CREATING THE ENVIRONMENT FOR ECONOMIC REVIVAL:

ISSUES OF EXCHANGE-RATE AND MONETARY POLICY

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It is my custom to begin a paper of this type by making quite clear the sort of experience on which my presentation is based. The occasion of this conference will represent just my third visit to Russia. It should therefore be clear to all readers that I cannot claim to be an expert on the Russian economy. I have, however, had extended conversations with many of Russia's most outstanding economists, both within the government and in the academic and research communities. They have helped me to see many features of Russia's recent economic experience and to have a good appreciation of the serious problems that continue to beset this nation. I have also been able to gain some degree of appreciation of the institutional features, largely an outgrowth of Russia's earlier history, that limit the degrees of freedom available to policymakers and make their tasks more difficult and challenging than those facing their counterparts in many other countries.

What, then, can I bring to the table in a conference like this? The short answer to that is experience -- some 50 years of work on the economic policy problems of many countries, at all stages of economic development, and with very varied histories. My hope is that with the help

of my recent exposure to the Russian economy, and aided by the briefings I have received from Russian experts, I will be able to select from this experience elements that are relevant for the problems Russia faces today, and helpful to Russia's policymakers as they grapple with those problems.

Policy Instruments and Objectives

At the heart of my story are two economic variables -- the real exchange rate and the real money supply. My main message is that both of these are endogenous variables of the economy. They can be influenced by policy, but they must be considered as policy objectives, not policy instruments. And even when they are treated as policy objectives, policymakers must realize that they cannot set real exchange rate targets and real money supply targets at will -- they must always recognize and respect the fact that both these variables are endogenous to the economy. If a policy is to have any genuine influence upon them, that policy must work to modify their equilibrium levels.

Two simple examples follow, the first concerning the money supply; the second the real exchange rate. With respect to money supply, a policy that increases the nominal supply of money without altering any of the relevant features of the real economy will end up producing nothing but a general increase in prices. The old real equilibrium will be restored, but at a higher price level. So, too, if the authorities want to increase the real price of the dollar, but end up doing nothing more than increasing its nominal price, there is a genuine likelihood that the end result will be just a parallel rise in all prices in the economy, with no change in the real exchange rate or any other real variable.

Indeed, the use of nominal instruments of policy can even have perverse effects on their real counterparts. The prime example arises when policymakers try repeatedly to increase the

real money supply. Perhaps the first step or two will generate simple increases in the price level, with little or no effect on the real money supply. But people learn from experience, and soon come to build an expectation of inflation into their decision processes. At this point they tend to want to hold smaller real cash balances, as they see the real value of their money holdings being continually eroded by successive bites from the "inflation tax". The authorities may combat this tendency by arranging for certain components of the money supply (such as time and savings deposits) to pay interest rates that compensate for the ongoing inflation. And they may allow for deposits and loans to be made in dollars or other hard currencies, with much the same effect. But such adjustments are never complete, if for no other reason that that the national currency in circulation (in the form, say, of ruble notes and coins) is always subject to erosion via inflation.

Up to now I have spoken of situations in which policymakers tried to move a real variable away from its equilibrium level. Such efforts are bound to end in frustration.

But there are also times when policymakers, by operating on the nominal money supply and/or the nominal exchange rate, can help bring about an adjustment <u>toward</u> a new equilibrium. In most cases this involves using policy measures to help avoid deflationary adjustments. Economists all over the world have learned, often by bitter experience, the high costs that deflation brings upon an economy. Even though in our theoretical work we often assume a rapid and frictionless adjustment of prices and wages, whether in an upward or downward direction, we have learned from repeated observation that serious frictions impede major downward adjustments, particularly of nominal wages. All too often, pressures that could be easily accommodated if only a sharp downward adjustment of nominal wages were possible, tend instead to work themselves out via prolonged periods of substantial and protracted unemployment. Under such circumstances, wise policy would work to trace out a different path

to the new real equilibrium -- a path through which the deflationary pressures would be blunted or even totally avoided.

Two examples will suffice to illustrate this point. First, consider a case in which the equilibrium real exchange rate (the real price of the real dollar) has increased. This did happen in Russia when capital ceased to flow into the country, and indeed went the other way. It could also happen with any other abatement of the supply of foreign exchange -- such as could follow from a sharp fall in the price of petroleum. If in such circumstances the nominal exchange rate is held fixed by policy, the rise of the real price of the dollar has to come from a fall in the internal price index. That is, $E/\bar{p}_d$ can be made to rise either through E (the nominal exchange rate) rising, or, $\bar{p}_d$ (the domestic general price level) falling. A prudently managed devaluation (a rise in E) is in nearly all circumstances preferable to a long period of deflation, in which $\bar{p}_d$ inches downward painfully, while the economy suffers sharply reduced activity and widespread unemployment.

The second example concerns a change in the demand for real cash balances , $(M_2/\bar{p}_d)$. This can happen in otherwise quite favorable times, as the economy stabilizes after a spurt of inflation, or as the demand for monetary balances increases while the economy emerges from a recession, or undergoes increasing monetization as traditional sectors are modernized. In this case the equilibrium level of $M_2/\bar{p}_d$ is rising, creating economic forces which can be accommodated either by a rise in M_2 (the nominal supply of money) or by a fall in $\bar{p}_d$ (the domestic general price level). Increasing nominal M_2 balances to meet the increased demand is

the painless path of adjustment. Failure to do this will push the economy onto the painful path, of adjusting via internal deflation as $\bar{p}_d$ is pressed downward.

Obviously, making the right adjustment in the circumstances of my last two examples entails having a reasonable idea of what has happened (or is happening) to the equilibrium level of the real exchange rate (in the first case) or the real money supply (in the second case). Sometimes this is easy to do, as with a sharp fall in oil prices or a sudden massive capital flight. But other times the signals are not clear, the tea leaves not so easy to read. This is when the authorities have to engage in what I call serious "detective work", so as to assemble the available evidence in a careful, professional way, and to analyze it intelligently. Here perhaps the most important task is to distinguish between transitory pressures and those of a more long term nature. In addition, the evidence at hand usually reflects the complexity of the real world -- there are many types of evidence to look at, and not all of them will be telling the same story at any one time. Likewise, a complex economy is subject to shocks or disturbances from many different sources; part of the necessary detective work consists in identifying the key forces that lie behind what we see in the evidence, and assessing their strength and durability, and the direction and intensity of their influence on our variable of interest, be it the equilibrium real exchange rate, or the equilibrium real money supply or yet another variable with which we are concerned.

The Real Exchange Rate as a Key Policy Objective

I believe that the real exchange rate has to play a central role in bringing the Russian economy out of its recent and present slump, and back on a path to a thriving prosperity. This conclusion can be based on Sherlock Holmes's principle of eliminating the other "suspects". To my mind, any attempt to pull the economy up by massive printing of money would only end in

inflation. The resort to massive foreign borrowing is precluded by Russia's poor standing in credit markets. Inflows of equity capital, including direct foreign investment may come, but only gradually, and as a consequence of legal and structural reforms that provide the basis for greater investor confidence and security.

So, having eliminated (or given a rather limited role to) the above suspects, there remains the real exchange rate. I do not want to speak of a specific target level for the real price of the dollar in Russia. Rather, I simply want to emphasize the need for a real exchange rate that promises profitability for a wide range of export and import substitute commodities. Such a stimulus came about naturally as the real price of the dollar rose in the wake of the "Russian crisis". But it was placed in some jeopardy by the boom in oil prices that followed -- a boom which prompted an abundant flow of dollars into the Russian economy.

The Central Bank has been buying the bulk of those dollars, in the process expanding the nominal supply of money. Two forces have kept this expansion within reasonable bounds. First, there is the continued outflow of capital from Russia -- in itself a lamentable phenomenon, but in this particular case a cloud that has a silver lining. The silver lining is that it helps to very substantially contain the number of dollars that the Central Bank acquires. The second force is the policy of sterilization followed by Russia's Central Bank. This latter policy has been atypical, but nonetheless effective. For Russia has accomplished sterilization by attracting deposits from the commercial banks. This contrasts with the more standard form of sterilized intervention, which consists of the sale of government or Central Bank securities in the open market, with the proceeds being used to buy foreign exchange without the necessity of a concomitant expansion of the money supply. The "Russian solution" has certainly worked in the same direction and in essentially the same way as the more traditional sterilized intervention.

The supply of local money is absorbed in Russia by increased commercial bank deposits at the Central Bank, in other countries by the sale of new Central Bank bonds (or government bonds initially in the hands of the Central Bank) to the public. The important thing is that something is done to absorb a significant part of the additional M_2 that is created when the Central Bank buys, in this case, petrodollars.

The use of deposits rather than open market operations to effectuate sterilization has one limitation -- namely, that the initiative rests with the commercial banks rather than the Central Bank. Of course, the Central Bank can always make it more or less attractive for the commercial banks to deposit money with it, simply by varying the interest rates that it is willing to pay on such deposits. But even so, the ultimate initiative in such situations rests with the commercial banks. I was thus pleased last December to learn that the Central Bank had been authorized to issue marketable obligations of its own so that it could have at its disposal a policy instrument by which it could exercise its own initiative in its sterilization operations.

The Consequences of Sterilization

Sterilization seems to be a fine way of keeping the real price of the dollar from falling in the face of a significant increase in the supply of dollars. But it usually comes at a price. This price is best seen by visualizing a schematic version of what economists call the consolidated balance sheet of the banking system. This balance sheet looks at the whole banking system vis-a-vis the nonbank public. The principal liabilities of the banking system with the public are currency, demand deposits, time and savings deposits, certificates of deposits, etc. These add up to M_2, or some other, closely related "broad definition" of money. The principal assets are the net foreign exchange holdings of the banking system (typically dominated by the foreign exchange reserves of the Central Bank), and the various classes of domestic credit -- credit to

public sector entities is typically put in one category, that to private sector entities in another. It has become increasingly common for the consolidated balance sheet to include deposits in both domestic and foreign currency, and similarly for loans. That is, foreign currency deposits and loans are entered together with local currency deposits and loans, rather than consolidated with other foreign currency assets and liabilities as part of "net foreign assets". Other assets not yet listed would typically be the buildings and other real estate holdings of the banks, and other physical assets such as vehicles, computers, etc. These tend to vary very little over the episodes that economists typically study. On the other side of the balance, the liabilities not yet listed typically consist of the capital and surplus (net worth) of the banks, plus assorted long-term liabilities.

The "big picture" of the consolidated balance sheet thus appears as follows:

Consolidated Balance Sheet of the Banking System

Assets	Liabilities	
Net Foreign Assets	Currency in Circulation	} M_2
Credit to Public Sector	Demand Deposits	
Credit to Private Sector	Time and Savings Deposits	
Buildings, Equipment, etc.	Capital and Surplus	

Our story to date has been as follows. If an increase in the supply of foreign exchange is bought by the Central Bank without sterilization, it is matched by an expansion of M_2 on the liability side. If it is bought with sterilization, M_2 does not (or need not) change, but then some other item on the asset side must be squeezed. Typically, and I would say almost invariably, this other item consists of credit to the private sector. The consequences of such a credit squeeze are

usually an increase in interest rates, and often a sharp reduction in investment and in economic activity generally.

