

---

## STUDY

---

Translated by Tim Ennis

# EXCHANGE RATE POLICY AND ECONOMIC STABILITY THE INTERVENTION ZONES ALTERNATIVE\*

**Francisco Rosende**

The aim of this study is to examine the way in which the establishment of a system of exchange rate flotation bands can help to harmonize the goals of price and real exchange rate stability. The reconciliation of these two goals is a complex task for the authorities in economies where saving rates are too low to prevent a massive inflow of capital occurring.

In general, the existence of domestic interest rates that are higher than those prevailing in the rest of the world will promote a process of capital inflow which can seriously complicate the achievement of the targets mentioned above. However, the nature of capital entering the economy will depend directly on the degree of certainty associated with this arbitrage operation. Thus, the perception that increases in the real exchange rate will not occur in the near future will accentuate the attractiveness of short-term capital inflows. As the

---

FRANCISCO ROSENDE. Commercial Engineer, University of Chile; Master of Economics, University of Chicago. Professor at the Economics Institute at the Catholic University of Chile. Researcher at *Centro de Estudios Públicos*.

\* I am grateful for valuable comments from Juan Andrés Fontaine, Fernando Ossa, Patricio Rojas and Rodrigo Vergara, as well as those received in the macroeconomics seminars at the *Centro de Estudios Públicos* and the Central Bank of Chile. Any remaining errors are my responsibility.

A preliminary version of this paper was published as Centro de Estudios Públicos Working Paper N° 177.

estimated variation of exchange rate movements increases, this incentive will decrease sharply.

Given that the establishment of a floating exchange rate system can involve significant real costs, especially arising from the uncertainty generated as to the future course of the real exchange rate, it seems appropriate that the authorities should provide certain signals regarding their estimate of the medium-term real exchange rate. For economies that are highly dependent on what happens to their terms of trade, this rule should be seen as a policy commitment by the authorities in order to stimulate greater saving in cyclical expansions.

Moreover, the existence of an appreciable degree of flotation in the exchange rate will give greater independence to monetary policy in achieving a situation of price stability. Furthermore, a exchange rate system involving restricted flotation can be seen as a mechanism of transition towards a purer exchange rate arrangement, such as fixing the nominal exchange rate. In the case of the EC economies, the exchange-rate bands system has played precisely the role of facilitating the harmonization of the authorities' different macroeconomic objectives in the transition towards a fixed exchange rate framework.

Although there are various elements to take into consideration in the proper working of this type of mechanism, it is important to highlight the importance of two of them: the need for an "anchor" for monetary policy, to avoid discretionary use of the degrees of freedom which the Central Bank has in this framework, and the importance of the Central Bank's interventions in the foreign exchange market being stabilizing, which ought to be reflected in a positive trend in its operating results.

## 1. INTRODUCTION

Since the collapse of the Bretton Woods system, discussion of the costs and benefits associated with alternative monetary systems has had a dominant place in the agenda of the economics profession. Thus, after an initial period of satisfaction and confidence with the workings of floating exchange rate systems in industrialized countries, these have been steadily replaced by frameworks aimed at attenuating exchange rate variability. Furthermore, the perception among academics regarding the efficiency of exchange markets and the behavior of exchange rates, has altered significantly during the past decade.

In the case of numerous developing countries such as Chile, the tendency has been in the opposite direction during this period, although abrupt changes of course have not been absent. For example, the traumatic inflationary experiences at the beginning of the 1970s led to the adoption of fixed nominal exchange rate systems, as a tool to safeguard the stability of the currency. However, the subsequent outbreak of the “external debt crisis”, with its consequent depressive effects on activity, consumption and employment in these countries, gave rise to a profound questioning of the strategy of fixing the exchange rate pursued up to then by the most affected economies. As result of the balance of payments problems caused by the adverse turn of events on the external front, which occurred at the beginning of the past decade, the Chilean economic authorities adopted a “real exchange rate policy” from 1983, revealing through this policy its prioritization of the balance of payments objective over and above price stability.

The overcoming of difficulties inherent in the external debt problem, and the consequent reinsertion of the Chilean economy in international financial markets, has once again given rise to debate on the compatibility of alternative exchange rate strategies with the achievement of different economic policy objectives. In particular, in recent years the Chilean economy has been exposed to a loss of monetary policy autonomy as result of its greater integration into foreign financial markets, in a context of a fixed nominal exchange rate. In a special way the authorities have increasingly had to face the dilemma between maintaining a crawling-peg type exchange rate rule and achieving low rates of inflation.

The purpose of this study is to examine the way in which a restricted exchange rate flotation system can cooperate in achieving the objectives of price stability and strength in external accounts. The harmonization of these two objectives has been a complex problem to resolve for many economies which have taken steps towards great integration with the rest of the world in a context of relative domestic saving scarcity.

In particular, in this paper we analyze the basic properties of the so-called “target zone” scheme which has aroused significant interest in the profession following its use in various countries in recent years. With this aim, the initial sections of this paper provide a review of recent literature on the determination of nominal exchange rate, placing special emphasis on the degree of neutrality of the type of arrangement through which the nominal exchange rate is determined with respect to the behavior of the real exchange rate. Then we analyze the way in which a system of fixing the level or path of the nominal exchange rate can affect capital movements and the harmonization of different economic policy objectives. Finally, the

paper describes the role of exchange rate flotation—even though this may be restricted such as in a target zone setup—in containing short-term capital movements and through this, defense of the real exchange rate.

## 2. THE REAL EXCHANGE RATE AND RESOURCE ALLOCATION

The real exchange rate is usually defined as the relative price of tradable goods in terms of non-tradables. The level and path of this relative price has enormous importance for resource allocation in an economy. In particular, the level of this variable has an appreciable influence on the course of external accounts, real wages and foreign borrowing, among other macroeconomics variables.

The importance of the real exchange rate for a country's macroeconomics performance, suggests that the greater or lesser impact on the economy caused by external disturbances, such as variations in the terms of trade or foreign interest rates, will largely depend on the evolution of the real exchange rate in the period prior to the adverse exogenous shock to national income. So, for example, when the real exchange rate has been falling in response to a significant inflow of capital from abroad, this will tend to complicate the economy's ability to confront adverse external shocks.

In this case, the increase in the balance of payments current account deficit and, hence, in the stock of external debt which occurs in the period prior to the shock to national income, tends to accentuate its negative effect. This is true to the extent that the magnitude of the adjustment effort needed to maintain equilibrium in external accounts and meet contractual commitments, is greater in the presence of adverse exogenous shocks to national income. This type of difficulty can be appreciated more clearly if one considers the case where the adverse external shock takes the form of a rise in international interest rates, or else where the terms of trade and international interest rates move in opposite directions.

The establishment of mechanisms aimed at stabilizing the behavior of the real exchange rate can be an appropriate strategy for an economy which is frequently exposed to exogenous disturbances in its spending capacity, especially when there are distortions preventing the private sector from developing efficient insurance mechanisms against such disturbances<sup>1</sup>.

---

<sup>1</sup> One type of distortion frequently seen in developing economies is the existence of a political system that does not guarantee property rights or the basic rules of economic policy in a stable way. Thus, economic agents have incentives to spend resources in periods of crisis in order to avoid its costs.

Alternatively, a justification for putting in practice policies aimed at stabilizing the real exchange rate is the existence of a close relationship between the external disturbances faced by the economy and the evolution of fiscal revenues. An example here is the Chilean economy itself, where the Treasury is the main owner of the large-scale copper mining industry, so changes in the international price of this product have a direct repercussion on this sector's spending capacity. In this case, the implementation of a real exchange rate policy acts as a constraint on the management of public finances, especially in periods when the copper price is booming. This is because the maintenance of a high exchange rate in such conditions requires channeling to savings a significant fraction of the revenues that the Treasury obtains in periods of burgeoning copper prices<sup>2</sup>.

Given the real nature of the exchange rate concept to which we have referred, its determinants must be sought in the real sector of the economy<sup>3</sup>. Specifically, in view of the fact that this relates the price of tradable goods to non-tradables, the equilibrium level of this variable should be defined as that which reconciles the supply and demand conditions prevailing in the two sectors. At the aggregate level, this means that the level of the real exchange rate will depend on the observed relation between aggregate spending and GDP. This, given a certain structure of demand, which is usually considered stable, and which habitually translates into using a homothetic utility function for the representative agent. Notwithstanding this, the aggregate spending pattern can be changed insofar as income transfers occur between the private sector and the government. Thus, the equilibrium level of the real exchange rate will be altered insofar as changes occur in taxes on the consumption or production of tradable and non-tradable goods<sup>4</sup>; for example, changes in the average tariff rate.

The implementation of a "real exchange rate policy" involves a commitment by the authorities to promote a domestic spending pattern consistent with this objective. Thus, in periods when the economy is benefiting from positive changes —transitory ones— in national income, the authorities should encourage channeling a substantial fraction to higher saving. In the opposite case, a rise in the spending-output ratio will genera-

---

<sup>2</sup> In this sense the creation of a mechanism such as the Copper Compensation Fund, is a policy consistent with maintaining a high real exchange rate, in periods when increases occur in the copper price compared with what is estimated to be its long-run trend.

<sup>3</sup> In this respect see, for example, Dornbusch (1982; 1986, Ch. 6).

<sup>4</sup> In the long run the existence of different rates of technological progress in the production of these goods, is a source of variation in the equilibrium level of the real exchange rate. On this, see Balassa (1964).

te upward pressure on the relative price of non-tradable goods —whose supply is limited in the short run by the availability of productive resources— which is equivalent to a downward trend in the real exchange rate. Naturally, the relevance of the real exchange rate policies adopted by the authorities will depend heavily on the relative size of the government in the economy, as well as the magnitude and scope of existing regulations on domestic markets. Thus, in economies where both the size of the government and the extent of the regulations imposed by it are small, the behavior of the real exchange rate will essentially depend on the spending programs and insurance schemes developed by the private sector.

Notwithstanding the essentially “real” nature of the determinants of this relative price, it is important to ask about the effect that the prevailing exchange rate regime has on its own path. In other words, for an economic policy which has stabilizing the real exchange rate among its goals, it is important to establish the way in which the system of determining the nominal exchange rate may affect the results obtained in terms of this goal, given a certain path of aggregate expenditure and output.

