advance model. | Filter: Hodrick and Prescott (1997)<br>Method of solution: Linear quadratic with distortions<br>Metric: Standard deviations, (contemporaneous-fifth) cross-correlations.[1] | Quarterly data, 1986.1-2000.1 | Objective: To replicate regularities (several sample moments) and assess the role of money in Chilean business cycles.<br>Good fit: direction of variables except capital stock and money.<br>Difficulties to replicate: GDP, employment, prices, inflation, and productivity volatility; phase shift of all variables except consumption, prices, and productivity; output-money correlation. |
| Chumacero and Fuentes (2002) | DSGE model. Infinitely-lived agent, 2-good, small open economy. Includes relative price of investment and income taxes. Based on Greenwood, Hercowitz, and Krusell (2000). | Filter: Not used<br>Method of solution: Perturbation method (second-order approximation)<br>Metric: Set of VAR coefficients and impulse-response functions of real GDP. | Annual data, 1960-2000 | Objective: To replicate regularities (several impulse-response functions) and assess the determinants of growth in Chilean economy.<br>Good fit: response of output to a shock on terms of trade, fiscal spending as a percentage of GDP (fiscal distortions) and relative price of equipment with respect to consumption. |
| Bergoeing and Soto (2002) | DSGE models (5 specifications). Infinitely-lived agent, 2-good, closed, cash-in-advance economy, with labor and wage rigidities. Based on Cooley and Hansen (1989) and McGrattan (1994). | Filter: Hodrick and Prescott (1997)<br>Method of solution: Linear quadratic<br>Metric: Standard deviations and cross/autocorrelations.[1] | Quarterly data, 1986.1-2000.1 | Objective: To replicate regularities (several sample moments) and assess the role of monetary and fiscal variables in Chilean business cycles.<br>Good fit: prices and output volatility, consumption volatility and its correlation with output. Difficulties to replicate: correlations: output-price level (and inflation), hours worked-average productivity. Correlations of money and other variables not reported. |

Notes: DSGE denotes dynamic stochastic general equilibrium, DGE denotes dynamic general equilibrium. 1/ Confidence intervals of the metric are not reported.
Source: Author's elaboration.

**Table 3. Parameters Used in Previous Studies**[/a]

| Authors | Country and Period of Study | Preferences and Technology | | | | | |
|---|---|---|---|---|---|---|---|
| | | $\beta$ | $\phi$ | $\alpha$ | $\rho_z$ | $\sigma_z$ | $\delta$ |
| Quiroz and others (1991) | Chile, 1977.1-1990.4 | NR | ... | NR | 0.999 | 0.0200 | 0.0000 |
| McGrattan (1994) | US, 1947-1987 | 0.985 | ... | 0.397 | NC | 0.0980 | 0.0226 |
| Cooley and Hansen (1995) | US, 1954-1991 | 0.989 | ... | 0.400 | 0.950 | 0.0070 | 0.0190 |
| Walsh (1998) | US, (NR) | 0.989 | 0.005 | 0.400 | 0.950 | 0.0089 | 0.0190 |
| Acuña and Oyarzún (2001) | Chile, 1986.1-2000.1 | 0.986 | ... | 0.400 | 0.990 | 0.0178 | 0.0250 |
| Bergoeing and others (2001) | Chile, 1981-2000 | 0.980 | ... | 0.600 | NR | NR | 0.0800 |
| Chumacero and Fuentes (2002) | Chile, 1960-2000 | 0.980 | ... | 1/3 | 0.730 | 0.0400 | 0.0600 |
| Bergoeing and Soto (2002) | Chile, 1986.1-2000.1 | 0.979 | ... | 0.37-0.4 | 0.981 | 0.0990 | 0.0200 |
| Duncan (2002) | Chile, 1986.01-2000.12 | 0.996 | 0.005 | 0.35 | 0.9 | 0.0001 | 0.09/12 |
| **Authors** | **Country and Period of Study** | **Exportable Sector and Fiscal Policy** | | | | | |
| | | $\rho_q$ | $\sigma_q$ | $\tau$ | $g_0$ | $\rho_g$ | $\sigma_g$ |
| McGrattan (1994) | US, 1947-1987 | ... | ... | NP | 70.99 | NC | 0.078 |
| Bergoeing and others (2001) | Chile, 1981-2000 | ... | ... | 0.51-0.12 | ... | ... | ... |
| Chumacero and Fuentes (2002) | Chile, 1960-2000 | 0.892 | 0.14 | 0.25 | NR | 0.895 | 0.024 |
| Bergoeing and Soto (2002) | Chile, 1986.1-2000.1 | ... | ... | NP | 0.089 | 0.760 | 0.097 |
| Duncan (2002) | Chile, 1986.01-2000.12 | 0.961 | 0.0127 | 0.25 | 1.22 | 0.76 | 0.008 |

a. NR denotes “not reported”. NP denotes that it is not considered as parameter in the study. NC means “not comparable”, since the author(s) did not use an AR(1) process.