Russia has been in a rather unusual situation in this regard, in that active credit to the private sector has not recovered much since the crisis period. I was told that the reason Russia's commercial banks are willing to place deposits in the Central Bank, at interest rates that are below the rate of inflation, is that "they have nothing better to do with the money." Some detective work is clearly needed to verify the extent to which this holds true, but on the surface it certainly appears to explain the broad outlines of what we observe -- "passive" sterilization by the Central Bank, with that entity paying low nominal (and negative real) interest rates to the commercial banks.

Central Bank Policy Options

The policy of sterilization has the objective of preventing an undesired fall in the real price of the dollar. In this it has, in my view, succeeded reasonably well to date, but one has no clear assurance regarding future trends. Part of the reason for the Central Bank's successful sterilization is, however, the rather unpleasant fact of the commercial banks having "nothing better to do with the money". This suggests that an alternative for the Central Bank would be to pay even lower interest on its deposits from commercial banks, or even eliminate such deposits entirely. Without a doubt, this would lead, directly or indirectly, to a further demand for dollars, either by the commercial banks themselves, or by the public at large. The Central Bank would accumulate fewer additional reserves, but M_2 would end up smaller.

Does this alternative make sense? Perhaps yes, from the standpoint of the specific goal of influencing the demand for foreign currency so as to keep the real price of the dollars in an acceptable range. But from a longer-term point of view it moves the real money supply in an

undesired direction. A positive scenario for the future of the Russian economy surely incorporates a healthy and growing supply of real bank credit to the productive sector. The "source" from which such credit is ultimately drawn is the M_2 liabilities of the consolidated banking system. A part of the middle-to-long-term scenario is, therefore, a rising volume of desired real monetary balances, voluntarily held by consumers, firms and other economic agents. A significant reduction, right now, of the economy's real M_2 balances would thus be a move that would have to be sharply reversed as the economy got on track for a healthy recovery.

What costs must be borne in order to keep the real money supply moving in the right direction? That is a question that I am asking, but am not yet in a position to answer. But I do know where to look for clues. On the whole, economic agents respond to the incentives they face. In the course of an ongoing inflation, even one at a relatively moderate rate of 20% per annum or less, M_2 balances tend to vary with the interest rate that is paid on them (that rate being conceptualized in real terms even if it is stated and actually paid in nominal terms). So the question is, at what "price", in terms of the interest rate paid to depositors, can one achieve a desirable level and trajectory for the real M_2 balances of the Russian economy? What "price" is being paid now, in the present situation? Is that price itself low enough to be acceptable? And what can be projected to be the time path of that price, as the economy moves forward, in a hoped-for healthy recovery?

Let me tell a story from the recent history of Indonesia. When the Asian crisis first struck in the summer of 1997, there was a huge capital flight together with an equally huge run on the commercial banks. At the same time some of the borrowers from banks were unable to make payments on their loans. The banks were scrambling for funds in every direction. Many made announcements that they were making no new business loans, not even renewing old loans, as

they matured. In part autonomously, and in part in response to these bank announcements, the businesses that owed money to the banks went on what I have termed a "borrowers' strike". They simply did not make amortization payments on their outstanding bank loans. The "good" firms kept up the interest payments in their loans. The weak and the "bad" firms paid neither interest nor amortization.

But the banks had to pay interest on their M_2 deposits in order to avoid a further run. How was this done? In brief, the banks received SBIs -- the Indonesian equivalent of Treasury bills, except that they are issued by Bank Indonesia (the Central Bank) rather than by the country's Treasury. These SBIs, together with some government bonds, became the principal earning assets of the banks as part of an emergency restructuring scheme. The interest on these assets has thus been the source from which the commercial banks have been paying interest to their depositors.

This led to an appalling situation, in which, in December 1998 (over a year after the crisis had first hit) Indonesian commercial banks were paying nominal interest rates of 37 and 38 percent per annum, on deposits of thirty days or more. The beginning point here was a guarantee of deposits by Bank Indonesia, in the early months of the crisis. I believe such a guarantee was necessary, for otherwise the banks faced a huge run by depositors which they would not have survived. Moreover, a good chunk of the withdrawn funds would have gone to fuel an attempted flight of capital from the country (much bigger than what actually occurred), with a consequent huge additional pressure on both the exchange rate and the nation's international reserves.

The move of guaranteeing deposits also reflected a wise prescription -- that under such panic conditions the authorities should make every effort to keep M_2 -- the broad money supply -- from collapsing. This they did, for which they should be given due credit. But one must

remember that the main reason behind the objective of keeping M_2 from collapsing is not M2 itself so much as the huge squeeze in private sector credit that a collapse of M_2 would imply.

That is, we want to keep M_2 from falling in order to keep the credit system as healthy as possible. An economy should be ready to pay a pretty high price for this. But in Indonesia's case, the price was high, but the credit market was already in the deep freeze. So it was scandalous that such a high price was being paid. What do I mean by "such a high price"? Given the state of the banking system, the principal source for the interest payments actually being made was the interest received on the SBIs the banks were holding. This was not enough to pay all the accruing interest on bank deposits, but many accounts were being rolled over, with the interest being added each month to the account balance. But even this interest was in the end going to be paid by the taxpayers, under Bank Indonesia's deposit guarantee.

So in December, 1998 I desperately urged that the authorities seek ways to lower that huge interest cost. Finding such ways was not an easy task, because a rash move could readily precipitate a drastic drop in deposits and even a flight of capital from the country. In this light, what we observed on this front during the year 1999 is nothing short of a miracle. The SBI rate, which was then in the high 30s, came down to the low teens. And this was accomplished without precipitating any of the dire consequence mentioned above.

I am sure that some good luck was involved in this, particularly the public's willingness to maintain their monetary balances throughout the process. But I think we can gain some insight into the mechanics of what happened. Bank Indonesia was auctioning off SBIs, essentially every week. By controlling the quantity of SBIs offered at each such auction, Bank Indonesia certainly was able to influence the rate of interest that resulted. By keeping SBIs in relatively short supply, then, Bank Indonesia created the circumstances where the equilibrium of

supply and demand took place at a relatively high price for the SBIs -- that is, at a relatively low interest rate.

The other piece of good news that contributed to the successful outcome was the stability of the general price level. This served the purpose of reinforcing confidence, and at the same time kept the real exchange rate well above the level that would cause us great concern. That is to say, the real exchange rate remained throughout this period in the range where it was a powerful stimulus to the production of export goods and of tradable goods in general.

What were the options facing the Indonesian authorities as of December, 1998? If they kept paying 38% interest on the SBIs, huge Central Bank losses would be incurred. If they did not continue paying such high interest rates, they would run the risk of another currency flight, which they did not have sufficient foreign reserves to finance. Hence the end result could easily have been a repetition of the huge exchange rate "bubble" that had peaked in June of 1998 when the nominal exchange rate reached six times, and the real exchange rate more than three times its pre-crisis level.

The Indonesian authorities were, in my opinion, very lucky to be able to produce a very rapid reduction in the interest rate in SBIs, without a concomitant reduction in real M_2 holdings. This was achieved through growing confidence in the economy, buoyed most importantly by a very stable price level. One way to look at the situation is to presume, with some reason, that the high nominal interest rates of some 38% per year in December of 1998 embodied a significant element of anticipated inflation, and that as price stability continued to prevail in the subsequent months, this anticipation of inflation was progressively reduced, so that an interest rate of around 15% in August of 1999 may have been viewed by money holders as being just as good (in prospective real terms) as an interest rate of 38% had been in December, 1998. This, then, is our

best interpretation of how this "mini-miracle" of stable real monetary balances in the face of falling real interest rates was achieved. The key is that the measured real interest rates (nominal rate minus the contemporaneous inflation rate) fell sharply, but the expected real interest rate (nominal rate minus the expected inflation rate) may have experienced little or no reduction.

Revitalizing Bank Credit

One of the most pernicious and most lasting effects of a banking crisis is the atrophy, partial or total, of the system of bank credit to the private sector. With all the success, just reported, that the Indonesian authorities had in reducing nominal and real interest rates in the wake of that country's banking and exchange-rate crisis, they did not succeed to any significant degree, in the task of revitalizing bank credit. Other countries, notably Mexico, have had similar problems on the credit side, even when other aspects of recovery were capped by remarkable success.

I call attention to this point because it is clear that Russia's system of bank credit suffers from the same malady -- certainly not as bad as Indonesia's, but probably not as good as Mexico's. The recipe of what is needed is very simple. The problems all lie in how to get there. What is needed is for banks to have confidence that their borrowers will service their loans faithfully, and in a timely manner. If they fail to do so, the banks must have reasonable recourse -- to claim collateral, to swap debt for an equity position, etc. Otherwise, why would they want to do anything but hold government obligations and foreign assets as counterparts to their deposits?

An easy way to view the problem is to think of any banking crisis as involving some sort of borrower's strike. In Indonesia, the strike was almost universal (with the recipients of microcredits being the most notable exceptions). In Mexico the strike was partial, but still very

widespread. There, the banks trusted the loyal customers who kept servicing their debts, did not trust at all those who failed to do so, and on the whole were very reluctant to extend credit to new borrowers. Trust, discipline, order, accountability -- all these are lacking to an important degree in the wake of any banking crisis, and all these must somehow be restored before the system can be restored to full health.

Rarely is it true that a Central Bank can by itself handle the rescue of a failed banking system, and rarely, in recent times at least, have the depositors been called upon to share any major part of the cost of the system's failure. Most commonly, the rescue of the banking system has been carried out with the taxpayers' money. This is not what the theorists of risk view as the best solution, but it is what most often actually happens in the real world. So I am prepared to contemplate rescue operations in which the bad paper held by the banks is exchanged, directly or indirectly, for good paper issued by the government. The losses are then represented by the interest the government pays on this good paper, plus any loss (usually huge) that it sustains in the course of liquidating the bad paper it has acquired.

The sad note is that a country can go through this whole rescue process -- with the banks ending up fully solvent and safe, and with the government having borne costs equal to ten or twenty or even thirty percent of a year's GDP -- and still be at square zero with respect to the revival of the credit system. Banks can live forever on government paper and foreign assets.

I am not pointing to specific solutions here -- only to the urgency of finding one (or more). What I'm really trying to do is to alert people to the fact that rescuing the banks is at most only half the story -- the revival of the credit mechanism is a different and additional problem -- easily as difficult and challenging as the rescue operation itself.

Deposit Interest Rates and the Demand For Monetary Balances

The reason for the authorities to try to prevent a collapse of the demand for real M_2 balances in times of crises is in the first instance to forestall its likely consequence -- i.e., a parallel collapse in the availability of real credit to the productive sector of the economy. In periods of recovery, real M_2 balances should follow a trajectory which leaves adequate room for the development of a healthy "market" for bank credit, in which interest and amortization payments are typically made in a timely fashion, and in which as old loans are paid off, the banks readily grant fresh credits, to new as well as old borrowers.

The first principle to follow in implementing such a policy is certainly to avoid situations in which the rate of interest in time and savings deposits is below the rate of inflation. There is a long listing of inflationary episodes in which the resulting phenomenon of negative real interest rates actually occurred, with devastating effects on the demand for such deposits.

The second principle is to recognize the sensitivity of real monetary balances to the interest rates paid (or not paid) on them. The authorities typically have considerable capacity to influence real monetary holdings, by means of policies which affect the interest rates the commercial banks pay on their deposits.