### 3. ARE EXCHANGE RATE SYSTEMS NEUTRAL?

In a distortion-free competitive economy it is possible to demonstrate the absolute neutrality of exchange rate systems on resource allocation. This means that the level of a given nominal variable such as the price of foreign currency in terms of national currency, is totally irrelevant to the performance of the real sector of the economy<sup>5</sup>. So, adopting a fixed or floating nominal exchange rate system will only be relevant in terms of the restrictions imposed in each case on the amount of discretion the monetary authorities have in administering the evolution of the means of payment, and thus the price level<sup>6</sup>.

However, the available evidence has tended to reject the neutrality hypothesis for exchange rate regimes. For example, Mussa (1987) finds

---

<sup>5</sup> Helpman (1983).

<sup>6</sup> This is true unless, in the case of a floating system, one restricts the discretion of monetary authorities through targets limiting the growth of monetary aggregates. The comparison of these two alternatives —nominally fixed exchange rate versus flotation with targets for the growth of monetary aggregates— is analyzed by Genberg (1990), for the cases of Austria and Switzerland in the period following the breakdown of the monetary system based on the Bretton Woods Agreement. From the study by Genberg one can conclude that there should not be any differences in the behavior of inflation under the two alternatives, provided these are implemented in a rigorous and credible manner.

that the behavior of real exchange rates is substantially different under different exchange rate regimes. This translates into a situation in which under floating exchange rate systems the real exchange rate follows a random-walk type of process, whereas under nominally fixed exchange rates it shows a significant degree of serial correlation. The results obtained by Mussa are consistent with the hypothesis of slow adjustment of goods prices in the short run, in response to changes in supply or demand conditions. This gradual response of goods prices contrasts with that of asset prices, which are characterized by their high speed of adjustment. This evidence was used by Dornbusch (1976) to put forward the theory of short-run nominal exchange-rate overshooting, as a mechanism to equilibrate asset markets, given the relatively slow response seen in the general level of prices.

In a recent literature review, MacDonald and Taylor (1991) find significant support for the hypothesis of overshooting, viewed as evidence of the slow response of goods prices to changes in market conditions, which, in turn would lead to the serial correlation seen in the real exchange rate. Favorable evidence for this hypothesis is also reported in Driskell (1981), Backus (1984), and in Hacche and Townend (1981).

According to evidence found by Mussa, under floating exchange rate systems there will be greater variability in the short run, both in the nominal and the real exchange rate. In addition, a strong correlation is detected between short-run movements in the nominal and in the real exchange rate. This, despite the fact that over longer periods one sees exchange rate movements, as well as movements in the ratio between domestic and foreign prices, consistent with the law of one price, or purchasing power parity, at least for countries with substantially different inflation rates.

Despite the fact that the breakdown of the fixed exchange rate system that occurred at the beginning of the 1970s, and the subsequent adoption of a floating exchange rate system in the main industrialized economies, contributed to the different stochastic process followed by real exchange rates, it cannot be denied that the type of disturbances which confronted these economies under the new exchange rate regime was substantially different from those seen before. The succession of oil crises, changes in financial regulation in the main industrialized economies, as well as the debt crisis in developing countries, were all episodes with sufficient impact on the performance of the world economy, that to ignore them in order to make a direct comparison of the results of different exchange rate systems does not seem appropriate.

Moreover, it is also important to keep in mind that, in practice, the exchange rate policy options facing the authorities represent different degrees of freedom for managing economic policy. Thus, under a floating regime the monetary authorities do not face the discipline of a fixed nominal exchange rate<sup>7</sup>. In fact, it is important to recall that the abandonment of the fixed parity system, and its replacement by floating, took place precisely due to the departure by monetary authorities, especially in the United States, from the disciplinary norms inherent in a fixed exchange rate system.

Apart from the greater or lesser influence that such disturbances may have had on the performance of floating exchange rate systems, it cannot be denied that the absence of constraints on the authorities' monetary management represents a significant difference between one system and the other. Thus, the an assessment of the two regimes has to be analyzed on the basis of the fact that replacing a fixed exchange rate with a system of floating involves a change in the degree of discretion available to the monetary authorities. Hence, a more reasonable comparison would be between a fixed exchange rate system and one in which floating is accompanied by certain disciplinary rules constraining the monetary authorities<sup>8</sup>.

Of course it is difficult to analyze the behavior of the real exchange rate, on the basis of conjectures about what would have been its evolution under a different exchange rate regime from the one that actually prevails. However this is a significant element to consider as an indicator of the magnitude of real shocks to which each exchange rate system must accommodate. According to evidence found by Mussa (*op. cit.*), attempts made to correlate movements of real exchange rates with certain specific shocks have not, in practice, been satisfactory. One possible explanation for his results is the presence of a significant degree of disinformation, on the part of both economic agents and the authorities, regarding the nature of these disturbances, which translates into a degree of "noise" or over-reaction of the system in the face of such innovations. This is particularly so con-

---

<sup>7</sup> Notwithstanding the fact that the degree of discipline to which the monetary authorities have to submit under a fixed nominal exchange rate system is generally stricter than under flotation schemes (because under a fixed exchange rate the Central Bank does not control a quantity of money), in certain conditions of capital account openness and currency competition it is possible to generate similar disciplinary rules to govern the Central Bank's monetary management. On this, see Barandiarán (1974) and Wallace (1981).

<sup>8</sup> As was indicated, the study by Genberg (*op. cit.*), comparing the experiences of Austria and Switzerland, finds significant coincidences in the macroeconomic results achieved under a fixed exchange rate system and a regime of floating with a monetary rule. Although this evidence is of a preliminary nature, it is an important starting point for evaluating more rigorously the effects of alternative exchange rate regimes.



ring that, in competitive financial markets, economic agents' speed of response to changes in market conditions is an inherent feature.

Whatever may be the reasons that have led to different stochastic behavior patterns in real exchange rates under alternative exchange rate regimes, the evidence is very clear in highlighting these differences. Furthermore, the replication of the result found by Mussa for different economies and points in time, tends to support the idea that different behavior patterns do indeed exist among real exchange rates, depending on the exchange rate regime that exists.

As analyzed in the following section, the gradual response of the real exchange rate to the changes in spending and income conditions seen in the economies with fixed exchange rates, not only has relevance for the speed of adjustment of goods markets, but also in determining capital movements. Moreover, the greater volatility of the nominal and real exchange rate observed under floating regimes also needs to be qualified by the degree of restriction faced by the monetary authorities in this context. Thus, greater instability in exchange rates may reflect the unstable nature of the demand for money as well as a discretionary management of money supply.

#### 4. MONETARY RULES AND EXCHANGE RATE SYSTEMS

For many decades the existence of fixed nominal exchange rates was an outstanding feature of the monetary system prevailing in numerous economies. Furthermore, the Bretton Woods Agreement itself established this type of organization as a fundamental aspect of the economic order it aimed to promote. The breakdown of this system at the end of the 1960s, together with a significant rise in inflation rates in industrialized economies, led to intense debate among economists on the design of monetary systems that would cooperate more effectively in the workings of decentralized economies.

The appearance of the phenomenon of "stagflation" following the first oil shock in 1973, which translated into a "Phillips Curve" with a positive gradient in some of the main industrialized economies, accentuated the interest of economists in establishing rules to restrict the degrees of freedom of Central Banks in managing monetary policy<sup>9</sup>. A brief experi-

---

<sup>9</sup> A fundamental aspect in this argument was the development of the Theory of Rational Expectations. According to this, the implementation of active aggregate demand policies by monetary authorities will not have lasting effects on real variables such as the level of output or the rate of unemployment. For details of this approach, see Lucas (1977).

ment along these lines was carried out in the USA under Paul Volcker's administration of the Federal Reserve. This monetary management procedure was followed from 1979 until 1982 approximately, with the aim of reducing the rate of price increases in this economy. This experiment caused a sharp rise in the interest rates prevailing in the USA and the other industrialized economies, a significant appreciation of the dollar, together with a fall in inflation. As a consequence of this policy, a significant recession was generated in the Western economies, especially among developing economies, which were seriously affected by the combination of a rise in international interest rates, together with a fall in the price of raw materials —this, in a context where these economies' foreign debt had gone up sharply in the period prior to change in the external scenario. Quantitative targets for the growth of monetary aggregates were progressively abandoned in the United States, as it was deemed that the demand for money was displaying unstable behavior due to the significant structural transformations in the North American economy, and most especially in the financial sector. This led to the use of different indicators and monetary policy targets followed by the Fed, with the nominal interest rate, and exchange rates between the main currencies the preferred policy targets, thereby relegating monetary aggregates to a secondary role<sup>10</sup>.

A similar phenomenon occurred in Britain during the same period<sup>11</sup>. From 1980 onwards, quantitative targets were set for monetary growth in order to contain inflation. Similar to that what was being seen in the USA, the application of a restrictive monetary policy via a sharp increase in domestic interest rates, led to an appreciable revaluation of the pound, and a recession in the tradable goods producing sector. Despite the fact that the monetary targets were exceeded in five out of six years following their introduction, the inflation rate fell significantly, certainly partly as a result of the sterling appreciation. As in the USA, a factor repeatedly mentioned as a cause of the apparent instability of the demand for money was the deregulation of financial activity. As from 1986, monetary targets were abandoned in Britain as an "anchor" for Central Bank policy, and the level of the exchange rate was adopted as a monetary policy target. For the defenders of this strategy, especially Finance Minister Nigel Lawson, this strategy had the virtue of overcoming the difficulties inherent in using quantitative targets for the growth of monetary aggregates, as well as focu-

---

<sup>10</sup> In this regard, see M. Johnson (1988), Goodhart (1989), Lindsay (1990), among others.

<sup>11</sup> See Miller and Sutherland (1990).

sing the authorities' attention on one of the main transmission mechanisms of monetary policy, as the change exchange rate was deemed to be.

This reorientation of short-run economic policy in Great Britain was consolidated through this country's participation in the "Louvre Accords" in 1987, in which the main industrialized economies agreed to implement a policy to stabilize their exchange rates.