## Table 4. Parameterization of the Model[a]

| Parameter | Symbol | Value | Criteria of Choice |
|---|---|---|---|
| Subjective discount factor | $\beta$ | 0.996 | Calibration of steady-state real interest rate around 5**%** (annual) |
| Utility sensitivity to domestic money | $\phi$ | 0.05 | Duncan (2002) |
| Utility sensitivity to leisure | $\eta$ | 1.2 | Calibration of steady-state labor: 0.35. This value implies a labor day of 8.2 hours. |
| Capital share | $\alpha$ | 0.35 | Previous literature (0.33-0.4) |
| Technological constant | $A_0$ | 0.9 | Calibration of steady-state share of consumption on GDP around 70% |
| Technological-AR1 coefficient | $\rho_z$ | 0.9 | Duncan (2002) |
| Technological volatility | $\sigma_z$ | 0.0001 | Duncan (2002) |
| Depreciation rate | $\delta$ | 0.09/12 | Calibration of steady-state share of investment on GDP around 20% |
| Cost of price adjustment parameter | $\rho_i$ | 2 | Calibration of output volatility |
| Steady-state exportable sector | $Y_2$ | 1.5 | Calibration of steady-state share of exportable sector on GDP around 10% |
| Terms-of-trade-AR1 coefficient | $\rho_q$ | 0.961 | OLS estimates using Bennett and Valdés (2001) |
| Terms-of-trade volatility | $\sigma_q$ | 0.0127 | OLS estimates using Bennett and Valdés (2001) |
| Income tax | $\tau$ | 0.25 | Chumacero and Fuentes (2002) |
| Steady-state government spending | $g_0$ | 1.4 | Calibration of steady-state share of government spending on GDP: 10-15% |
| Government-AR1 coefficient | $\rho_g$ | 0.76 | Duncan (2002) |
| Government expend. volatility | $\sigma_g$ | 0.008 | Duncan (2002) |
| Foreign interest rate (constant) | $R^*_0$ | $1.05^{(1/12)}-1$ | Duncan (2002) |
| AR1 coefficient | $\rho_R$ | 0.8 | Duncan (2002) |
| Foreign interest rate volatility | $\sigma_{R^*}$ | 0.0061 | Duncan (2002) |
| Domestic interest rate (constant) | $R_0$ | $1.077^{(1/4)}-1$ | Calibration of steady-state annual inflation rate between 2% and 3% |
| AR1 coefficient | $\theta_1$ | 0.67 | Corbo (2002) |
| Output deviation coefficient | $\theta_2$ | 1.46 | Corbo (2002) |
| Output deviation coefficient | $\theta_2$ | 0.32 | Corbo (2002) |
| Domestic interest rate volatility | $\sigma_r$ | 0.000068 | Calibration of inflation rate volatility. |

a. AR(1) denotes first-order autoregression process. All the parameter values are used in both models with the exceptions mentioned in this table. The covariances of the shocks are assumed to be zero. Data from the Chilean economy were obtained from Central Bank of Chile, the National Bureau of Statistics, and Bennett and Valdés (2001).

**Table 5. Statistics of the (simulated) series from the models**

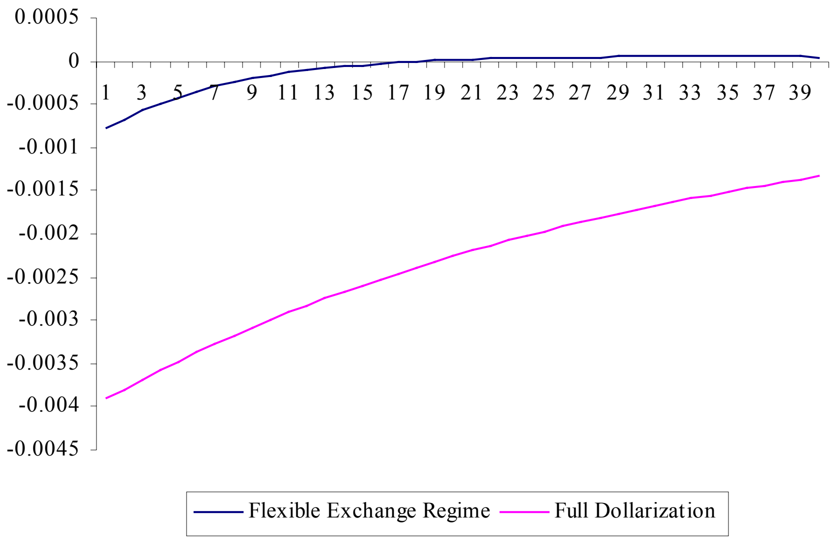
| Statistic | Simulated series from the economy with flexible exchange rate | | | Simulated series from the fully dollarized economy | | |
|---|---|---|---|---|---|---|
| | Output | Inflation | Fiscal Deficit | Output | Inflation | Fiscal Deficit |
| Std. Dev. | 0.014583395 | 0.055275331 | 0.019192821 | 0.10003337 | 0.017413171 | 0.029335713 |
| Coeff. of Var.[/a] | 0.0035027839 | 0.054253089 | 0.053338693 | 0.024152327 | 0.017214405 | 0.080429276 |

a. The coefficient of variation results dividing the standard deviation by the mean of each series.

**Table 6. Welfare Loss in Each Regime**

| $\chi_1$ | $\chi_2$ | Flexible Exchange Regime (1) | Official Dollarization (2) | Difference (1)-(2) |
|---|---|---|---|---|
| 0.7 | 1.7 | 0.00534299 | 0.00752014 | -0.21771555 |
| 0.6 | 1.6 | 0.00501618 | 0.00648915 | -0.14729699 |
| 0.5 | 1.5 | 0.00468938 | 0.00545817 | -0.07687843 |
| 0.4 | 1.4 | 0.00436258 | 0.00442718 | -0.00645987 |
| 0.3 | 1.3 | 0.00403577 | 0.00339619 | 0.06395869 |

**Figure 1. Responses of Output in Both Regimes to a Negative Terms-of-Trade Shock (-10% of Steady State Value)**



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