Some readers may think that the focus ought to be on the interest rates that banks collect from business firms, and that these ought to be "low" in order to stimulate the demand for bank credit. This is an erroneous line of reasoning. In the first place, charging negative real interest rates on bank loans is an invitation to wasteful uses of those funds -- it has no place in a modern market economy. In the range of positive real interest rates, the key lesson is that a project that can afford to pay a real interest rate of only two or three percent per annum is not contributing much to the prosperity and growth of the economy. Net investment equal to 10% of GDP, and

invested at a marginal productivity of 3%, would contribute only 0.3% to the growth rate of the economy.

In the present state of the Russian economy, emphasis must be placed on making the whole economy more productive and efficient. Policies are required that contribute to economic efficiency by making markets more fluid and agile, by eliminating waste and corruption, and by seeing to it that the price signals that reach business firms and other economic agents are appropriate signals for the middle-to-long-run allocation of resources. Many such policies are required before a sound path of economic recovery can be achieved. Here I would emphasize one critical policy -- that of seeing to it that the real exchange rate promises good profitability to many sectors of export and import-substitute activities. It is from here that I confidently anticipate an adequate demand for business loans, at interest rates that are significantly positive, as the economy proceeds along the path of recovery.

Evidence On Bank Deposits and Interest Rates

One of the great mysteries in the history of economic thought is how entrenched the idea became that real monetary balances were a negative function of interest rates. Obviously, those who put forward this proposition were not thinking about the interest rate paid on bank deposits themselves. But normally, economists think first of the price of a product itself as determining the demand for it. Only in the case of real money balances has attention been concentrated on some "other" price.

Most people recognize the above anomaly once it is pointed out to them. So I will not attempt to delve further into how it came about or what may explain its durability in our literature. Instead I will here present evidence that in the actual working of economic processes, interest rates work as they should. Real monetary balances respond positively to the real interest

rates paid on them, negatively to the real interest rates paid on other financial assets, and negatively to the expected rate of inflation.

The evidence I am about to present comes from a recent (2000) doctoral dissertation by M.B. Freire, done under my supervision. Monetary balances are divided into two components: money (M_1) and quasi-money (M_2 minus M_1), according to the definitions used in the International Monetary Fund's International Financial Statistics. They are converted to real terms each month, by dividing by the contemporaneous consumer price index. Real M_1 balances are treated as paying no interest, while quasi-money balances are treated as receiving the interest reported by the Central Bank of each country as being paid on 30-day deposits. Real interest rates are obtained by taking the contemporaneous nominal interest rate minus the "expected rate of inflation".

Tables 1, 2, and 3 depict demand equations estimated for the two components M_1 and (M_2-M_1) separately, and for their sum (M_2). In every case we see that the demand for real M_1 balances responds negatively to the rate of inflation, and in all but one case to the real rate of interest on 30-day deposits. Recall that this interest rate is paid on "other" (time and savings account) balances, not on M_1 balances.

In the case of quasi-money the interest rate on the deposits themselves proves to be a positive stimulus to those deposits, with only one exception (the Philippines). But the response to the interest rate on government bonds is, as it should be, in the opposite direction (once again with the exception of the Philippines).

In the case of the demand for $(M_2 / \bar{p}_d)$ the sum of the two components, we have no clear presumption of the sign of the coefficient of the real interest rate on deposits, because that

operates negatively on M_1 and positively on (M_2-M_1). Nonetheless, the positive effect predominates in 13 out of the 15 cases.

Some readers are probably curious about the definition of the expected inflation variable. This uses a declining weighted average of current and past annual rates of inflation, the current rate being the rate applying in the 12-month period ending with the current quarter, and the past rates applying in the three preceding 12-month periods. The weights applied to these four annual rates of inflation were 0.4, 0.3, 0.2, 0.1). This weighting pattern is meant to give a rough reflection of the underlying reality, in tune with our experience and intuition, that memories of past inflation do not evaporate, but do lose power over time, as indicators of future rates of price increase. Despite the roughness of the indicator, it performed significantly better than the contemporaneous inflation rate (the one-year rate ending with the current quarter). Tables 4 and 5 show the results using contemporaneous inflation as the inflation variable. The comparison between the results of the two indicators is given in Tables 6 and 7. A simple sign test (of which of the two R^2s or the two F-statistics is greater under one or the other inflation definition) gives only a moderate edge to the expected inflation variable, but a dramatic advantage for this variable is revealed when the total of positive differences is compared to the total of negative differences (see bottom panel of Tables 6 and 7).

Linking Monetary and Real Exchange Policies

Let me begin this section by recalling what was said at the outset -- the real exchange rate and the real money supply are endogenous variables. They can be influenced by policy, but cannot by any means be manipulated at will. Among the worst policy mistakes are those that try to "force" a real variable to a level that is incompatible with prevailing supply and demand conditions. So the task of the authorities is to do what they can, within the limits of their

capacity, to influence the equilibrium levels and time paths of these two variables in a positive way, conducive to a sustained economic recovery.

To my mind, the real exchange rate is of primary concern because of its importance in giving adequate continuing stimulus to the production of export goods (and of tradable goods generally). One sensible way to deal with this concern is for the Central Bank to have, at any given time, a sort of "intervention point". When the real price of the dollar starts to fall below the intervention point, the Central Bank would enter with its own demand for dollars, being willing at that point to add significantly to its foreign exchange reserves.

Such intervention will, of course, entail in the first instance an expansion of base money, and of other monetary magnitudes like M_1 and M_2. In the luckiest of cases, this monetary expansion will be "absorbed" by an increased desire, on the part of the public, to hold real monetary balances. This increased demand could come from a growing GDP (as recovery proceeds) and also from a growing confidence in monetary policy (especially the control of inflation) and in monetary institutions (especially the commercial banks).

When the authorities are less lucky, there will be a need to sterilize all or part of the increase in M_2 that would otherwise stem from the purchase of additional foreign currency reserves. This could occur via the Central Bank's attracting increased deposits from the commercial banks (perhaps through its raising the interest rates it pays on such deposits), or through its using its new authority to engage in direct open market operations, or even (less desirably) through mandating increases in required reserves that the commercial banks would have to hold against their demand, time and savings deposits.

Such sterilization has the natural consequence of generating a squeeze on some other assets of the commercial banks -- presumably private sector credit. This squeeze can be

ameliorated by the authorities inducing an increase in the public's desired holdings of real M_2 balances. The purpose of the preceding section of this paper was to demonstrate that desired real monetary balances do indeed respond positively to the interest rates paid on them. So the Central Bank can help to generate an increase in the level of M_2 balances by introducing policies that cause higher interest rates to be paid in time and savings deposits.

As far as I can see, there are just three avenues for doing so: a) increase the private sector demand for credit; b) increase the Central Bank's own willingness to pay for deposits from the commercial banks (or for open-market paper that the commercial banks can hold); and c) increase the efficiency of banking operations, so that the equilibrium spread between deposit rates and lending rates is reduced. Of these, I believe only b) is really a short-term option for the Central Bank. a) depends on the revival of the economy and of a properly functioning credit market, while c) comes slowly over time as the fruit of changed organization and practices of the commercial banks as they implement cost-reducing measures.

So we recognize that in order to induce an increase in desired real M2 balances, the Central Bank will likely have to increase the interest rates it pays on deposits and/or its own open market operations. This will automatically induce commercial banks to charge higher interest rates on their credits to the private sector (to the extent that these are not in the "frozen" category). This consequence is to be expected -- the natural way in which an excess demand is resolved in any normally-functioning market is for a rise in price to induce an increase in supply (greater desired M_2 balances) and at the same time a reduction in "other" demand (reduced demand for private-sector credit, releasing part of the funds that go to the Central Bank as it sterilizes).

The Missing Link: Revitalizing the Market For Private Sector Credit

It should be seen from the preceding section that a substantial and sustained increase in the amount of "healthy" credit to the private sector is part of just about every good scenario. Yet this is something that is beyond the reach of standard monetary and exchange rate policy. I cannot claim to have the answers as to how to bring this economic elixir into being -- but I know that important steps of a legal and institutional nature are involved, in addition to sound economic policies that set the economy on a solid growth path, that create and maintain confidence in its monetary and fiscal stability, and that provide a solid base of profitable and growing firms, earning real rates of return on their investments that enable them to fuel a growing demand for "healthy" private sector credit. None of these changes can be accomplished overnight -- this makes it all the more important to begin early a sustained campaign to bring them about.

TABLE 1

Regression Results: Real Demand for M_1 $[\log(M_1 / \bar{p}_d)]$, 1970-95

(Newey-West standard errors)

		C O E F F I C I E N T							
				Interest Rates		Seasonal Dummies			
Country Name		Expected Inflation	Log GDP	Real Dep.	Real Bond	dum1	dum2	dum3	trend
		b0	b1	b2	b3	b4	b5	b6	b7
1.	Ecuador	-0.985*	0.005	-0.500	n.a.			0.110*	
		(-5.377)	(0.026)	(-2.526)				(9.016)	
2.	Colombia	-0.987*	0.501*	-1.069*	n.a.	0.035*		0.186*	
		(-3.421)	(4.877)	(-3.431)		(4.328)		(15.905)	
3.	Mexico	-1.417*	0.554*	1.584*	-1.428*		-0.049*	0.150*	
		(13.069)	(5.374)	(4.390)	(-4.574)		(-1.831)	(6.585)	
4.	Philippines	-2.762*	1.004*	-1.283	-0.247		-0.050*	0.072*	
		(-3.994)	(5.455)	(-1.047)	(-0.336)		(-3.268)	(4.024)	
5.	Thailand	-1.226*	0.968*	-1.358*	-1.214*	-0.095*	-0.106*	-0.029*	
		(-2.166)	(31.092)	(-2.692)	(-1.930)	(-8.889)	(-7.662)	(-2.441)	
6.	Malaysia	0.919	1.472*	-2.598*	-1.621*			0.028*	
		(1.196)	(54.057)	(-5.794)	(-2.707)			(4.009)	
7.	Korea	-2.059*	1.090*	-2.852*	-0.201		0.053	0.138*	
		(-2.422)	(26.251)	(-2.327)	(-0.207)		(2.329)	(8.300)	
8.	Uruguay	-0.187*	1.202*	-0.205*	n.a.		-0.120*	0.085*	-0.012*
		(-1.916)	(4.403)	(-2.302)			(8.284)	(5.164)	(-7.777)
9.	Chile	-0.477*	0.930*	-0.330*	n.a.	-0.066*	-0.107*	0.039*	
		(-2.964)	(15.524)	(-2.514)		(-3.846)	(-5.640)	(1.692)	
10.	Argentina	-0.170**	2.894*	-0.0003*	n.a.	0.073*		0.176*	-0.016*
		(-1.666)	(3.349)	(-2.971)		(3.121)		(5.445)	(-5.829)
11.	Indonesia	-0.718*	1.317*	-0.073	n.a.				
		(-2.087)	(19.838)	(-0.253)					
12.	Costa Rica	-2.938*	-0.087	-2.352*	n.a.	-0.056*	-0.065*	0.165*	
		(-5.220)	(-0.361)	(-3.168)		(-1.915)	(-2.008)	(5.132)	

Table 1 (cont.)