Along with the emergence in industrialized economies of an intellectual climate favorable to the establishment of restrictions on Central Banks' monetary management, in the developing economies a similar climate tended to be generated at the end of the 1970s, although with different degrees of intensity between countries. In particular, in the Southern Cone countries of Latin America a movement developed in favor of reimplementing fixed nominal exchange rates. This tendency was sustained by the strong feelings of rejection of inflation generated in these economies following the experience of three figure rates, which in some cases like Argentina and Chile bordered on hyperinflation. In addition, the popularization of the "Monetary approach to the balance of payments" contributed significantly to the reintroduction of fixed exchange rate regimes in countries such as Argentina, Chile, Mexico and Uruguay.

Contrary to the stabilizing effects that were expected from a fixed nominal exchange rate regime, the difficulties encountered by economies choosing this route gave rise to a profound questioning of this exchange rate regime a few years after its implementation, which was accentuated by the recession through which these countries passed in the early 1980s. Although in certain cases the failure of fixed exchange rate regimes was to be expected to the extent that the authorities did not keep to the disciplinary rules required, for example in the case of Argentina, in other countries like Chile, pinning responsibility on this system for the recession of the early 1980s is more difficult to establish. This is because the economic authorities of this country strictly followed the disciplinary rules associated with implementing a fixed nominal exchange rate. However, the fixing of the nominal exchange rate was followed by a sharp increase in external debt and a significant real appreciation of the peso, which significantly affected the competitiveness of national output.

Although there are various channels through which the non-neutrality of exchange rate regimes can be expressed, attention has tended to be directed towards their influence on capital movements. This, because from the evidence collected in an analysis of various economies that have set up fixed nominal exchange rate systems and which have kept to the disciplinary rules inherent therein, one can infer the existence of a direct relation

between the difficulties encountered in maintaining the competitiveness of domestic output and the presence of strong capital inflows.

## 5. CAPITAL MOVEMENTS AND EXCHANGE RATE REGIMES

In simple terms, the relation between the exchange rate regime and capital movements can be expressed using the interest rate parity conditions. Equation (1) describes the equilibrium condition in the arbitrage carried out by capital movements. The variable “ $i$ ” represents the domestic nominal interest rate, “ $i^*$ ” represents the foreign nominal interest rate and “ $E_t(d(X_{t+1}))$ ” represents expectations, constructed in period “ $t$ ”, of a devaluation of the nominal exchange rate in the following period.

$$(1) \quad i = i^* + E_t(d(X_{t+1}))$$

According to equation (1), as expectations that the announced exchange rate policy will be maintained take root among both resident and non-resident economic agents, which means no devaluations greater than predetermined ones —at the limit none at all, in the case of the fixing the level of the exchange rate— only the interest rate differential will be relevant for determining capital movements<sup>12</sup>.

Equation (2) expresses the idea that capital inflow will depend on the differential existing between domestic and relevant foreign interest rates. In this equation, “ $K$ ” represents net capital entry from abroad.

$$(2) \quad K = f(i - i^* - E_t(d(X_{t+1}))) \quad f' > 0$$

For an economy that decides to set the level, or path, of the nominal exchange rate at a time when domestic interest rates display significant differentials with those in the rest of the world, due to a relative scarcity of domestic saving, the progressive building of credibility in the maintenance of the exchange rule will stimulate greater capital inflow into the economy. In this case, the pressures on domestic spending which the larger capital entry will cause, will pose a serious dilemma to the authorities: either let the real exchange rate fall —as a result of the higher production costs the non-tradable producing sector has to incur to meet the growth in spen-

---

<sup>12</sup> In equation (1) it is assumed that economic agents are risk-neutral. This assumption is analyzed in greater detail below.

ding—, accepting with this a lower level of competitiveness in the economy; or else try to defend the value of the real exchange rate through a crawling peg-type rule, for example, but at the cost of higher inflation. This is because the rising trend in the relative price of non-tradable goods, when offset by a similar rise in the nominal exchange rate, will put upward pressure on the general level of prices<sup>13</sup>.

## 6. THE IMPORTANCE OF THE EXCHANGE RATE'S STOCHASTIC PROCESS

The difficulties facing the economic authorities in maintaining the competitiveness of the economy in the face of massive capital entry from abroad is accentuated under a fixed nominal exchange rate framework, precisely due to the characteristics mentioned above relating to the stochastic process that the real exchange rate follows in this context. Indeed, the fact that the real exchange rate displays a high degree of serial correlation makes it reasonable to expect that its movements will not be abrupt, but instead smooth and systematic. Hence, the same downward trend in the real exchange rate that occurs in the face of capital entry induced by the interest rate differential, causes an intensification of these movements. This is because the perception that the real exchange rate will keep falling—and so is not suddenly about to rise—will stimulate residents to make greater use of foreign borrowing. In addition, in this case the channeling of such resources to finance projects in the non-tradable sector is encouraged, where the relative price is expected to continue rising<sup>14</sup>. The importance of the stochastic process followed by the real exchange rate is clearly revealed by rewriting equation (1) in real terms:

$$(3) \quad r = r^* + aE_t(de(t+1))$$

As can be appreciated in equation (3), where “*r*” represents the real rate of interest and “*e*” the nominal exchange rate, expectations of a fall in the real exchange rate within the relevant planning horizon will lead to a cheapening of foreign credit. The effect of expected changes in the real

---

<sup>13</sup> On this dilemma, see Rosende (1985).

<sup>14</sup> This process was rigorously precise in the case of the Chilean economy during the period of fixing the nominal exchange rate. In the case of Spain in recent years, there has also been a sharp expansion of the non-tradable sector and in domestic asset values, with something similar occurring in Britain as from the mid-1980s.

exchange rate on the real domestic rate of interest is directly related to the importance of the consumption of non-tradable goods in the utility function, represented by the variable “a” in the above equation.

Although it is true that fixing the nominal exchange rate, or its growth rate, constitutes a sort of rule constraining Central Bank management, it is no less true that insofar as an expansionary cycle in money supply and credit is promoted —elements within the business cycle classical theory—<sup>15</sup> via the more intensive use of external financing, this will conspire against the achievement of a framework of macroeconomic stability. This is so even though the management of domestic credit by the Central Bank may be carried out prudently, so as to make it compatible with price stability and strong foreign accounts. In particular, the expansion of foreign borrowing tends to increase the economy’s vulnerability to adverse shocks that may come along, such as a fall in the terms of trade.

The conflicts arising between price stability and the level of the real exchange rate in fixed nominal exchange rate system, have had a special place in recent economic debate in many economies. One example of this relates to the polemic caused by the position of Great Britain with respect to EC monetary agreement. As will be recalled, the Prime Minister Mrs. Margaret Thatcher tenaciously opposed her country’s participation in this agreement. For Alan Walters, Mrs. Thatcher’s adviser until the mid-1980s, the adoption of a fixed exchange rate regime, as participation in the Community implied, would lead to capital flowing towards those economies offering the highest interest rates. This is true unless restrictions are introduced on capital entry from abroad, as Italy and France did with the consequent efficiency costs that this type of control involves. To contain this capital inflow, and with it the process of domestic currency appreciation, the domestic rate of interest would have to be lowered, and this would ultimately lead to a rise in inflation<sup>16</sup>. Against this, the then British Finance Minister, Nigel Lawson, held the view that as the demand for money is unstable, monetary policy should focus on the exchange rate, as indicated above. In addition, the stabilization of exchange rates within known flotation bands was seen by the Minister as an efficient tool for achieving price stability. On the other hand, for Lawson the use of foreign borrowing was not necessarily perverse or explosive (Miller and Sutherland (1990 *op. cit.*): to the extent that such resources were channeled to investment, good use

---

<sup>15</sup> In this regard see, for example, Hayek (1936) and Simons (1946).

<sup>16</sup> On the recent polemic caused by Britain’s participation in the EC exchange rate agreement, see *The Economist*, October 5th and 12th, 1991. In this regard, see also Goodhart (1989).

would be being made of them, and this would prevent balance of payments problems being generated for this reason. Where foreign loans were channeled towards financing a higher level of consumption, this would be restricted automatically through market mechanisms.

It is interesting to point out that despite Mrs. Thatcher's opposition to British entry into the European Monetary System, at the suggestion of Mr. Lawson a monetary policy was adopted from 1986 onwards aimed at following the movements of the German mark within an unpublished flotation band, whose range of variation was estimated to be 10%<sup>17</sup>.

Another interesting example in this respect relates to the above-mentioned case of Spain at the end of the 1980s and early 1990s, where the strong appreciation experienced by the peseta following this country's entry into the EC, has appreciably reduced the competitiveness of its economy, while the monetary authorities have had to make successive cuts in domestic interest rates in order to discourage capital inflow. As a consequence of this process, the inflation rate in Spain is higher than among the other members of this agreement. Thus, the Spanish experience of the end of the 1980s and early 1990s is a living example of the validity of the "Walters Critique" of the establishment of fixed exchange rates or systems with limited flexibility (*The Economist*, October 12th, 1991). As was pointed out above, for Walters, in this case a "perverse monetary policy" would be produced, leading to a choice between a loss of competitiveness in national output and higher inflation.

Similar difficulties have been seen recently in the South East Asian economies known as the NICs (Newly Industrialized Countries). In these countries the economic authorities have had to choose between allowing a rise in inflation or a fall in the real exchange rate, so as to reconcile a scenario of greater slack in the balance of payments with growing scarcity of non-tradable resources, especially labor. With the aim of harmonizing the objective of price stability with the maintenance of a high level of competitiveness in domestic output, these economies have accepted some increase in inflation—which in 1991 amounted to about 12% per year in Hong Kong, 9% in Korea and 5% in Taiwan and Singapore—and an appreciation of their currencies against the dollar. As was foreseeable, those economies that have allowed the biggest drops in the real exchange rate are the ones with the lowest inflation rates.

Finally, mention should be made of the Chilean economy in 1989, 1990 and 1991. In these years the authorities have been involved in the

---

<sup>17</sup> Miller and Sutherland (*op. cit.*); see also Goodhart (1989).

complex task of reconciling balance of payments strength with the maintenance of a stable real exchange rate. As a consequence of the difficulties caused by the harmonization of these two goals, the inflation rate has been reluctant to fall, despite balanced fiscal accounts, while at the same time the Central Bank had to bear significant cash losses arising from the currency purchase inherent in defending its pre-established rule governing exchange rate movements. The real exchange rate fell by about 10% between 1990 and 1991, while the authorities have tried to achieve macroeconomic equilibrium through a series of measures such as the imposition of a special reserve requirement on capital inflows<sup>18</sup>, the establishment of a tax on foreign loans, tariff cuts, the introduction of irregular and surprise changes in the exchange rate rule and a lowering of domestic interest rates. Finally, the difficulties encountered by the monetary authorities in harmonizing the maintenance of the real exchange rate with a monetary policy consistent with moderate inflation, led to the adoption of new measures at the beginning of 1992, consisting of a 5% revaluation of the peso and a widening of the exchange rate band from  $\pm 5\%$  set by the Central Bank according to a real exchange rate rule, to a band of  $\pm 10\%$ <sup>19</sup>.