Country Name	Expected Inflation	Log GDP	Interest Rates: Real Dep.	Interest Rates: Real Bond	Seasonal Dummies: dum1	Seasonal Dummies: dum2	Seasonal Dummies: dum3	trend
	b0	b1	b2	b3	b4	b5	b6	b7
13. Paraguay	-0.314	0.983	-0.312	n.a.		-0.040*	0.105*	
	(-0.314)	(1.383)	(-1.218)			(-2.983)	(4.681)	
14. Singapore	-3.592*	0.865*	-3.130*	-1.721			0.018*	
	(-3.925)	(32.750)	(-3.843)	(-3.218)			(1.750)	
15. Venezuela	-3.453*	0.149	-1.432*	-0.278**			0.094*	
	(-9.578)	(0.364)	(-8.891)	(-1.756)			(3.581)	

[1] Numbers shown are the estimated coefficients; numbers in parentheses correspond to their respective t-statistics; a star (*) alongside a coefficient shows it is statistically significant at a 5% significance level; two stars (**) indicate the coefficient is significant at a 10% significance level.

[2] T-statistics are calculated using Newey-West standard errors. These standard errors are consistent with the presence of either heteroscedasticity or autocorrelation.

Source: M.B. Freire, Essays in Money Demand, Inflation and Growth in Developing Countries (Ph.D. dissertation, UCLA, 2000), Table 6a

TABLE 2

Regression Results: Real Demand for Quasi-Money [log(quasi - money / p_d)], 1970-95

(Newey-West standard error)

		C O E F F I C I E N T							
				Interest Rates		Seasonal Dummies			
	Country Name	Expected Inflation	Log GDP	Real Dep.	Real Bond	dum1	dum2	dum3	trend
		b0	b1	b2	b3	b4	b5	b6	b7
1.	Ecuador	-1.635*	1.638*	0.531*	n.a.				
		(-4.216)	(21.787)	(2.527)					
2.	Colombia	-3.960*	1.912*	1.308*	n.a.				
		(-5.902)	(13.870)	(3.705)					
3.	Mexico	-0.311	1.550*	4.315*	-3.009*				
		(13.069)	(-0.884)	(3.060)	(2.764)	(-2.380)			
4.	Philippines	-2.385*	3.276*	-5.186*	3.682*			0.042*	
		(-5.258)	(34.680)	(-4.756)	(4.121)			(1.982)	
5.	Thailand	-3.093*	1.684*	1.394*	-0.840				
		(-6.181)	(42.047)	(2.288)	(-1.539)				
6.	Malaysia	-6.142*	1.591*	3.949*	-5.55*				
		(-4.466)	(50.573)	(6.086)	(-5.547)				
7.	Korea	0.604	1.373*	1.794**	-2.072*				
		(0.845)	(57.268)	(1.707)	(-3.048)				
8.	Uruguay	0.390*	1.784*	1.374*	n.a.				
		(1.869)	(7.657)	(6.913)					
9.	Chile	-0.734*	0.696*	0.142*	n.a.				
		(-3.433)	(2.445)	(2.642)					
10.	Argentina	-0.373*	1.931*	0.0008*	n.a.				
		(-3.842)	(2.958)	(11.944)					
11.	Indonesia	1.988*	2.798*	2.708*	n.a.				
		(2.297)	(27.352)	(3.967)					
12.	Costa Rica	0.424	1.613*	0.441	n.a.			-0.045*	
		(0.853)	(-0.361)	(-3.168)				(-2.996)	

Table 2 (cont.)

Country Name	Expected Inflation	Log GDP	Interest Rates: Real Dep.	Interest Rates: Real Bond	Seasonal Dummies: dum1	Seasonal Dummies: dum2	Seasonal Dummies: dum3	trend
	b0	b1	b2	b3	b4	b5	b6	b7
13. Paraguay	-4.502*	0.003	2.159*	n.a.				
	(-2.710)	(0.002)	(2.236)					
14. Singapore	9.678*	1.084*	2.927*	-0.663				
	(7.665)	(21.576)	(2.019)	(-0.750)				
15. Venezuela	-0.335	-0.669	1.282*	-0.346				
	(-0.634)	(-0.993)	(3.187)	(-0.894)				

[1] Numbers shown are the estimated coefficients; numbers in parentheses correspond to their respective t-statistics; a star (*) alongside a coefficient shows it is statistically significant at a 5% significance level; two stars (**) indicate the coefficient is significant at a 10% significance level.

[2] T-statistics are calculated using Newey-West standard errors. These standard errors are consistent with the presence of either heteroscedasticity or autocorrelation.

Source: M.B. Freire, Essays in Money Demand, Inflation and Growth in Developing Countries (Ph.D. dissertation, UCLA, 2000), Table 7a

TABLE 3

Regression Results: Real Demand for M_2 [$\log M_2/\bar{p}_d$)], 1970-95

(Newey-West standard error)

Country Name	Expected Inflation	Log GDP	Interest Rates: Real Dep.	Interest Rates: Real Bond	Seasonal Dummies: dum1	Seasonal Dummies: dum2	Seasonal Dummies: dum3	trend
	COEFFICIENT							
	b0	b1	b2	b3	b4	b5	b6	b7
1. Ecuador	-1.632*	2.026*	0.107	n.a.			0.052*	
	(-6.881)	(23.128)	(0.890)				(3.463)	
2. Colombia	-2.222*	1.263*	0.280*	n.a.			0.080*	
	(-7.480)	(20.789)	(1.963)				(5.661)	
3. Mexico	-0.659*	1.212*	3.190*	-2.316*			0.079*	
	(-2.916)	(3.729)	(3.449)	(-3.093)			(2.496)	
4. Philippines	-2.509*	2.623*	-4.602*	2.914*				
	(-5.375)	(19.767)	(-3.871)	(3.194)				
5. Thailand	-2.544*	1.570*	0.809**	-0.857*				
	(-6.064)	(48.972)	(2.714)	(-1.949)				
6. Malaysia	-3.741*	1.543*	1.786*	-4.178*			-0.01*	
	(-5.204)	(83.112)	(3.832)	(-6.653)			(1.668)	
7. Korea	-0.242	1.311*	0.669	-1.810*		0.020*	0.042*	
	(-0.647)	(64.011)	(0.970)	(-3.078)		(1.690)	(4.662)	
8. Uruguay	0.155	1.158*	0.905*	n.a.		-0.036*		
	(0.981)	(6.650)	(6.333)			(-2.575)		
9. Chile	-1.610*	0.996*	-0.279**	n.a.		-0.016	0.048*	
	(-5.960)	(13.546)	(-1.598)			(-1.812)	(2.391)	
10. Argentina	-0.421*	1.077*	0.0005*	n.a.			0.045*	
	(-5.284)	(2.165)	(8.178)				(2.504)	
11. Indonesia	1.395*	2.302*	1.075*	n.a.				
	(3.950)	(39.332)	(3.332)					
12. Costa Rica	-0.587**	1.067*	-0.414	n.a.			0.036*	
	(-1.727)	(15.730)	(-1.325)				(2.924)	

Table 3 (cont.)

Country Name	Expected Inflation	Log GDP	Interest Rates: Real Dep.	Interest Rates: Real Bond	Seasonal Dummies: dum1	Seasonal Dummies: dum2	Seasonal Dummies: dum3	trend
	b0	b1	b2	b3	b4	b5	b6	b7
13. Paraguay	-3.232*	0.202	2.234*	n.a.	0.040*		0.063*	
	(-3.971)	(0.265)	(2.124)		(2.325)		(4.074)	
14. Singapore	6.297*	1.031*	1.354	-0.806				
	(7.797)	(31.020)	(1.497)	(-1.371)				
15. Venezuela	-1.679*	-0.303	0.099	-0.248				
	(-6.908)	(-1.081)	(0.531)	(-1.166)				

[1] Numbers shown are the estimated coefficients; numbers in parentheses correspond to their respective t-statistics; a star (*) alongside a coefficient shows it is statistically significant at a 5% significance level; two stars (**) indic ate the coefficient is significant at a 10% significance level.

[2] T-statistics are calculated using Newey-West standard errors. These standard errors are consistent with the presence of either heteroscedasticity or autocorrelation.

Source: M.B. Freire, Essays in Money Demand, Inflation and Growth in Developing Countries (Ph.D. dissertation, UCLA, 2000)

Table 8a

TABLE 4

Regression Results: Real Demand for M_1 [$\log(M_1 / p_d)$], 1970-95

(Newey-West standard error)

		COEFFICIENT							
				Interest Rates		Seasonal Dummies			
Country		Current	Log	Real	Real				
Name		Inflation	GDP	Dep.	Bond	dum1	dum2	dum3	trend
		b0	b1	b2	b3	b4	b5	b6	b7
1.	Ecuador	-0.955*	-0.131	-0.475*	n.a.			0.108*	
		(-7.654)	(-0.953)	-3.700)				(10.105)	
2.	Colombia	-1.185*	0.487*	-1.009*	n.a.	0.035		0.185*	
		(-6.991)	(4.712)	(-2.897)		(4.320)		(15.963)	
3.	Mexico	-0.462*	1.393*	2.901*	-2.939*		-0.087*	0.192*	
		(-2.350)	(4.050)	(4.551)	(-1.996)		(-2.026)	(5.370)	
4.	Philippines	-2.058*	1.180*	-2.379*	-0.337*		-0.055*	0.055*	
		(-4.352)	(6.804)	(-2.614)	(-0.472)		(-3.287)	(2.626)	
5.	Thailand	-1.004*	0.958*	-1.377*	-0.539	-0.097*	-0.106*	-0.030*	
		(-1.796)	(34.085)	(-2.859)	(-1.089)	(-8.675)	(-7.598)	(-2.513)	
6.	Malaysia	-0.093	1.414*	-1.280*	-1.392*			0.020*	
		(-0.071)	(33.122)	(-1.731)	(-1.060)			(2.416)	
7.	Korea	-4.261*	1.082*	-3.904*	-0.438			0.121*	
		(-7.564)	(37.749)	(-5.280)	(-1.154)			(4.719)	
8.	Uruguay	-0.169*	1.122*	-0.230*	n.a.		-0.120*	0.086*	-0.012*
		(-1.859)	(4.578)	(-1.896)			(-8.349)	(5.230)	(-8.116)
9.	Chile	-0.671*	0.901*	-0.334*	n.a.	-0.065*	-0.106*	0.038*	
		(-2.869)	(16.219)	(2.788)		(-3.736)	(-5.589)	(1.681)	
10.	Argentina	-0.321*	1.450*	0.0002*	n.a.	0.070*		0.154*	
		(-5.767)	(4.082)	(-2.025)		(2.920)		(4.570)	
11.	Indonesia	-0.357*	1.380*	-0.254	n.a.				
		(-1.580)	(24.712)	(-0.831)					
12.	Costa Rica	-2.549*	-0.015*	-2.226*	n.a.	-0.056*	-0.066*	0.161*	
		(-3.834)	(-0.079)	(-2.964)		(-1.894)	(-2.081)	(4.986)	

Table 4 (cont.)

Country Name	Current Inflation	Log GDP	Interest Rates: Real Dep.	Interest Rates: Real Bond	Seasonal Dummies: dum1	Seasonal Dummies: dum2	Seasonal Dummies: dum3	trend
	b0	b1	b2	b3	b4	b5	b6	b7
13. Paraguay	-0.399	0.701*	0.108	n.a.		-0.042*	0.106*	
	(-1.389)	(3.191)	(0.301)			(-2.935)	(6.412)	
14. Singapore	-3.754*	0.877*	-3.334*	-0.211*			0.017*	
	(-5.132)	(36.374)	(-5.741)	(-4.421)			(1.710)	
15. Venezuela	-2.287*	-1.066*	-1.387*	-0.029			0.094*	
	(-9.148)	(-4.013)	(-7.761)	(-0.186)			(2.985)	

[1] Numbers shown are the estimated coefficients; numbers in parentheses correspond to their respective t-statistics; a star (*) alongside a coefficient shows it is statistically significant at a 5% significance level; two stars (**) indicate the coefficient is significant at a 10% significance level.

[2] T-statistics are calculated using Newey-West standard errors. These standard errors are consistent with the presence of either heteroscedasticity or autocorrelation.

Source: M.B. Freire, Essays in Money Demand, Inflation and Growth in Developing Countries (Ph.D. dissertation, UCLA, 2000), Table 10

TABLE 5

Regression Results: Real Demand for Quasi-Money $[\log(\text{quasi-money} / \bar{p}_d)]$

(Newey-West standard error)

		COEFFICIENT							
				Interest Rates		Seasonal Dummies			
	Country Name	Current Inflation	Log GDP	Real Dep.	Real Bond	dum1	dum2	dum3	trend
		b0	b1	b2	b3	b4	b5	b6	b7
1.	Ecuador	-1.219*	3.855*	-0.282	n.a.				
		(-3.571)	(12.758)	(-0.900)					
2.	Colombia	-0.842*	1.890*	1.513*	n.a.				
		(-1.648)	(10.354)	(2.570)					
3.	Mexico	0.711	2.467*	4.805*	-4.439*				
		(1.562)	(3.062)	(2.407)	(-2.550)				
4.	Philippines	-1.978*	3.301*	-5.334*	3.966*			0.037*	
		(-5.958)	(33.354)	(-4.542)	(4.070)			(1.745)	
5.	Thailand	-4.097*	1.725*	0.336	-2.617*			0.018*	
		(-1.962)	(35.912)	(0.404)	(-2.809)			(1.816)	
6.	Malaysia	-5.303*	1.639*	2.892*	-5.703*				
		(-3.273)	(36.612)	(4.067)	(-4.214)				
7.	Korea	0.74	1.391*	1.166	0.410*				
		(1.301)	(54.026)	(1.444)	(2.100)				
8.	Uruguay	0.632*	1.717*	1.596*	n.a.				
		(3.898)	(6.988)	(7.276)					
9.	Chile	-0.270*	0.727*	0.153*	n.a.				
		(-2.098)	(2.986)	(3.391)					
10.	Argentina	-0.207*	3.600*	0.001*	n.a.				
		(-4.651)	(15.598)	(8.942)					
11.	Indonesia	2.393*	2.796*	3.037*	n.a.				
		(4.104)	(29.676)	(4.552)					
12.	Costa Rica	0.438	1.567*	0.632	n.a.			-0.048*	
		(0.956)	(20.186)	(1.356)				(-3.458)	

Table 5 (cont.)

Country Name	Current Inflation	Log GDP	Interest Rates: Real Dep.	Interest Rates: Real Bond	Seasonal Dummies: dum1	dum2	dum3	trend
	b0	b1	b2	b3	b4	b5	b6	b7
13. Paraguay	-0.007	3.286*	2.282	n.a.				
	(-0.007)	(6.464)	(1.834)					
14. Singapore	4.676*	1.092*	4.161*	-2.849*				
	(2.120)	(14.212)	(3.444)	(-2.177)				
15. Venezuela	0.555	-1.560*	1.264*	-0.217				
	(1.021)	(-2.143)	(2.768)	(-0.534)				

[1] Numbers shown are the estimated coefficients; numbers in parentheses correspond to their respective t-statistics; a star (*) alongside a coefficient shows it is statistically significant at a 5% significance level; two stars (**) indicate the coefficient is significant at a 10% significance level.

[2] T-statistics are calculated using Newey-West standard errors. These standard errors are consistent with the presence of either heteroscedasticity or autocorrelation.

Source: M.B. Freire, Essays in Money Demand, Inflation and Growth in Developing Countries (Ph.D. dissertation, UCLA, 2000), Table 11

TABLE 6

Comparison of Real M1 Demand Equations

Estimated With Expected Versus Current Inflation[1]

		R2 Adjusted Statistics				F-Statistic		
		a		b	c	d	e	f
		Equation w/ Expected Inflation		Equation w/ Current [1] Inflation	(a-b)	Expected[1] Inflation	Current[1] Inflation	(d-e)
1.	Ecuador	64.9	<	76.7	-11.8	27.9 >	48.8	-20.9
2.	Colombia	84.3	=	84.5	-0.2	56.2 =	56.8	-0.6
3.	Mexico	89.4	>	74.9	14.5	100.3 >	36.0	64.4
4.	Philippines	71.4	=	71.4	0.0	33.9 =	33.9	0.0
5.	Thailand	98.3	=	98.4	644.1	<	714.2	-70.1
6.	Malaysia	99.2	=	98.6	0.6	2404.5 >	1239.4	1165.0
7.	Korea	95.8	=	95.5	0.3	279.8 <	317.4	-37.5
8.	Uruguay	84.5	=	84.6	-0.1	82.4 =	83.1	-0.7
9.	Chile	94.9	=	95.0	-0.1	254.3 <	262.2	-7.7
10.	Argentina	79.9	>	64.4	15.5	59.0 >	27.3	31.7
11.	Indonesia	97.5	=	97.3	0.2	1260.7 >	1181.9	78.8
12.	Costa Rica	46.5	=	46.9	-0.4	10.7 =	10.9	-0.2
13.	Paraguay	75.4	<	79.5	-4.1	23.1 <	28.9	-5.9
14.	Singapore	98.7	=	98.9	-0.2	640.5 <	768.6	-128.0
15.	Venezuela	93.0	>	89.6	3.4	159.4 >	103.6	55.8
Total of negative differences in the statistic (Expected Inflation minus Current Inflation)					-15.9		-270.1	
Total of positive differences in the statistic (Expected Inflation minus Current Inflation)					23.4		1395.7	

[1] Current inflation represents the current quarter's end of period, annual inflation rate. Expected inflation is the weighted average of the last four years annual rates of current inflation, as defined above.

Source: M.B. Freire, Essays in Money Demand, Inflation and Growth in Developing Countries (Ph.D. dissertation, UCLA, 2000) Table 12

TABLE 7

Comparison of Real M1 Demand Equations

Estimated With Expected Versus Current[1]

		R2 Adjusted Statistics				F-Statistic		
		a Equation w/ Expected Inflation		b Equation w/ Current [1] Inflation	c (a-b)	d Expected[1] Inflation		e Current[1] Inflation	f (d-e)
1.	Ecuador	93.8	>	91.1	2.7	371.3	>	241.9	129.4
2.	Colombia	92.5	>	88.1	4.4	201.1	>	122.7	78.4
3.	Mexico	67.7	>	54.2	13.7	35.2	>	20.3	14.9
4.	Philippines	96.3	=	96.4	-0.1	633.9	<	651.8	-17.9
5.	Thailand	96.8	=	96.1	0.7	3402.0	>	1625.5	1776.6
6.	Malaysia	97.2	=	96.9	0.3	2305.4	>	1737.2	568.2
7.	Korea	98.1	=	98.0	0.1	1578.3	>	1443.6	134.7
8.	Uruguay	76.7	-	76.8	-0.6	97.6	<	101.2	-3.6
9.	Chile	95.7	=	95.2	0.5	1082.4	>	823.8	258.6
10.	Argentina	78.2	<	79.2	-1.0	100.3	<	107.2	-6.9
11.	Indonesia	96.6	=	96.7	-0.1	2049.3	<	2162.4	-113.1
12.	Costa Rica	94.8	=	95.2	-0.4	296.0	<	324.6	-28.7
13.	Paraguay	91.7	<	94.0	-2.3	98.6	<	129.6	-30.9
14.	Singapore	78.0	>	96.1	1.9	526.1	>	258.4	267.7
15.	Venezuela	48.9	>	42.5	6.5	14.6	>	11.5	3.1
Total of negative differences in the statistic (Expected inflation minus Current Inflation)					-3.3			-201.0	
Total of positive differences in the statistic (Expected Inflation minus Current Inflation)					29.2			3231.6	

[1] Current inflation represents the current quarter's end of period, annual inflation rate. Expected inflation is the weighted average of the last four years annual inflation rates, as defined above.

Source: M.B. Freire, Essays in Money Demand, Inflation and Growth in Developing Countries (Ph.D. dissertation, UCLA, 2000) Table 13

APPENDIX

Excerpt From Arnold C. Harberger's

"The Road to Economic Recovery: Strategic Issues and Choices"

(August 2000)

[In preparing the present paper, I felt constrained by the fact that I had treated real exchange rate issues at some length in an earlier paper. This paper was submitted in August 2000, and served as my written contribution to the December 2000 conference sponsored by the Institute for the Economy in Transition. I take it for granted that many of those who attend the present (April 2001) conference will have had access to that earlier paper. But also, very likely many will not. My solution to this dilemma was to include the relevant portion of the earlier paper -- the part dealing most explicitly with the real exchange rate -- as an appendix to the present paper.]

The Role of the Real Exchange Rate

Let me begin this section by pointing out that, in the 1940s, 1950s and 1960s, even specialists in the field of international trade were unfamiliar with the concept of the real exchange rate. My own diagnosis is that its special role was obscured by the simplifications (assuming a world of two countries A and B, two products X and Y, and two factors of production L and K) that were typically employed in classrooms and in theoretical work obscured the need for such a concept. Moreover, the 1950s and 1960s were decades of relative calm, in which the real exchange rate did not come to center stage either as a reflection of new and critical problems, or as a policy variable that might help in their solution.

All this changed dramatically in the 1970s and 1980s. The first decade was characterized by two major oil price shocks, and by one major world recession, and also by the inevitable abandonment (in the face of these shocks) of the Bretton Woods system. All these elements led to an era of unprecedented volatility of real exchange rates. This volatility was a reflection of changes that were taking place in the underlying structure of supply and demand, to which the adjustment of a country's real exchange rate was typically a natural and necessary response. But at times the problem took the reverse form, of a disequilibrium whose solution (a major adjustment of the real exchange rate) was prevented or long delayed, usually by a combination of rigidities both of prices and of the nominal exchange rate.

By studying the experiences of countries in the 1970s, 1980s, and 1990s, we have come to have a quite full appreciation of the role that the real exchange rate plays in the economic system. That role is nothing less than its being the "fundamental equilibrating variable" of a country's balance of payments. All kinds of disturbances lead quite naturally to the need for an upward or downward adjustment in the real exchange rate:

a) reducing tariffs, quotas and other import restrictions leads to an increased demand for imports, hence to a rise in the equilibrium real price of the dollar.

b) reducing restrictions on exports adds to the supply of foreign currency, hence to a fall in its equilibrium real price.

c) a boom in the world price of a major export commodity makes dollars abundant, so their real equilibrium price falls.

d) technical advances (real cost reductions) in the prices of tradable goods add to the supply of exports and/or import substitutes. This adds to the supply of dollars (via more exports) or reduces the demand for them (via lower imports), with the result that the equilibrium real price of the dollar falls.

e) capital inflows typically add to the available supply of dollars, thus tending to reduce their equilibrium real price. One should note here, however, that the effect of a capital inflow on the real exchange rate will differ depending on how it is spent. If money is borrowed and used exclusively to buy capital equipment (or other tradable goods) for a new project, the new supply of foreign exchange is just matched by a new demand, so there is no effect on the equilibrium real price of the dollar. It is quite different if the borrowed money is spent on local (nontradable) goods and services; in this case the borrowed dollars have to be converted to local currency, creating a need for a fall in their equilibrium real price.