As was mentioned at the outset, the real nature of the relative price between tradable and non-tradable goods should lead the analysis of its determinants into the real sector of the economy, specifically to the processes of investment and saving. However, given the non-neutrality of exchange rate regimes for the adjustment process of this relative price and, consequently, for spending patterns in the economy, it is important to look for formulas to reconcile achieving a climate of monetary stability appropriate to fixed nominal exchange rate systems, with disincentives to short-term capital inflow implied by the existence of a floating exchange rate system where the stochastic process of this variable, as well as that of the real exchange rate, can be described as a type of random walk in the short run.

## 7. "PURE" EXCHANGE RATE ALTERNATIVES: FLOATING VERSUS FIXING

The establishment of a certain exchange rate regime for the national currency with respect to foreign currencies implies defining the degree of autonomy of monetary policy and also adjustment mechanisms for the real

<sup>18</sup> Like what happened in Spain when the same measure was imposed, the Chilean authorities have been unable to contain capital inflows and help to stabilize the real exchange rate.

<sup>19</sup> As regards the specific aspects that have influenced the behavior of the real exchange rate in Chile, see Rosende (1990, 1991, and 1992).



exchange rate in response to changes in market conditions. Under a fixed nominal exchange rate, the variable with most responsibility for the real exchange rate adjustment process is the level of domestic prices. At the policy-tool level, fiscal policy is responsible for acting on saving conditions in the economy so as to facilitate movements in the real exchange rate.

As indicated above, one of the greatest virtues of a fixed exchange rate system is that it sets a nominal “anchor” to the economy, similar to what happens under a metallic currency system<sup>20</sup>. However, the task of exchange rate adjustment can be highly complex for economies which, as result of a long inflationary history, maintain labor hiring systems based on past inflation, as this detracts from price flexibility in response to unexpected events, especially real-type disturbances.

The capacity of a fixed exchange rate regime to collaborate with the proper working of a market economy is directly related, not only to the effectiveness with which prudent macroeconomic management is pursued, but most especially with the amount of flexibility in price contracts entered into in the economy. In particular, in economies frequently exposed to real shocks, it is not always possible to deal with these through international reserves policy, due to the magnitude or frequency of the shocks, as seems to be in the case in the Chilean economy. Thus, under conditions of price and wage flexibility, the real exchange rate adjustment needed in response to changes in the spending capacity of the economy can be brought about rapidly and, consequently, at less cost.

The existence of a gradual price response to changes in market conditions is source of difficulties for economic policy, due to the incentives to foreign borrowing generated by fixing the exchange rate. In particular, when economic agents realize that the authorities really are following the policies needed to sustain the stated exchange-rate commitment, this will encourage a flow of foreign financing towards the economy, to the extent that the ceiling existing on exchange rate movements is seen as effective. As was pointed out above, the same downward tendency in the real exchange rate that originates from a rise in aggregate spending will tend to reinforce the attractiveness of foreign borrowing, and this accentuates the expansion of domestic spending as well as growth in the non-tradable producing sector.

This cycle of spending and borrowing —which has a close parallel with the classical approach to the business cycle, especially with the

---

<sup>20</sup> In this case the correspondence is not exact as the liquid liabilities of the banking system are not 100% backed by international assets, as occurs with the monetary base. This is an important aspect to consider, for in the past it constituted a serious obstacle to maintaining this exchange rate scheme in economies facing adverse external shocks, such as the Chilean economy in the early 1980s.

viewpoints of Hayek and Simons, as was pointed out earlier— in theory can be discouraged through the formula proposed by Simons (1946) to avoid this type of episode: introduce a degree of risk into the profitability of financial system liabilities —both domestic and foreign. This solution —which to some extent is included in the mid-1980s General Banking Law reform in Chile— is a necessary complement to establishing a fixed exchange rate rule. In this context, domestic interest rates *ex-ante*, must be assessed in the light of the possible shocks that could upset domestic macroeconomic equilibrium and especially the profitability of banks' lending portfolios. Thus, equilibrium domestic interest rates can stay at different levels from those abroad. In particular, the absence of state insurance on the liabilities of the financial system will help to contain the inflow of capital, thereby attenuating and eventually eliminating the conflict between price stability and external payments mentioned earlier.

The main question mark against this way of confronting the incentives to foreign borrowing generated in expansionary periods of the economy under a system of fixed exchange rates, relates to the effective capacity of governments in smaller economies to cause lenders in the national banking system, and more especially external lenders, to incur losses. In other words, if neither domestic nor foreign economic agents believe the rules will be applied, then these will not be effective in resolving the problem posed by the perception that an implicit insurance exists on intermediation activities carried out by banks, and particularly the use of foreign borrowing.

Without pretending to make an exhaustive analysis of the costs and benefits of establishing a fixed nominal exchange rate system, it should be noted that the stochastic process followed by the real exchange rate under this scheme is a factor conspiring against its adoption —at least until the incentives have been developed to generate the saving needed to produce a significant degree of convergence between domestic and foreign interest rates. In addition, the adoption of a fixed exchange rate system requires a significant degree of confidence among economic agents, as to the framework of price stability being achieved within a reasonable period. This, in order to stimulate the abandoning of indexation clauses in contracts and enhance the flexibility of domestic prices, in both absolute and relative terms<sup>21</sup>.

---

<sup>21</sup> It is interesting to note that the incorporation of European economies into the integration process being implemented by the EC, involves fulfilling a series of macroeconomic requirements. These are justified, among other reasons, as mechanisms to facilitate setting up a fixed exchange rate regime between these economies, in a first stage, and a common currency later on.

Given the problems posed for the stability of the growth process in developing economies by establishing a fixed nominal exchange rate system, it seems reasonable to explore the effects of adopting the alternative course, namely a floating exchange rate.

Although in theory this exchange rate system contains the elements needed to achieve greater independence for domestic economic policy as regards international capital movements, is also important to recognize that there are a series of disadvantages associated with it, which need to be analyzed. Firstly, one should assess the extent to which real exchange rate volatility will not be excessive for efficient resource allocation. Secondly, we need to examine the way in which greater exchange rate flexibility can be made compatible with the existence of a disciplinary rule restricting the degrees of freedom and, consequently, the discretionary management of monetary policy by the Central Bank.

For a small economy with under-developed insurance markets, the instability associated with a floating exchange rate system can be excessive; in particular, for economies with a significantly concentrated foreign trade, such as Chile. In fact, the available evidence for industrialized economies themselves points to a high degree of instability in this variable<sup>22</sup>. The response to this concern has been that is preferable to concentrate disturbances in a market such as assets, which are likely to be better able to confront them than others such as the labor market<sup>23</sup>.

According to the theory that stresses the asset-price nature of the nominal exchange rate, its spot level will depend not only on conditions currently ruling in the money market and other domestic assets in the private sector, but also on the future conditions expected to prevail in those markets. In equation (4) we express the level of the exchange rate ( $X_t$ ) as a function of its expected future level and the current level of its basic determinants ( $Z$ ).

$$(4) \quad X_t = (1/(1+b)) \sum_{i=0}^{\infty} (b/(1+b))^i (E_t(Z_{t+i}))$$

This equation, in which “X” represents the logarithm of the spot exchange rate, comes from an equilibrium condition in the exchange mar-

---

<sup>22</sup> For example, see Frenkel (1983), Frenkel and Mussa (1980) and Mussa (1979), among others.

<sup>23</sup> Frankel (1983).

ket, linking the spot level of the nominal exchange rate with the expected future level of this same variable. This relation is set out in (5).

$$(5) \quad X_t = Z_t + b (E_t (X_{t+1}) - X_t)$$

Insofar as the demand for money is a stable function, the principal determinant of changes in “Z” will be the behavior of money supply. In this case, the high level of instability shown by exchange rates could be interpreted as a reflection of the implementation of a highly discretionary monetary policy by Central Banks, and consequently difficult to predict as regards its future movements. Hence, rather than the existence of structural factors inherent to exchange markets, the explanation for high instability in the exchange rate would be the lack of nominal “anchors” within the system to facilitate the prediction of future shifts in monetary policy<sup>24</sup>. Thus, arrangements such as setting quantitative targets for monetary growth, or an independent Central Bank, are possible ways to achieve a more stable behavior pattern in nominal and real exchange rates<sup>25</sup>.

An alternative interpretation for the evidence of instability seen in exchange markets is that the demand for money does in fact behave in an unstable way, and a possible explanation for this phenomenon is the irrational nature of the behavior of participants in this market. Thus, economists such as Dornbusch (1982) have posited the presence of “speculative bubbles” in foreign exchange markets, with an important expression of this hypothesis being evidence of overreaction by economic agents to irrelevant information, which would explain the high degree of variability displayed by exchange rates in industrialized economies. Moreover, Krugman (1985) has argued that some form of irrational speculative bubble needs to be introduced into the analysis, to be able to explain the observed behavior of

---

<sup>24</sup> As was mentioned, in Switzerland a policy of quantitative targets has been implemented on the growth of monetary aggregates, together with a floating exchange rate. According to evidence reported by Genberg (*op. cit.*), the behavior of the nominal and real exchange rates in this economy have not been substantially different from the experience of the Austrian economy where a policy of fixing the exchange rate against the German mark has been maintained.

<sup>25</sup> The establishment of an autonomous Central Bank has grown in popularity in the profession, as a formula for promoting the establishment of a scenario of economic stability, without this translating into an total loss of flexibility for the monetary authorities, which might be more difficult to sustain for a Central Bank subject to political pressures. However, it is necessary to point out that the establishment of Central Bank autonomy does not guarantee the efficient use of the tools in their hands. Moreover, one often sees scant on the part of the Central Bank to defend its autonomy, as argued in Pierce (1978). For this reason the establishment of some type of disciplinary rule on Central Bank management is an important complement to its autonomy.

exchange rates between the main industrialized economy currencies since the 1970s. Against this, Mussa (1987) has argued that an important explanation for the behavior of exchange rates under floating regimes is the absence of the monetary policy management constraints that economic authorities face under a fixed exchange rate system.