This list of forces affecting the equilibrium real exchange rate should give readers an appreciation that mastery of real exchange rate analysis does not come easily. Much misunderstanding of this subject has prevailed and continues to prevail. There is a great need for policymakers to recognize the fundamental importance of the real exchange rate in the ongoing processes of a modern economy, and also to bear in mind that it is a variable that responds to many different and complex forces. This is not an area where simplistic notions can serve as a reliable guide.

The real exchange rate has a particularly important place in the situation of Russia today. The Russian economy has been engaged in a major adjustment process for more than a decade, and still has not achieved the goal

of a thriving market economy, with its resources fully and efficiently employed, and with its links to the world economy fully and efficiently developed.

The analogy fits quite well to think of the Russian economy as being in a swamp, struggling to get out to dry land, where it can move much better and much faster, and can operate much more productively.

How can the Russian economy escape from this swamp? It surely requires a healthy, economic demand for the services of its abundant human and physical resources. How can this demand be fostered, stimulated, developed? The easy response is to create demand internally, perhaps by the government, perhaps via the banking system. Such "autonomous" creation of demand invariably involves, in one form or another, the inflationary expansion of the money supply. This was the subject of the preceding section, where the folly of the inflationary path was amply demonstrated. High rates of inflation are, in theory, in practice, and in common sense, inimical to economic efficiency and to economic growth. And in the Russian case, one can also say that the inflationary "solution" has already been tried, and has led to disastrous consequences.

The alternative and much better avenue of escape from the swamp is provided by the real exchange rate. The objective in this case is export-led growth, in which the economy exploits its known sources of comparative advantage, and in the process also encounters new ones.

This route out of the swamp can be said to be the natural one, in the sense that it is likely to evolve quite naturally in a market economy,. If a country has to export more to solve its problems, then what is more natural than for those exports to be priced attractively? And attractive pricing for exports means high prices in rubles, as far as Russian producers are concerned, and low prices in dollars, pounds or marks as far as foreign buyers are concerned. A high real price of the dollar accomplishes both of these apparently contradictory objectives at the same time.

A high ruble price of the dollar gives a strong incentive to old export items, and at the same time stimulates a search for new items of comparative advantage. It was the stimulus of a high real exchange rate that led to the development in Chile during the middle and late 1970s, of several major new export items -- including salmon (in which Chile is now one of the three biggest exporters), kiwis (in which it disputes for leadership only with the old leader, New Zealand), and table grapes, peaches, raspberries, nectarines and other fruit. These are all items of true comparative advantage for Chile. The salmon are cultivated in the fiords of Chile's southern coast, just as they are cultivated in the fiords of Norway and Scotland. The boom in fruit exports is quite natural, too, as it takes advantage of Chile's location in the southern hemisphere and of its rich soil and benign climate.

Yet this comparative advantage remained unexploited for many, many years. Production and export of these new items was stimulated by a high real price of the dollar in the mid-1970s, which made it highly attractive for people to experiment with ideas for new export items. In every single case major investments were involved, which took years to bear fruit. Once again the high real exchange rate was a major contributor to the attractiveness of these investments.

Influencing the Real Exchange Rate

I hope that the preceding section has given readers a good appreciation of the importance of the real exchange rate as a key economic variable, and of the many different forces that are reflected in its movements. As is the case for most economic prices, it is a variable that should be treated with a great deal of respect -- one should not dream of ordering it around, of telling it what to do. Here, as elsewhere on the economic stage, the law of supply and demand has to be appreciated and respected.

It is within this context that one ought to be thinking as one contemplates the role of the real exchange rate (RER) in economic policy. The RER cannot be ordered about, and cannot be simply manipulated to do what the policymaker wants. But this does not say that it cannot be influenced by the actions of the economic policy authorities.

There are two ways in which the authorities can fruitfully work to influence the RER. The first is by operating on the real variables that influences the supply and demand for foreign currency, and the second is by moving the nominal exchange rate to facilitate the adjustment of the real rate to a new equilibrium level. But one must shun like the plague any idea that one can sensibly think of using changes in the nominal exchange rate as an instrument for bringing about changes in the equilibrium level of the RER.

I now proceed to a series of historical examples, each of which illustrates one or another of the points just made. First will be the case of El Salvador 1985-88, which will show the futility of trying to use a nominal instrument (in this case the nominal exchange rate) as a device for changing the equilibrium value of a real variable (in this case the real exchange rate). The second is Brazil, 1968-1979 where a policy of targeting the real exchange rate succeeded in that objective. In this case real instruments were used, namely changing the intensity of import restrictions plus accumulating reserves of foreign currency. The third example is Chile, 1985-1998, where the real exchange rate was also targeted, but less strongly than in the earlier Brazilian case. Here the main real instruments were at the beginning the repatriation of foreign debts, and toward the end the massive accumulation of foreign

reserves. The final example is that of contemporary Argentina, where the real exchange rate has been out of equilibrium for at least five years, and a tragic confluence of economic rigidities has frustrated its appropriate adjustment.

El Salvador, 1985-1988. The economy of El Salvador has for more than two decades been characterized by what is perceived as a low real price of the dollar. This perception is reflected in constant complaints by large numbers of producers of tradable goods. In my own experience there, the agricultural sector has been the most vocal complainer. Farmers have had a difficult time meeting international competition and, not being economists, have come to a simplistic determination of what was wrong. What they alleged was that the government, and in particular the Central Bank, had in its hands a very simple answer to their problem. Whereas they (the farmers) were barely surviving at the prevailing exchange rate, the whole sector could be made to thrive if only the exchange rate were, say, to be doubled. Misery would be turned into prosperity, losses into profits, penury into wealth. How, asked the farmers, could the authorities be so stupid as not to see and appreciate this?

Well, the authorities yielded and performed the experiment in early 1986. The exchange rate had been 2.50 colones per dollar for many years; now it was doubled to 5.00 colones. With this, according to the farmers' view, the agricultural and other producers of tradables goods should have been rescued from their plight. Undeniably a sort of temporary rescue did take place, but by 1988, barely two years after the massive devaluation, the general price level had doubled, compared to its pre-devaluation (1985) level. And by 1990 it had tripled. The dollar value of merchandise exports, which had averaged about $700 million in 1983-85, jumped to $777 million in 1986, but quickly receded to about $600 million in 1987 and 1988, and was below $600 million for the following three years.

What happened to frustrate the results that agriculturists and others so fondly expected from a massive devaluation. The answer is that the underlying real situation of the economy had not changed, and in particular the devaluation did nothing to change the equilibrium value of the real exchange rate.

The reason why the real exchange rate was low in El Salvador in the middle and late 1980s, and continues low to this day, is the massive flood of dollars that arrives every year in the form of emigrant remittances and foreign aid. These have financed the bulk of El Salvador's excess of imports and exports for more than 15 years -- deficits that have ranged from 6 to 15 percent of GDP in the period in question. This flood of dollars is what made the dollar abundant and therefore cheap in real terms. I have often said to complaining farmers in El Salvador, if you really want to raise the real price of the dollar, tell your relatives and friends in Los Angeles to stop sending

remittances, and tell your government to stop accepting foreign aid. Cut off these sources of supply of dollars and the price of the dollar will surely rise in real terms. But as long as these inflows of dollars continue, you can expect the dollar to be cheap.

Needless to say, my argument here was rhetorical. El Salvador as a nation and a society has clearly benefited both from emigrant remittances and from foreign aid. It is not in their interest to cut off either flow. My real point is that while these large inflows of dollars continue, the equilibrium real exchange rate will remain low. A major devaluation will change the nominal rate, but the real rate will try to go back to its equilibrium level, as it actually did in the period 1986-88. In the end, all that El Salvador got out of its big devaluation of 1986 was a roughly doubled price level.

Brazil, 1968-1978. Brazil's economy was in a state of distress in 1963-64, beset by high levels of protectionism, inflation, price controls and related maladies. A series of major reforms in the 1964-68 period set the stage for the so-called Brazilian miracle of 1968-78. One of the key policies characterizing that "miracle" period was the attempt to maintain the real exchange rate at a level that would stimulate investment in the production of tradable goods in general, and of export goods in particular.

If the El Salvador episode demonstrates that one cannot successfully target the real exchange rate using a nominal instrument, the Brazilian miracle period shows that one can at least sometimes succeed in such an attempt if one uses one or more real policy instruments. The key real instruments were a buildup of foreign exchange reserves plus the manipulation of import restrictions so as to influence the market's demand for foreign exchange. Brazil started this period (Dec., 1967) with only $157 million of foreign currency reserves, and ended it (Dec., 1978) with over $11 billion. The buildup of reserves actually came in two spurts -- one which lasted until 1973 and brought reserves to $6.36 billion, and a second in which they rose from $3.65 billion at the end of 1975 to $11.83 billion at the end of 1978. In between, reserves were depleted in response to the 1974 oil crisis, but this too was in pursuit of Brazil's RER target. For the two periods when reserves grew, the market would otherwise have set a rate below the target, so purchases were called for. During the oil crisis years, however, market demand for dollars soared, and it took sales of reserves to keep the RER from exceeding its target level.

The other instrument Brazil employed was changes in import restrictions. During the first period this was a case of happy coincidence as between two policy objectives. The government wanted to liberalize trade, and was faced with existing import barriers that were far too high. Lowering these barriers helped it to meet its liberalization

objective, and at the same time the added demand for foreign currency helped lift the real exchange rate to the target level. Brazil's strategy during the 1968-73 period can be thought of as turning first to reserve accumulation as the "central variable" to influence the RER. But then, if the required rate of reserves accumulation was too great, a judicious reduction of import restrictions was brought into play.

One can think of this strategy as being put into reverse gear starting with the oil price boom of 1974. Recall that now the market pressure was toward a real exchange rate that was higher than the target. Brazil first sold off its reserves, but when they were judged to have fallen too far, the Brazilian authorities responded by putting an additional import restrictions so as to curtail the demand for dollars and bring the equilibrium RER down to the target level they had set.

Most economists genuinely applauded as import restrictions were successively reduced or eliminated during the 1968-73 period, but were dismayed by the reintroduction of such restrictions in the 1974-78 period. It must be said, however, that this policy, though far from being first best, did in fact succeed in holding the real exchange rate to within plus or minus 5% of its target level, all the way through 1978. Moreover, the growth of the Brazilian economy was spectacular, averaging 10% during 1968-73, and 7% during 1974-78.

Chile, 1985-98. Chile was the Latin American country that was hardest hit by the debt crisis of 1981-82. The capital inflow into that country had reached a peak of 15% of GDP in 1981 (which was higher than the peak attained by any other Latin American country), and fell by more than 10 percentage points of GDP in the single year 1981-82. However, this turnaround happened to coincide with a precipitous fall in the price of copper, which fell by more than 30% between 1980 and 1982.

The Chilean economy remained in a deep depression until 1985, when a new finance minister (Hernán Buchi) and a new economic team mounted a series of major new economic reforms. These represented a continuation of the process of liberalization and modernization that had characterized the earlier Chilean boom of 1975-81. The cornerstone of Buchi's macroeconomic policy was the real exchange rate. His objective was to emulate the Brazilian miracle by organizing an economic recovery that was driven by the growth of exports. A high real price of the dollar was sought as a means of stimulating this export growth.