Although the evaluation of the behavior of money demand needs to be carried out in the context of a given institutional framework, which affects the process of expectations formation among economic agents, it is important to point out that despite doubts about the hypothesis of a stable demand for money function, the existing evidence does not allow rejection of this hypothesis for periods longer than one quarter. For shorter periods, in general no evidence is really found of a significant correlation between movements of money and nominal income. Having said that, one should not ignore the fact that in numerous cases short-run movements in monetary aggregates are closely linked to discretionary reactions by the monetary authorities to changes in states of nature<sup>26</sup>.

Independently of what is thought to be the ultimate cause of movements in the nominal exchange rate, to permit a greater generality of options within the analysis, the variable “Z” can be defined as “M+V”, where “M” is the logarithm of the nominal domestic money stock and “V” is the logarithm of the velocity of circulation.

Despite strong support received at the beginning of the 1980s for models of exchange rate determination associated with a theory that assimilates it to an asset price<sup>27</sup>, later studies have called into question the explanatory capacity of this type of model. For example, Meese and Rogoff (1983; 1984) find that most of the models that visualize the exchange rate as an asset price do not manage to do better in terms of short-run explanatory power than a simple random-walk type model. Equally, Salemi (1984) finds that in the short run the nominal exchange rate tends to behave as a stochastic random-walk type process, although for longer periods its behavior keeps a closer relation to the economic variables that, according to theory, are relevant for its determination.

According to the literature review made by MacDonald and Taylor (1991), for most of the 1970s models determining the nominal exchange

---

<sup>26</sup> As regards the empirical debate on the stability of the demand for money, see for example, Lucas (1988) and Poole (1988), among others. In relation to the Chilean case the evidence also tends to support this hypothesis. For example, see Matte and Rojas (1986) and Herrera and Vergara (1991).

<sup>27</sup> Frenkel (1983), Dornbusch (1976), Frenkel and Mussa (1980) and Hodrick (1978), among others.

rate as an asset price achieved an adequate explanation of the behavior actually seen in this variable. However, by the end of the decade, widespread failure was seen in the explanatory power of these models for short-term data. These economists have argued that a possible explanation for this phenomenon is the existence of risk-averse, rather than risk-neutral behavior on the part of economic agents. To address this problem they include a variable risk aversion coefficient in their estimation of equations (1) and (4). For these economists, the rejection found in recent investigations for the hypothesis that the exchange market is efficient, is essentially because these studies ignore the fact that estimations of exchange rate behavior constitute a joint hypothesis of two hypotheses: one is verifying the rationality of agents participating in the currency market, while at the same time evaluating their attitude to risk.

Although a rigorous analysis of the interpretation of theory and evidence made by MacDonald and Taylor is beyond the scope of this paper, it seems relevant to point out that their proposed interpretation for explaining the problems encountered in theories of exchange rate determination are still of a preliminary nature. In particular, an explication of the factors that might have led to significant changes in economic agents' behavior towards risk remains to be provided. Moreover, it should not be forgotten that from the end of the 1970s onward there was a series of real-type disturbances to the equilibrium of industrialized economies, which to a greater or lesser extent may have influenced the movements seen in financial and foreign exchange markets —particularly considering that some of these shocks represented innovations in the economic authorities' attitude or strategy in response to certain phenomena like inflation. Thus, it should be remembered that it was precisely at the end of 1970s, more specifically in 1979, when important changes in both the orientation and procedures of monetary policy pursued by industrialized countries, especially the USA, were implemented; and this occurred again before the middle of the following decade, when the Fed abandoned its use of quantitative targets as a criterion for monetary policy management. Furthermore, in this period significant amendments were made to financial legislation in industrialized countries, especially in the USA, involving a far-reaching program of deregulation in this sector. As a result of these two factors, it was reasonable to expect a process of portfolio adjustment among economic agents to occur, in a context of relative uncertainty, in view of the learning required by the change that had occurred in the monetary-financial environment. Finally, the oil shock at the beginning of the 1980s should not be

ignored, nor the subsequent outbreak of the external debt crisis in developing countries, as an outcome of the set of elements described above.

Thus, it is highly likely that the combination of financial and real changes that took place between the end of the 1970s and the mid-1980s have caused a change in the money demand functions in the main economies, and thus in exchange rates, which could only be captured by econometric models to the extent that these incorporate the structural changes that have occurred. This can be seen as one more example of the validity of the “Lucas Critique”. Despite the difficulties that the variants of the monetary approach to exchange rates have come up against in explaining the short-run behavior of this variable, it is important to stress that for longer periods they continue to provide an adequate analytical framework and explanatory capacity. A problem for theory arises essentially in the analysis of the short run, where the influence of innovations—in the market and in economic policy—as well as the signals and predictions provided by so-called “gurus”, often based on methods of scant scientific foundation, tend to dominate exchange-rate movements.

Despite the fact that the evaluation of the experience of flexible exchange rates is still a pending task, the recent history of economic policy in the main industrialized countries shows a gradual trend towards abandoning the floating scenario, at least in its purer forms. One of the causes of this abandonment is precisely the conviction, by the authorities of these economies, that it is advisable to restrict real exchange rate variability, so as to facilitate trade and productive decision-taking.

Thus, after a period of widespread floating of exchange rates among the main currencies, there has been a steady trend towards frameworks involving greater control of exchange rate movements by Central Banks. Thus, while the EC has set up a restricted floating framework between its member currencies as a stage on the road towards the establishment of fixed nominal exchange rates between these currencies—a process that should culminate in the creation of a common currency—the main industrialized economies have set up a system of controlled floating for their currencies. This arrangement, whose origins are associated with the 1985 “Plaza Accord”, involves the existence of certain intervention target zones used by the authorities, which are not made explicit to the market. Thus, the intention is to reconcile the use of the market in determining the exchange rate, with interventions by the authority to reduce volatility, particularly in view of the negative consequences of unstable real exchange rate behavior for the real sector of the economy.

## 8. THE TARGET ZONE ALTERNATIVE

As mentioned above, since the “Plaza Accord” in the mid-1980s, a restricted or managed floating system has prevailed among the main currencies (dollar, yen and deutschmark). The monetary authorities in the industrialized economies have intervened regularly in the currency markets so as to keep the parities of their currencies within certain ranges that have not been publicly announced.

Unlike what happens in a system of fixed exchange rates, in this case intervention by the monetary authorities in the exchange market does not need to be continuous, as they are only obliged to intervene at the limits of the zone, or at certain thresholds within it. On the other hand, in the target zone setup, and unlike a system of pure floating, the authorities set themselves a policy target of achieving less variability in the exchange rate. In this case, economic agents have to estimate what the authorities’ target zones are on the basis of their behavior in response to variations that occur in the exchange rate.

The possibility of adjustments being made to the Central Bank’s intervention range can act as a corrective element for the system, while leaving open the possibility that equilibrium is achieved through parity changes. To the extent that economic agents do not have confidence in the stability of the exchange rate zones or in the authorities capacity to defend them, then transactions will be made outside this range, tending to move the process of exchange rate determination closer to a regime of pure floating.

The existence of exchange rate zones represents an intermediate option between the establishment of fixed or floating exchange rates. According to this set up, the authorities intervene in the currency markets in attempt to stabilize exchange rate movements by reducing their range of variation. Another effect of adopting this exchange rate scheme consists of the authorities using the system to provide direct or indirect signals about its short-term priorities, and at the same time tending to provide clues enabling the real exchange rate level which the authorities hold to be a medium-term equilibrium, to be discerned. As mentioned above, the simple fact of establishing a level or trajectory for the exchange rate has little value unless it is accompanied by a policy commitment to make such a strategy sustainable. So, just as fixing the nominal exchange rate involves a policy commitment for the Central Bank, which is relaxed but does not disappear when a flotation band is implemented around this level, so in the case where the flotation band is defined on the basis of a real exchange rate



policy, there is a monetary and fiscal commitment to this end. In particular, the authorities have to draw up a set of incentives, both in the monetary and fiscal field, to promote a rate of expenditure growth consistent with maintaining a given real exchange rate path.

A case that can be considered as a target-zone, or flotation bands type exchange-rate policy is what has prevailed in Chile since 1984. Here the Central Bank establishes the path for the nominal exchange rate according to a certain criterion, which in this case has been the maintenance of a stable real exchange rate. In addition, a range has been defined for the exchange rate to float around this level, initially set at 0.5%, but which has gradually been widened to 10%, thus forming a scenario in which private-sector influence in determining exchange rate movements is appreciable.

Unlike what occurs in the case of target-zones established between currencies in industrialized countries, in the Chilean case the limits defining the commitment of Central Bank intervention are made public. Thus, once the exchange rate reaches one of these limits the system behaves like a fixed exchange rate regime. Eventually, if the exchange rate stays at the limits of the band for a long period, this can cause problems for the authorities in terms of monetary control, which in turn will generate expectations for realignment of the exchange rate's central path. This has been a recurrent problem faced by the Chilean economic authorities between 1990 and 1991.

Unlike the exchange-rate scheme prevailing in Chile in recent years, the existence of exchange rate zones which are not publicized by the authorities, keeps uncertainty among economic agents as to what the authorities' intervention ranges are. Thus, in response to a downward tendency in the exchange rate, the authorities reserve for themselves the option of intervening, as well as deciding the magnitude of such intervention, and consequently the authorities' set of possible actions are broader. In this case, economic agents have to estimate what the authorities' target zones are, on the basis of their conduct in response to exchange rate variations.

Despite the existence of a certain degree of commitment on the part of the economic authorities to a medium-term exchange rate path—which basically acts as a constraint on the management of fiscal policy—, uncertainty about exchange rate movements within the zone is a disincentive to short-term financial speculation in response to interest differentials which does not occur under a fixed exchange rate (assuming that the size of the zone leaves room for a significant exchange rate variation).

The uncertainty inherent in exchange movements under a floating setup should not be interpreted as anything other than a cost inherent to this

system. However, a more rigorous assessment of the nature of this, and its effects, would need to consider the fact that small economies like Chile, with relatively low saving rates, are exposed to frequent changes in their spending capacity as a result of movements in foreign and domestic markets. Against this background, one option is for the exchange rate to be fixed and the Central Bank to guarantee the stability of exchange rate rule. Through this device the Central Bank gives insurance to the private sector, allowing it to avoid real disturbances of a transitory origin, or to alleviate permanent shocks on the level of domestic spending by gradually spreading the adjustment process required by alterations in national income over time. For an economy frequently exposed to real shocks, and in which there is a relatively small insurance market in relation to these shocks, the maintenance of a fixed exchange rate will enable the real costs of such disturbances to be reduced. However, as this form of insurance has the nature of public good, its excessive consumption is stimulated, thereby provoking a distortion known as moral hazard, which in particular induces greater incentives to short-term financial movements, whose rates of return are raised thanks to the insurance provided by the Central Bank.

The existence of flotation bands can be seen as a setup in which the provision of insurance by the Central Bank is partial, and channeled preferably towards activities, essentially of a real type, which require stable medium-term signals. On the other hand, in this system a certain degree of risk is maintained for short-term activities, directly related to the size of the pre-announced flotation band.

One implication of applying a system of unannounced target zones is that it leaves the economy without a monetary or fiscal policy "anchor". As a result, the future evolution of these variables is left at the mercy of discretionary decisions by the authorities, which may constitute a significant obstacle for private-sector decision-taking. In the case of the industrialized economies mentioned above, the ranges of exchange rate variation between their currencies are established on the basis of a strategy that gives priority to price stability. In fact, this is an important criterion for the various European countries in gaining admission the more advanced stages of monetary integration among the members of the EC. One formula for resolving this inconvenience consists of predetermining the course of the nominal exchange rate, used as a reference for the flotation band according to inflationary targets. This strategy means that the Central Bank's domestic credit policy has to aim at fulfilling the proposed inflationary targets, whereas fiscal policy must work to achieve the saving needed to maintain the real exchange rate at levels consistent with maintaining a solid balance-of-payments position in the medium term.

The specialized “target zones” literature, is associated with papers by Williamson (1985), Flood and Garber (1983), Miller and Williamson (1987), and most especially Krugman (1991)<sup>28</sup>. Although the formal exposition of target-zone intervention theory is highly complex<sup>29</sup>, it is possible to illustrate its essential aspects by means of the set of equations set out above. Below we reproduce equations (1), (4) and (5) to serve as the basis for subsequent analysis.

$$(1) \quad i = i^* + E_t(dX_{t+1})$$

$$(4) \quad X_t = (1/(1+b)) \sum_{i=0}^{\infty} (b/(i+b))^i (E_t(Z_{t+i}))$$

$$(5) \quad X_t = Z_t + b(E_t(X_{t+1}) - X_t)$$

As explained above, equation (1) states the arbitrage equilibrium condition for the case of risk-neutral individuals. Equation (4) argues that the spot level of the exchange rate depends not only on the current level of its determinants, the “Z’s”, which in the “target zones literature are known as fundamentals, or final determinants, but also on the level of these variables that individuals project for the future. Equation (5) is an expression from which (4) is derived.

As it can be seen in equation (4), there is a direct relation between the level of the Z’s and the exchange rate, notwithstanding the fact that this relation passes through the expectations of economic agents, who efficiently use the available information regarding the behavior of the Z’s in order to project the conduct of this variable in the future. This exercise is particularly clear and simple in the case where the demand for money is stable, and the source of instability in the behavior of the Z’s comes from monetary policy. In this case, by implementing a monetary growth rule of  $k\%$ , for example, *à la* Simons-Friedman, can achieve stable behavior in both the exchange rate and interest rates. A more complex case is where the instability stems from the demand for money. In this case the monetary authorities have to implement some sort of reactive monetary policy in order to reduce macroeconomic instability.

<sup>28</sup> An initial version of this study (Krugman, 1991) was presented in 1988. Recent papers in which different aspects of this system are developed include those by Bertola and Caballero (1990), Svensson (1989), Frankel and Phillips (1991), Klein and Lewis (1991), Pessach and Razin (1991) and Pesenti (1990), among others.

<sup>29</sup> For example see Pesenti (1990).

The basic argument of target zone theory is that the existence of a probability of currency market intervention by the authorities will affect the behavior of the exchange rate. Thus, as economic agents develop expectations of Central Bank intervention to prevent the exchange rate moving beyond a certain deviation from what is considered a target or trend level, then economic agents' reading of the contemporaneous evolution of the  $Z$ 's will be different from the case where the Central Bank is not expected to intervene in the exchange market in accordance with a given pattern of behavior, for example as described in equation (6) below.

$$(6) \quad h_t = g (X_t - X_t^*)^2 \quad g' > 0$$

In equation (6) the variable “ $h$ ” represents interventions made by the authorities to modify the path of the  $Z$ 's, while “ $g$ ” is a parameter relating these to deviations recorded in the spot level of exchange rate, compared with the authorities' target or the middle value of the band. Given expression (6), it is reasonable to expect the magnitude of interventions by the authorities to increase along with the deviation of the exchange rate from its target level. Put this way, the authorities' action in the exchange market is not very different from traditional exercises of optimal control involving the existence of a loss function which the authorities desire to minimize by using certain instruments.

As has been mentioned, a simple illustration of this idea is where the demand for money is a stable function and the behavior of the  $Z$ 's can be assimilated to that of nominal money. In this case, assuming the monetary authorities are not following another feedback rule apart from the exchange rate, the money supply equation can be described as follows:

$$(7) \quad Z_t = qZ_{t-1} + h_t$$

Given that variable  $Z$  in this case represents the logarithm of the nominal quantity of money, if there is full and free floating and the Central Bank sets a rule for monetary growth, we have that  $h_t = 0$ , and the value of  $q$  indicates the effective growth rate of the monetary aggregates. If intervention by the monetary authorities in the currency market is only aimed at neutralizing certain random disturbances in the exchange rate, then  $h_t$  will be a random variable with a mean of zero.

Naturally, in the long run the Central Bank cannot sustain the exchange rate at a level other than equilibrium, given a certain pattern of behavior in the supply and demand for money. For this reason, maintaining

certain target paths for the exchange rate requires the average value of interventions to be zero, and for the Central Bank to efficiently perform its role as stabilizing speculator, which should translate into gains—or at least not in losses—as result of this intervention<sup>30</sup>. In the opposite case, the Central Bank's budget constraint will be violated, making necessary a realignment of the exchange rate path or of the target zone. Of course, the period over the Central Bank can maintain exchange market operations of a given sign will depend critically on the strength of the its balance sheet situation.

For agents participating in the currency market, the task will consist of estimating the authorities' intervention zones from its past conduct. Thus, faced with a certain exchange rate trend, individuals will attempt to understand its significance in terms of what it estimates to be the authorities' target level for this variable. In this way, the relation between the spot level of the exchange and its determinants (the  $Z$ 's) as expressed in equation (4) will need to be modified to one that includes the monetary rule expressed in (7).

Figure N° 1 describes the way in which the relation between the exchange rate and its determinants is modified in the presence of certain exchange rate targets on the part of the authorities.

#### FIGURE N° 1

Exchange rate ( $X$ )

Determinants ( $Z$ )

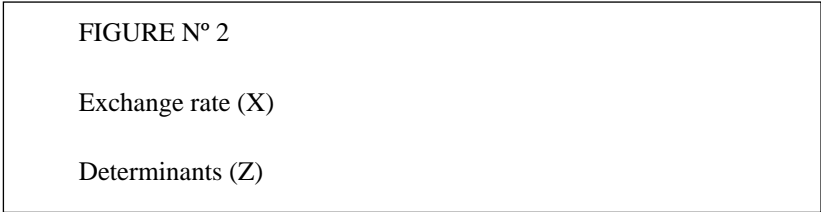
The line  $ZZ$  describes the relation that exists between the exchange rate and its determinants under conditions of “pure floating”, or at least without the presence of systematic rules of intervention by the authorities in the currency market. On the other hand, Curve II shows the way in which the two variables are related when there is an expectation of intervention by the authorities. In the case where intervention by the authorities only takes place at the limits of the target zone—which in this case are defined as “ $X^s$ ” and “ $X^i$ ”—this tends to cause the exchange rate to gradually approach the limit, as the “final determinants” or “fundamentals” follow a sustained upward or downward trend. This is true even when the limits have not been announced, due to a convergence of expectations among

<sup>30</sup> M. Friedman (1953).

market participants as to what the authorities’ intervention points in fact are. In the case where the authorities intervene not only at the limits of the zone, but also inside it, for example, in accordance with the rule expressed in (6), the relation between the exchange rate “fundamentals” and its spot level is shown by curve KK in Figure N°1. In this way a family of curves can be defined to describe exchange market equilibrium, depending on the frequency and magnitude of interventions realized by the authorities to sustain their exchange rate targets. Thus, to the extent that the magnitude or frequency of intramarginal currency market interventions by the monetary authority increases, the curve relating the level of exchange rate to its determinants will tend to flatten out, thus describing the evolution from a fully free exchange rate system to one which is more dependent on the authorities’ decisions.

As was mentioned above, the relation expressed in II only holds as long as the authorities pursue the policies needed to validate the “target zone”. Otherwise, it is possible that no coincidence of opinion will occur among agents as to what the authorities’ intervention limits are, thereby producing transactions outside the limits, which will grow to the extent that a change in the limits of the band used by the authorities to define their intervention in the currency market is expected to occur. This situation is expressed in Point 1 of Figure N° 2.

The fact that the authorities have intervention zones in the foreign exchange market means that, provided policies consistent with this target are pursued, it will be possible to reduce both actual and expected exchange rate variability. This argument, which is illustrated in Figure N°1, also has important implications for the behavior of domestic interest rates. Indeed, as can be inferred from Equation (1), expected exchange rate variability has important consequences for the level of interest rates. Thus, under a firmly defended fixed exchange rate framework, there should be a convergence between domestic and foreign interest rates unless there is an effective restriction on capital movements. On the other hand, in a floating exchange rate system it is possible to maintain significant differentials, and systematic ones, between domestic and external interest rates without this being an obstacle to monetary policy management.