The real instruments that Buchi employed to influence the real exchange rate included trade liberalization and accumulation of international reserves (both familiar instruments from the Brazilian and the earlier Chilean (1975-81) episodes), plus what I will call "Buchi's secret weapon". This was the repatriation of private sector debt,

carried over from the big capital inflows that had characterized the years 1979-81. It was mainly owed by Chilean banks to banks in the U.S. and Europe. In the wake of the debt crisis there had emerged in New York a secondary market for Latin American debt of all kinds, in which the debt instruments were transacted at varying degrees of discount below par. At the time Buchi discovered his secret weapon, the debt instruments of the main Chilean debtor banks were transacting at about 60% of par.

It was not legal for the Chilean banks to go into the international market to repurchase their own bonds at discounted prices. But that did not deter others from performing the same function. The Chilean authorities became alerted to the situation when the Central Bank began to receive large and growing demands for dollars, for the purpose of buying and repatriating the discounted bonds of Chilean banks. Fearful that such applications would lead to unmanageable pressures on Chile's market for foreign exchange, the Chilean authorities instituted a mechanism of control, which consisted of auctioning off, every two weeks, certificates which gave the buyer the right to repatriate the discounted debt instruments. (Chile's capital account had not been decontrolled, so this solution was easy to implement.)

With these auctions, it was easy for Chile's Central Bank to stem the flood of demand for foreign currency. That flood had started because of the high profit potential implicit in the difference between the discounted price of Chilean bank bonds (originally around 60) and their par value (100). Initially, this "profit" was available to be divided in negotiations between the entrepreneurs and the debtor banks. But once the bi-weekly auctions were instituted, the Central Bank ended up with most of this arbitrage profit.

So the Chilean authorities gained in two ways – they were able to control the flow of demand for foreign exchange for this purpose, and they made a lot of money in the process. It did not take long for them to see the potential for using these same bi-weekly auctions to produce yet a third advantage for them -- the capacity to create, at their own initiative, whatever demand for foreign currency (within feasible limits) was needed to produce an equilibrium of supply and demand within the band that they were targeting for the real exchange rate.

This was the beginning of what I would call a blissful period of real exchange rate targeting by the Central Bank of Chile. Supply and demand (including the Central Bank's own desired accumulation of international reserves) were always kept equal at a price within the target band, and the Central Bank made a lot of money in the process!! But the period of bliss was destined to end. Each passing year reduced the amount of discounted bonds that was still outstanding, and at the same time the size of the discount was progressively squeezed toward zero.

By the time Patricio Aylwin was elected as Chile's next President at the end of 1989, one can say that the permissions-auction idea had run its course. Yet the new government firmly believed in the idea of trying to keep the real exchange rate at an export-incentive level. But how to do it? Here they took a clue from the earlier, highly successful policy. That policy had in effect amounted to the replacement of discounted foreign debt denominated in dollars by newly issued domestic debt (of the Chilean debtor banks) denominated in pesos. That is, during 1985-89, the policy had fostered a reduction of foreign dollar liabilities plus a rise in peso liabilities of these banks. A very close counterpart of this could be achieved, it was thought, by effecting a rise in dollar assets of the country (held abroad) compensated by a rise of peso liabilities. Thus began a systematic policy (known as sterilized intervention) of the Central Bank issuing bonds on the local market, and using the proceeds to build up dollar balances abroad.

The policy of building up dollar balances abroad certainly "worked" in the literal sense. The international reserves of Chile's Central Bank stood at $3.6 billion just after President Aylwin's election in December, 1989. By the end of 1990 they had risen to $6.1 billion; they reached $9.2 billion by the end of 1992, $13.1 billion by the end of 1994, and $17.3 billion by the end of 1997. This success, however, masked two problems, one of "Central Bank losses", the other of the "reflux of capital".

Although the "new" policy, under which the Central Bank of Chile borrowed in the home market, then demanded dollars (in order to prop up the real exchange rate), and finally placed those dollars abroad in the world financial markets bore a close resemblance to the old policy (of repatriating discounted debt), it differed dramatically in its effect on Central Bank earnings. Whereas the "old" policy brought a regular flow of cash (the proceeds of the biweekly auctions) into the coffers of the Central Bank, the "new" policy generated nothing but losses. These stemmed from the fact that the interest rate paid on the peso bonds issued by the Central Bank was significantly higher than that yielded by the dollar denominated securities and deposits that were acquired using the proceeds from the sale of the bonds. Interest rates on both sides of this equation varied through time, but they always signified losses for the Central Bank. An example of the discrepancy can be drawn from recent experience -- with the Central Bank paying 7 to 8 percent on peso bonds indexed to the Chilean price level, while the proceeds of those bonds were being used to buy securities yielding an average nominal return (in dollars) of only 4 to 5 percent. Since over the period since 1990 the peso has appreciated significantly in real terms (in spite of the Central Bank's efforts), the loss was significantly greater than the 2-4 percentage point differential between the real peso rate paid and the dollar rate received. Moreover, the Central Bank loss in this borrowing-cum-placement operation has an

automatic tendency to grow through time, so long as the operation is itself continuing. This can be seen by contemplating the growth in Chile's international reserves. If all of the growth from $3 billion in 1989 to $17 billion in 1997 was a reflection of operations of this type it would mean that the Central Bank would be taking its loss on an outstanding stock of bonds equal to the full increment ($14 billion) of reserves that those bonds had financed. Taking an illustrative figure of 5 percentage points as the net loss per annum, we would calculate the loss at .05 x $3 billion, or $150 million during 1991 (when total reserves were about $6 billion), rising to 0.5 x $14 billion, or $700 million by 1997, when Chile's foreign reserves had grown to $17 billion. The cumulation of these losses, and the prospect of future losses that would be linked to the extent of future reliance on similar operations, was certainly partly responsible for the acceptance, by Chile's Central Bank, of a downward drift in the real exchange rate in the years after 1989.

The "reflux" problem was related to the operation just described. As the Central Bank sold additional bonds on the local market, the interest rate within Chile tended to be driven higher -- i.e., above the level where it otherwise would have found its equilibrium. This higher interest rate within Chile made it more attractive for both foreigners and Chileans to shift money from, say, New York to the Santiago market. Thus, if the Central Bank were adding $4 billion to its international reserves in New York, perhaps a quarter or a third or half of that amount would flow back to Chile as an "induced" private capital flow. We do not know the precise fraction of funds put abroad that came back to Chile as an induced "reflux". But we do know that the Central Bank took the problem very seriously.

The response of the Chile's Central Bank to the "reflux" problem was to institute what was in effect a tax on flows of short-term capital into the country. This was accomplished by a requirement that 30% of any inflow of short-term funds be placed in a zero-interest deposit at the Central Bank, for a period of a year. Thus, if these funds could have earned a 10% interest rate in the local market, the effect would have been the same as a tax of 3 percentage points. (Indeed, in the latter part of the period, investors could simply pay the Central Bank an "up front" fee of three percentage points of the capital flow in question, thus "buying out" of the deposit requirements).

The 30% deposit requirement (and more recently the option of a 3% fee in lieu of a deposit) stayed in effect until very recently. In the wake of the so-called Asian crisis, however, the deposit was first reduced from 30 to 10 percent, and subsequently (late in 1998) eliminated entirely. By that point the Chilean authorities were more

interested in attracting capital to the country than in preventing too much of it from coming.

Argentina, 1995-2000. The big real exchange rate lesson to be drawn from Argentina's experience in this period is how difficult and painful it can be for a country to try to achieve a real exchange rate devaluation through a process of internal deflation.

There is an easy litany that one can use in instructing the uninitiated about the real exchange rate. Let us call the nominal exchange rate with the dollar (or any other chosen major currency) E -- the nominal price of the nominal dollar. Deflate this by a general price index (π_d) of the country in question and you get E/π_d -- the real price of the nominal dollar. Multiply this by an index (π^*) of the dollar prices of tradable goods and you get $E\pi^*/\pi_d$ -- the real price of the real dollar.[1]

From this definition ($E\pi^*/\pi_d$) of the real exchange rate it can easily be seen that any change that can be accomplished by a change in E can also in principle be achieved by an inversely proportional change in π_d. Indeed, movements in π_d are the main mechanism by which the RER adjusts, under any fixed exchange rate system. We have an enormous list of cases in which major declines (appreciations) of the real exchange rate have taken place successfully while the nominal rate E was fixed. But we have very few cases of successful major increases (depreciations) of the real exchange brought about by downward movements of the internal price level. These are the cases that are very hard to find.

The reason is apparent from the case of Chile in 1981-82. Chile's 1975-81 boom really came to its peak on the second quarter of 1981, when the rate of unemployment (which had been coming down but was mostly in double digits from 1975 through 1980), finally reached 8% in June 1981. Then the debt crisis struck, and the rate of

[1]This same number is also the real price of the real deutschmark, for we get E' (the nominal price of the nominal DM) by dividing E (pesos per dollar) by H, the number of marks per dollar, and we get π', the index of the DM prices of tradable goods by multiplying π^* times H. So $\pi^*E/\pi^d = (\pi^*H)(E/H)/\pi_d = \pi'E'/\pi^d$. In the same way it can be shown that a country's real exchange rates with the pound, franc and yen are all exactly the same as those with the dollar and with the DM. In short, the real exchange rate is not a bilateral variable but a variable signifying a country's connection with the world market for tradable goods and services. In this paper we use the dollar as the currency of reference because of its relative importance, and because most quotations of countries' exchange rates refer to the local currency price of the dollar.

unemployment rose from 8 to over 28 percent in the lapse of barely a year. Chile was operating with a fixed exchange rate of 39 pesos to the dollar. But huge capital inflows had brought about a major fall in the RER, as the Chilean consumer price index (1985 = 100), had risen from 27 to 45 while the nominal rate remained fixed. This major appreciation of Chile's RER occurred under a fixed nominal rate, while its international reserves grew, while real GDP grew at around 8% per year, and while international reserves were reaching record levels. But only misery followed starting in late 1981, when a major RER adjustment in the opposite direction was called for.

The reason for this asymmetry is not hard to find -- it is the oft-noted and well-documented fact that wage and price levels tend to be much more rigid in a downward than in an upward direction. Sometimes one encounters economists and others who try to dispute this fact by pointing to cases of prices (like those of primary commodities) that fluctuate up and down symmetrically, and by finding instances in which workers in certain firms and industries have willingly accepted reductions in their nominal wages. Such evidence can be perfectly true, but it does not speak to the issue of real exchange rate adjustment via deflation. To deal with that issue one needs to find examples of important increases in the real exchange rate that were brought about mainly through a declining price level. But when Chile's debt crisis struck, the general price level did not fall. Instead, economic activity fell, and unemployment skyrocketed to over 28%. Chile's government adamantly defended the fixed exchange rate to the last moment, when it felt it had no alternative but to devalue the peso. What this means is that this Chilean experience qualifies as a devaluation crisis, not as a case of successful deflation under a fixed exchange rate system. The same is true for the vast majority of other cases where a major upward adjustment of the RER was called for (by the market forces of supply and demand). Since devaluation came soon after the crisis struck, in all these cases, they do not allow us to see a full adjustment process with a fixed exchange rate.