Where a target zone for exchange rate movements is adopted, the equilibrium relation between the interest rate differential in the economy concerned, compared with the rest of the world, will depend crucially on the position the exchange rate takes up inside the “target zone” and the extent to which economic agents believe in its permanency. The case of full credibility, also assuming risk-neutral agents, is illustrated in Figure N°3, where expectations of a change in the exchange rate are consistent with maintaining the exchange rate band and are reflected in interest rate differentials with the rest of the world. Of course, one way of evaluating the degree of credibility among economic agents as to the permanency of the existing exchange rate band consists of contrasting the way in which the interest rate differential with the rest of the world develops at different positions inside the band. For example, Point 1 in Figure N° 3 represents a situation in which the interest rate differential is incompatible with the expectation that the ruling exchange rate band will be maintained without realignment. In fact, this point assumes that agents are anticipating a domestic currency devaluation, which means expecting the limits of the band to be shifted upwards.

Figure N° 3

Credibility zone

Non-credibility zone

Perfect credibility in the exchange rate band

## 9. SOME COMMENTS ON TARGET ZONES

The study of the characteristics of a target-zone type restricted floating scheme has attracted interest in the profession, following its use by the main industrialized economies after the Plaza Agreement in 1985. On this occasion the flotation bands for the currencies of countries participating in this agreement (USA, Japan and Germany) were not made explicit to public opinion. This characteristic makes a non-trivial difference compared to systems where the limits of the band are pre-announced, as has been the case in Chile since the mid-1980s and Israel since the end of that decade. In particular, when the authorities do not announce their intervention limits,

realignments of the central exchange rate parity are easier to implement and less costly in terms of credibility. However, the absence of an explicit commitment by the monetary authorities as to the path of the exchange rate, gives them a significant degree of discretion in managing aggregate demand, which can lead to significant real costs, insofar as productive decision-taking is discouraged.

In the case of the industrialized economies mentioned above, the available studies suggest that the width of the band implicit in the authorities' interventions has varied over time. Thus, for example, Klein and Lewis (1991) find that the implicit flotation band, estimated on the basis of calculating the probability of currency market intervention by the US monetary authorities in the case of the dollar-mark exchange rate, suffered changes ranging from 7% to more than 20% in a few days.

It is important to state that despite the dispersion that may exist among economic agents' estimations of the Central Bank's intervention zones, the agreement between the main economies involved a consultation mechanism when deviations of more than 5% occurred with respect to the parities used as benchmarks in the Central Banks' intervention policy.

Another recent experience of the use of exchange rate flotation bands is the case of Israel since 1989. The justification for setting up this exchange rate scheme in the Israeli case was that the maintenance of an effective control on monetary policy was incompatible with a fixed exchange rate system, in a context of growing integration into foreign financial markets, which it was deemed important to preserve<sup>31</sup>. Similar to the Chilean case, in Israel maintaining the real exchange rate grew more difficult as the economy approached full employment. This was because in economies where non-tradable goods production is labor intensive, the elasticity of labor supply is closely related to the elasticity of supply of non-tradable goods, which tends to reduce in near full-employment conditions.

In the Israeli case, the band was initially set at a  $\pm 3\%$  fluctuation around a parity set by the Central Bank, but was subsequently widened to  $\pm 5\%$ . As can be appreciated, this exchange rate scheme is similar to what has prevailed in Chile since the mid-1980s. Perhaps the most important difference between the two experiences is the way of determining the nominal exchange rate. In the Chilean case this has been established according to a real exchange rate policy, whereas in Israel the level of the exchange rate is set —rather than its path— in relation to a currency basket, and frequent discrete changes are made to the level of the parities,

---

<sup>31</sup> Helpman and Leiderman (1991).



depending on the authorities' assessment of the course of the economy and its level of competitiveness.

A significant factor in the success of an exchange rate zone system, as with any system where the level or path of the exchange rate is fixed, is for the rule to be credible to economic agents. Otherwise, productive activity is impaired by the disincentives caused by expectations of changes in the ruling policy, thereby stimulating financial speculation. Both in the case of Israel and that of France from the end of the 1970s to the mid-1980s, the available evidence tends to question the hypothesis that the level at which the exchange rate zone implicit in the authorities management is situated, was seen as sustainable on the part of economic agents<sup>32</sup>. In the Israeli case, the evidence suggests that as the exchange rate approached the upper limit of the band, domestic interest rates tended to rise, reflecting an expectation of a change in the parity rather than a conviction that the zone would be effectively sustained by the authorities. A similar situation occurred in the case of France between 1979 and 1983<sup>33</sup>.

The emergence of a scenario of growing conviction on the part of economic agents' regarding the sustainability of the exchange rate zone, is an important requisite for the good working of the system. In addition, the success of an exchange rate arrangement of this type requires the existence of effective restrictions on the degree of freedom available to the authorities to move aggregate demand, so that the maintenance of the arrangement is credible to economic agents. In particular, insofar as the behavior of the real exchange rate is a determinant of agents' expectations concerning possible parity realignments, it will be necessary to manage fiscal and monetary tools in ways that are consistent with this objective. The lack of credibility among agents as to the maintenance of the exchange rate zone will help to accentuate interest rate volatility, with the costs that this implies in terms of resource allocation. Having said that, the existence of unstable interest rate behavior which Helpman and Leiderman find in the analysis of certain experiences in which exchange rate zones were implemented, should not be interpreted as an inherent feature of this type of organization, but as a reflection of economic policy management seen by economic agents as incompatible with the stabilization of the exchange rate or its range of variation.

For a small open economy, the implementation of a target zone-type exchange rate scheme may be an efficient tool for harmonizing the aims of stabilizing the real exchange rate and the price level. This is true to the

---

<sup>32</sup> In this regard see Helpman and Leiderman (1991).

<sup>33</sup> Helpman and Leiderman (1991).

extent that its limited variability acts as a tax on short-term capital movements, without this constituting a factor discouraging foreign investment or the development of productive projects. On the other hand, the use of this exchange rate scheme as a tool to contain short-term capital movements has the advantage of market impersonality, which, due to its very characteristics, is less costly and often more predictable than the evolution of administrative controls that tend to be drawn up with the same aim.

Despite the benefits of this system as a tool for harmonizing the management of aggregate demand, compatible with economic stability, and the establishment of medium-term signals as to the path of real exchange rate, its implementation does not resolve the problem posed by the lack of an “anchor” for prices in the economy. On the other hand, one cannot ask this system to guarantee, on its own, a certain level or path for the real exchange rate. As was indicated above, this is a real variable so its medium-term evolution depends on real elements, despite the influence of the exchange rate regime on its dynamics.

Nor is it right to expect that by implementing an exchange rate system of this type, a lasting scenario of price stability will be achieved. Implementation of a target zone-type exchange rate system may be an effective mechanism within the harmonization of economic policy targets mentioned above; however, it is necessary to complement this with a price “anchor”.

The maintenance of a “target zone” for exchange rate variation requires certain targets to be established by the Central Bank for money or domestic credit growth, which only can fluctuate within a certain range. Of course, this range of variation must be calibrated to real events that might occur and affect the economy’s spending capacity. This procedure is not far from what historically has been the technique used by the IMF in designing its monetary programs. According to this, the Central Bank’s domestic credit expansion possibilities are made conditional on the evolution of Net International Reserves. In this way, in response to improvements in the economy’s spending capacity, due, for example, to a rise in the price of copper in the case of the Chilean economy, the domestic credit growth permitted by the program’s targets would rise.

Similarly, automatic saving mechanisms need to be established to respond to cyclical increases that may occur in public revenues. As was pointed out at the outset, this type of procedure is particularly important in the task of stabilizing the exchange rate in economies where the main exportable resource is under state ownership, and its international price is subject to periodic fluctuations.

## 10. ALTERNATIVE STRATEGIES

As was stated at the outset, the harmonization of a framework of price and real exchange rate stability is a complex task for a small economy whose real interest rates are higher than those prevailing in the main financial centers. In particular, this economic policy conflict seems to be especially relevant for economies that have overcome the obstacles preventing their financial integration with the rest of the world, as was the case of Latin American economies in the 1980s following the outbreak of the external debt crisis. Thus, the progressive removal of restrictions on access to foreign borrowing, caused by a country's high level of foreign debt, tends to raise foreign investor interest in committing resources in the area, which in turn means that monetary policy autonomy under a fixed exchange rate scheme is reduced.

Achieving a climate of macroeconomic stability, supported by monetary and fiscal management consistent with this goal, has traditionally been considered by the specialist economic development literature as an important determinant of productive investment behavior, especially in economies with low *per-capita* capital levels and a relative abundance of other productive factors<sup>34</sup>. However the same relative scarcity of capital and saving in these economies has conspired against maintaining stable signals, particularly as regards the stabilization of the real exchange rate, to stimulate an increase in productive investment when domestic macroeconomic conditions are stimulating strong short-term capital inflows.

Faced with the conjuncture mentioned above, some economists have argued for the possibility of setting up restrictions on short-term capital entry. A concrete example of this kind of policy is the imposition of reserve requirements on this type of capital, a formula used in countries such as Spain and Chile, with dubious success. Alternatively, economists such as Rudiger Dornbusch (1986; 1988) have promoted the establishment of dual exchange rates. This type of formula aims at separating financial transactions from those involving trade in goods and services, and investment projects. In this way, a fixed exchange rate would be established for commercial transactions and a flexible one for financial transactions, so that the same variability of the "financial exchange rate" would accommodate variations in financial movements, without this introducing uncertainty over the real exchange rate and resource allocation.

---

<sup>34</sup> A recent study on the determinants of productive investment in developing countries has been made by Larraín and Vergara (1991).

Contrary to what is stated in Dornbusch (1988), and despite possible advances in systems for recording and auditing financial transactions, in practice it is highly complex to effectively implement exchange controls of this type. Furthermore, progress achieved in the development of financial transaction technology render highly vulnerable the systems of exchange control that might be designed, unless backed up by such a high level of coercion that, at the cost of a huge efficiency loss in the economy, foreign and domestic markets can be separated.

The available evidence on the workings of dual exchange rate systems suggests that, where there are restrictions on capital movements, this tends to accentuate the role of commercial credit flows as a basic determinant of such systems. So, insofar as commercial credit is channeled through the commercial exchange rate, which would be reasonable, the effectiveness of this type of regulation is sharply reduced<sup>35</sup>.