The economics literature treats one famous case -- that of the British pound in the 1920s. Here the disequilibrium of the real exchange rate was created by the British authorities themselves when, after the end of the First World War, they imposed a huge appreciation of the nominal exchange rate (which had been allowed to float during the war). This is generally regarded as a huge policy mistake, as it set in motion a lengthy process of internal deflation, leading some economists to call the 1920s a "lost decade" for the British economy.

Argentina's situation in the 1990s was quite different from Britain's in the 1920s, in that one can not blame the Argentine authorities for a poor choice of the parity at which they fixed their exchange rate. But they carried with them a different burden -- the consequences of three near-hyperinflations within a span of less than 25 years.

Argentina's inflation rate had hit 444% in 1976, 672% in 1985, and 3000% in 1989. By the end of the third such episode, the exchange rate was being used as the general "inflation signal" of the economy. Shopkeepers, barbers, plumbers, restaurants -- just about everybody was setting their prices in dollars, then translating them into australes at the latest exchange rate that was reported over the radio. It was this practice that produced the real exchange rate that prevailed at the point when the parity of one new peso per dollar was set. Had the parity been set at two new pesos per dollar, the initial price level would simply have been twice as high, with the initial RER being just the same.

This was the historical process by which Argentina came to have a fixed parity with the dollar, as a consequence of which her initial real exchange rate almost came as an "act of God", being beyond the control of the authorities. This parity served the interests of Argentina pretty well as the economy grew at an average rate of nearly 9% per annum over the years 1991 (when the parity was set) through 1994. All hell broke lose, however, in the wake of the Mexican crisis of December, 1994. Within a single quarter after that crisis, Argentina lost a third of its gross international reserves and fully half of its net reserves. Only by imaginative emergency moves were the authorities able to prevent a total collapse of the money supply, and even so M2 fell by around 12% in a single quarter.

The Mexican crisis without a doubt changed the equilibrium real exchange rate of the Argentine economy, principally through its effect on capital flows. Thus what had up to 1994 been an RER that was reasonably close to equilibrium, now became an RER that was substantially below its new (1995 and after) equilibrium. Had Argentina been "any ordinary country", the natural remedy would have been a substantial devaluation of the currency. But Argentina economists of all stripes argued against this solution because, they all felt, it would lead the Argentine public to essentially abandon the peso (the new unit as of the establishment of parity in 1991) and run completely to dollars and other foreign currencies.

So the Argentines have stuck with their parity, bearing it and its consequences as the curse of their inflationary history. But these consequences have been severe. Despite the strong deflationary pressures, the best the consumer price index could do is to hold steady for the five years 1995 through 1999. The producer price level was slightly more responsive to the deflationary pressures, reaching an index level of 95 in 1999 [with 1995 = 100]. But the failure to achieve equilibrium was super-evident in Argentina's unemployment experience. Over the whole period from 1995 onward, the unemployment rate has averaged about 15%, and has not fallen below 12.5%.

Argentina has been unlucky in that Asian, Russian and Brazilian shocks have followed the Mexican one like the waves of the ocean. But there can be little doubt that Argentina would have been better off if it had been able (like its neighbor, Brazil) to use a nominal devaluation as a device to bring its real exchange rate into closer accord with its equilibrium level. Fixing the exchange rate in 1991 was not a mistake, and not a curse. The economy thrived for four years, just as the Chilean economy had thrived for two years under a fixed exchange rate before the debt crisis of 1981-82 struck. But in the presence of strong negative external shocks, a prompt and decisive devaluation (or freeing of the exchange rate) would under normal circumstances have been the natural solution for Argentina as of 1995. It would surely have made the necessary RER adjustment more palatable and less costly. Argentina's real curse is that her inflationary history has precluded her from using the policy instrument -- a freeing of the exchange rate or a sharp devaluation -- that would normally be most appropriate to resolve her recent and current disequilibrium.

More On Sterilized Intervention

Sterilized intervention is probably as old as central banking itself -- maybe even older, as it quite likely was also practiced by the "leading private banks" that were the precursors of today's central banks.

In a fully operative fixed exchange rate system, the Central Bank buys and sells foreign exchange at the specified rate. In this process, it naturally accumulates and decumulates international reserves. It seems at first sight that these holdings of reserves are beyond its influence, being simply the result of the simple acts of buying and selling at the fixed rate. But the truth is much more complicated. In a "pure" system, the pesos emitted by the Central Bank would serve as a base for a general monetary expansion. This would put more money in the hands of the public, very likely in excess of what they really wanted to hold. The result would be that they would want to spend the excess, on goods, services and financial instruments. In these acts of spending they would cause imports to increase as they spent on importables, and exports to decrease as they spent on exportables. An outflow of international reserves would typically result, which would only come to an end when the amount of money in the system was once again in accord with what people were willing to hold, given the prevailing levels of prices and incomes.

Unless the underlying conditions of the economy changed in some important way, this process that started from a full equilibrium with an amount R_0 of international reserves, and then received a "shock" of ΔR to those reserves, would end up with reserves back at or near R_0. The extra money ΔM that came into being on the basis

of ΔR would represent "unwanted monetary balances" and would tend to be spent. The part spent on tradables would be reflected in a loss of reserves. This is the process by which the original equilibrium reserves level (R_0) would be restored.

Now suppose that a Central Bank wanted to keep some or all of the increment ΔR in its reserves. What would it do? Quite obviously, it would have to try to short-circuit the process just described -- by which people brought about a loss of reserves through their spending their undesired monetary balances. The natural and easy way to do this is to short-circuit the link by which the increment to reserves ΔR produces an induced increment (ΔM) in the money supply. This can be done by the Central Bank's operating on the other major asset of the banking system, namely domestic credit. So if domestic credit can be curtailed by enough so that the money supply is kept in consonance with what people want to hold, this will eliminate the scenario through which the initial increment (ΔR) of reserves is reversed and ultimately erased.

This is where sterilized intervention enters the picture. Central Banks use various devices to prevent or at least control the increment of money (ΔM) that is generated in response to an increment of reserves ΔR. Increases in interest rates, changes in the fractions of reserves that banks must hold against deposits, open market operations in which the Central Bank absorbs base money by selling bonds or other assets, direct regulation of expansions of bank credit -- all these devices have been and are being employed by Central Banks. And important among the purposes for which they are used is sterilized intervention.

Sterilized intervention is not just a one-way street. The example above dealt with the Central Bank preventing an increment of reserves ΔR from having its full "natural" effect on the money supply. The same can happen in reverse -- preventing a loss of international reserves from leading to a proportionate or nearly-proportionate fall in the money supply. This is precisely what the Argentine authorities successfully did in early 1995 in their efforts to prevent a huge loss of international reserves from leading to a corresponding collapse of the nation's monetary magnitudes.

I cannot claim any intimate knowledge of the Russian case, but as I read that country's simple monetary statistics, I believe I see strong evidence of sterilized intervention. An easy example can be drawn from the recent gyrations of the world price of petroleum. As this price fell from nearly $20 a barrel in 1997 to around $10 in December 1998-February 1999 Russia's international reserves were allowed to fall from a peak of over $20 billion in the second quarter of 1997 to a low of less than $7 billion in March of 1999. But when the oil price turned around

and started to rise to bonanza levels, Russia's Central Bank allowed reserves to rise dramatically, so that by now they are again close to $20 billion. These are two good examples of what appears to be sterilized intervention.

Table 8 shows some examples of sterilized intervention by other countries. These cases were built up from an ongoing study by S. Wong, which deals with recent episodes of very large capital inflows. In column (1) the dates of the capital inflow episode are shown. Column (2) then gives the cumulative capital inflow over this period, expressed as a percentage of a year's GDP. Thus Chile's capital inflow over the nine years 1989 through 1997 amounted to some 60% of a year's GDP, equivalent to about 6.7% of GDP per year.

The third column of Table 8 shows the accumulation of international reserves over the specified period. The fourth column simply gives the ratio of (3) to (2). Thus, in Chile's case, we see that 52% of the capital inflow ended up "reflected" in increased reserves. This did not happen by accident. We know, in the Chilean case, that those reserves were accumulated as a result of a conscious policy by the Central Bank of influencing the real exchange rate using the instrument of sterilized intervention. I certainly would not contend that all or even most of the other cases were the result of such a conscious policy. But there is little doubt concerning the fact of sterilized intervention in the other cases. And this would mean a corresponding effect on the real exchange rate, even if that were not the main purpose of the operation.

To see what actually happened to real exchange rates in these capital inflow episodes, we show in column (5) the ratio of ending RER/beginning RER. For this ratio we use as the beginning point the average RER of the year before the capital inflow started, and as the ending point the average RER of the year before it ended. (This guards against the possibility that the crisis which ended the capital inflow took place during a last year in which the net inflow was still positive, triggering a big increase in the RER which was really not the consequence of the capital inflow, but instead of its abrupt termination at some point in its final year.) One can see in column (5) the natural effect of capital inflows in causing the real price of the dollar (the RER) to fall. This tendency was mitigated but not obliterated by the sterilized interventions that the table documents.

As a final note on sterilized intervention let me return to the "reflux" problem mentioned in the analysis of the Chilean case. The intensity of this problem depends very much on the degree of integration of a country with the world capital market, and with the way in which that market assesses its "country risk". Recall that the reflux problem emerges when the country's accumulations of international reserves are to some degree offset by "induced" private capital flows in the opposite direction. Such flows would be induced by the squeezing of domestic credit in

the country, which typically would cause interest rates to rise. It is this rise in interest rates that then operates to attract the induced "reflux" of funds. The reflux problem obviously depends on the degree of capital market linkage and on the degree of confidence that international market participants place in the country. This linkage and confidence were quite low for Chile and Argentina in the middle 1970s, so reflux was not a problem. Linkage and confidence were considerably better in the 1990s so by then the issue of reflux became a problem. Luxembourg, with its virtually complete integration and full confidence, has to be a country for which the reflux problem would be huge, which would mean that sterilized intervention would have little effect. It seems quite clear that in the present circumstances, Russia is more like Chile and Argentina in the middle 1970s than it is like those countries, not to mention Luxembourg, today. So I do not see any serious impediment to the effectiveness of sterilized intervention in Russia. Indeed, I believe we have seen the successful use of this instrument in both directions, during the past three years.

TABLE 8

Sterilized Intervention in Periods of Capital Inflow

Country	Period (1)	Capital Inflow Over Period (2)	Accumulation of Reserves Over Period (3)	Rate (3)/(2) (4)	RER* Ending/Before (5)
Argentina	1977-81	7.19	6.86	.95	57/149
Chile	1989-97	60.24	31.29	.52	73/111
Peru	1991-97	39.22	19.31	.49	74/100
Uruguay	1990-97	43.85	12.85	.29	54/107
Bolivia	1990-97	43.85	12.85	.29	90/95
Brazil	1992-97	15.97	19.55	1.22	94/112
Korea	1990-96	16.52	4.75	.29	93/98
Malaysia	1989-97	75.37	29.27	.39	80/96
Indonesia	1990-96	26.73	8.15	.31	92/99
Singapore	1972-87	232.27	129.77	.56	102/108
Thailand	1990-96	71.18	22.81	.32	89/101

*In column (5) we attempt to show what happened to the real exchange rate over the period of capital inflow. It makes sense to use the RER the year before the start of the inflow period as the base. Similarly, because the "crisis" that ended the inflow sometimes occurs in the last year of the inflow, we take the penultimate year of inflow as our ending period.