## 11. FINAL CONSIDERATIONS

The design of a monetary system which contributes to achieving a framework of macroeconomic stability is a priority goal of economic policy. For a small economy integrated into international trade, it is highly likely that arrangements will lead to fixing the nominal exchange rate as a tool to guarantee the achievement of a framework of price stability and monetary discipline. However, given the difficulties of establishing this type of exchange rate regime in the presence of low domestic saving rates compared to those abroad, manifested in a positive interest rate differential with the respect to the rest of the world, it seems appropriate to move gradually towards this system via the use of a certain degree of exchange rate flexibility as a mechanism for discouraging short-term capital inflows. Under this framework, the establishment of exchange rate “target zones” can be an appropriate tool<sup>36</sup>.

Where flotation of the exchange rate together with some type of rule governing monetary growth is seen as the best monetary arrangement, here too a restricted flotation scheme may play an important role in the transition; this, insofar as it allows the real adjustments to be carried out that are

---

<sup>35</sup> See Lanyi (1975) and Marion (1991) on this.

<sup>36</sup> It should be mentioned that this type of strategy is fully consistent with what has been used in the EC to advance the process of adherence to this agreement. Thus, the form and type of incorporation, among the different members of this agreement, to its macroeconomic aspects depends on the evolution of their different macro-indicators, and this process should culminate in the introduction of a common currency.

needed to prevent real exchange rate variability becoming excessive as a result of capital movements.

The establishment of target zones, as mentioned above, is not simple, for it requires efficient intervention by the Central Bank to attenuate exchange rate fluctuations, and this means that the Bank must effectively play the role of “stabilizing speculator” in the currency market. As with other forms of stabilizing intervention undertaken in asset markets by the Central Bank, one criterion of efficiency is that its balance sheet situation should not suffer as a result.

At the same time, it is important to introduce some criterion for rules governing the behavior of money or the nominal exchange rate, so as to limit the possibilities for discretionary behavior by the monetary authorities. Finally, it should be mentioned that although the organization of the monetary system is an important variable in the dynamics of the real exchange rate and external financial flows, the trend of these variables depends crucially on the patterns of saving and spending in the economy. Thus, in the face of highly frequent shocks to national income, and hence on the economy’s spending capacity, fiscal policy must design rapid response mechanisms for domestic spending, so as to protect exchange rate stability and the external accounts situation. In such conditions, a pending task is to define a policy for managing public finances in accordance with the goals mentioned.

## REFERENCES

- Backus, D. “Empirical Models of the Exchange Rate: Separating the Wheat from the Chaff”. *Canadian Journal of Economics*, 17 (1984).
- Barandiarán, E. “La Oferta Competitiva de Dinero Bancario”. *Cuadernos de Economía* N° 40, (1976).
- Dornbusch, R. “Expectations and the Exchange Rate Dynamics”. *Journal of Political Economy*, 84 (1976).
- . “Special Exchange Rates for Capital Account Transactions”. *The World Bank Economic Review*, September 1976.
- . “Exchange Rate Economics: Where Do We Stand?”. *Brookings Papers of Economic Activity*, 1 (1980).
- . *Open Economy Macroeconomics* (1986).
- . “The European Monetary System: The Dollar and the Yen”. In Francesco Giavazzi, Stefano Micossi, Marcus Miller (eds.), *The European Monetary System*. Centre For Economic Policy Research, (1988).
- . “Real Interest Rates, Home Goods and Optimal External Borrowings”. *Journal of Political Economy*, February 1983.

- Driskell, R.A. "Exchange rate dynamics: an empirical investigation". *Journal of Political Economy*, 89 (1981).
- Frankel, J. and S. Phillips. "The European Monetary System: Credible at Last?". *Working Paper N° 3819*, NBER, (1991).
- Frenkel, J. "Flexible Exchange Rates, Prices, and the Role of 'News': Lessons from the 1970s". In J. S. Bhandari and B. H. Putnam (eds.), *Economic Interdependence and Flexible Exchange Rates*. The MIT Press, (1983).
- \_\_\_\_\_ and M. Mussa. "The Efficiency of Foreign Exchange Markets and Measures of Turbulence". *American Economic Review*, May 1980.
- Friedman, M. "The Case for Flexible Exchange Rates". In M. Friedman, *Essays in Positive Economics*. Chicago: University of Chicago Press, (1953).
- Genberg, H. "In the Shadow of the Mark: Exchange Rate and Monetary Policy in Austria and Switzerland". In V. Argy and P. de Grauwe (eds.) *Choosing an Exchange Rate Regime: The Challenge for Smaller Industrial Countries*. IMF, Katholieke Universiteit Leuven, Macquarie University, (1990).
- Goodhart, C. "The Conduct of Monetary Policy". *The Economic Journal*, June 1989.
- \_\_\_\_\_ "Monetary Targets: European Experience". Seminar on Monetary Policy Instruments for Developing Countries. World Bank, May 1990.
- Hacche, G., and J. Townend. "Exchange Rates and Monetary Policy: Modelling Sterling's Effective Exchange Rate, 1972-1980". In W. A. Eltis and P. J. N. Sinclair (eds.), *The Money Supply and the Exchange Rate*. Oxford University Press, (1981).
- Hayek, F. Von. *Monetary Theory and Trade Cycle*. Sentry Press, (1933).
- Helpman E. and L. Leiderman. "Israel's Exchange Rate Band", *mimeo*, Tel Aviv University, December 1991.
- Hodrick, R. J. "An Empirical Analysis of the Monetary Approach to the Determination of the Exchange Rate" In J. A. Frenkel and H. G. Johnson (eds.), *The Economics of Exchange Rate* (1978).
- Herrera, L. O. and R. Vergara. "Estabilidad de la demanda de dinero, cointegración y política monetaria". *Cuadernos de Economía*, April 1992.
- Johnson M. "Current Perspectives on Monetary Policy". Cato Conference on Dollars, Deficit and Trade, February 1988.
- Klein, M. and K. Lewis. "Learning About Intervention Target Zones". *Working Paper N° 3,674* NBER, (1991).
- Krugman, P.R. "Purchasing Power Parity and Exchange Rates: Another Look at the Evidence". *Journal of International Economics*, 8 (1978).
- \_\_\_\_\_ "Target Zones and Exchange Rate Dynamics". *Quarterly Journal of Economics*, August, 1991.
- Lanyi, A. "Separate Exchange Markets for Capital and Current Transactions". *IMF Staff Papers*, (1975).
- Larraín, F. and R. Vergara. "Investment and Macroeconomic Adjustment: the Case of East Asia", *mimeo*, May 1991.
- Lindsey, D. "Monetary Targets: The U.S. Experience", World Bank Seminar on Monetary Policy Instruments for Developing Countries, May 1990.
- Lucas, R. "Understanding Business Cycles". In K. Brunner and A. H. Meltzer (eds.), *Carnegie Rochester Conference Series on Public Policy*. Amsterdam: North Holland.
- \_\_\_\_\_ "Money Demand in the United States: A Quantitative Review", *mimeo*, (1988).
- Mac Donald R. and M. P. Taylor. "Exchange Rate Economics: A Survey". *IMF Working Papers*, June 1991.

- Marion N. "Empirical Evidence on European Dual Exchange Rates and its Relevance for Latin American". *Working Paper* N° 3,809, NBER, (1991).
- Matte, R. and P. Rojas. "Evolución reciente del mercado monetario y una estimación de la demanda de dinero en Chile". *Cuadernos de Economía*, August 1989.
- Meese, R. A. and K. Rogoff. "Empirical Exchange Rate Models of the Seventies: Do They Fit Out of Sample?". *Journal of International Economics*, 14 (1983).
- Miller, M and A. Sutherland. "Monetary and Exchange Rate Targets, and After: A Stochastic 'Hard Landing' for Sterling?". In Victor Argy and Paul de Grauwe (eds.), *Choosing an Exchange Rate Regime: The Challenge for Smaller Industrial Countries*. IMF, Katholieke Universiteit Leuven, Macquarie University, (1990).
- Miller, M. and J. Willamson. "Target Zones and Policy Coordination", Institute for International Economics, Washington D. C., (1987).
- Mussa, M. "Empirical Regularities in the Behaviour of Exchange Rates and Theories of the Foreign Exchange Market". In K. Brunner and A. H. Meltzer (eds.), *Policies for Employment, Prices, and Exchange Rates*, Carnegie Rochester Conference Series on Public Policy, Vol. 11, Supplement to *Journal of Monetary Economics*, (1979).
- . "Nominal Exchange Rate Regimes and the Behaviour of Real Exchange Rates, Evidence and Implications". In K. Brunner and A. Meltzer (eds.), *Carnegie Rochester Series on Public Policy*, Vol. 25, 1987.
- Pesenti, P. "Exchange Rate Stochastic Dynamics and Target Zones: an Introductory Survey". *Terni di Ricerca* 9, 1990, Ente per gli Studi Monetari, Bancari e Finanziari, Roma.
- Pessach S. and A. Razin. "Targeting the Exchange Rate: An Empirical Investigation". *Working Paper* N° 3,662, NBER, (1991).
- Pierce, J. L. "The Myth of Congressional Supervision of Monetary Policy". *Journal of Monetary Economics*, April 1978.
- Poole, W. "Monetary Lessons of the Recent Inflation and Disinflation". *Journal of Economic Perspectives*, Summer 1988.
- Rosende, F. "Análisis de la situación económica. El ajuste: orígenes, políticas y resultados". *Serie Documentos de Trabajo* 138, September 1990, Centro de Estudios Públicos.
- . "Después del ajuste: la economía chilena en el primer semestre de 1991". *Serie Documentos de Trabajo* 160, August 1991, Centro de Estudios Públicos.
- . "Tipo de cambio real y salarios reales: consideraciones sobre la experiencia chilena". *Cuadernos de Economía*, August 1985.
- Salemi, M. K. "Comment". In J. A. Frenkel (ed.), *Exchange Rates and International Macroeconomics*. Chicago: NBER, (1984).
- Simons, H. "Rules versus Authorities in Monetary Policy". *Journal of Political Economy*, February 1936.
- Svensson, L. E. "Target Zones and Interest Rate Variability". NBER, *Working Paper* N° 3,218, (1989).
- Williams, J. *The Exchange Rate System*. Washington D.C.: Institute for International Economics, (1985). □