Gerardo Licandro  
José Antonio Licandro

Building the dedollarization agenda: lessons from the Uruguayan case

“I think one has to recognize that there is a social cost to excessive dollarization... I think that what countries have to begin to do is to explore alternative ways of de-dollarizing gradually. Probably the most important kinds of vehicles for doing that have to do with a combination of taxation, information and regulation”: Joseph Stiglitz. November 11th 2001, extracted from an interview in Radio El Espectador.

I. INTRODUCTION

Dollarization, since the early 70’s has been a topic of special interest for Latin America and Uruguay in particular. However, after a surge in economic literature on currency substitution, where the effectiveness of monetary policy was the issue, the efforts to stabilize inflation relegated dollarization to a secondary role.

Starting with the Asian crisis, balance sheet effects, and dollarization in the case of Latin America have returned to the main stage in policy making. In Uruguay, even though the topic never lost its appeal, the apparently neverending appreciation of the national currency started in the midst of the 80’s made the efforts of the advocates of dedollarization fade as the debt ratios plum-

Paper prepared by G. Licandro, economist, Department of Economic Studies, Banco Central del Uruguay and J. A. Licandro, manager, Economic Research Area, Banco Central del Uruguay. The First English version is dated March 2003. This version is dated September 2003. The opinions contained in this paper are the sole responsibility of the authors and do not compromise the institutions they work for.

MONEY AFFAIRS, JUL-DEC 2003
metted. Since then some new spices have been added to the Uruguayan mix. Some were on the right track, as the regulation banning currency mismatches in the balance sheets of banks. Some were bad, as the dollarization of the last defense of long term saving on national currency, namely the Banco Hipotecario del Uruguay, the national mortgage bank.

The development of (dollar) credit observed in the second half of the nineties was key to the generalized bankruptcy following the 2002 crisis. Additionally, such risk threatens to become a liability to the taxpayers in an economy in which lobbying of interest groups has resulted traditionally in bail outs by the government.¹

In this paper we will first survey the characterization the literature has made of this phenomenon –its anatomy– with an aim at pointing out the problems –pathologies– that creates. Then we would try to set up a strategy to reduce the financial fragility derived of non-marketable risks.

The paper proceeds as follows. We start by surveying the literature on dollarization trying to focus on the Uruguayan case. Then we try to sketch some unexplored paths to set up future work. We finish by setting up the basis for a strategy to reduce the financial vulnerability of our economy.

II. URUGUAY AND THE DOLLARIZATION DEBATE

We first study the causes and then the consequences of dollarization. In order to do that in a better way, we will survey the literature and simultaneously introduce the Uruguayan case.

II.1. The causes of dollarization

1) Incomplete Markets

The early literature on dollarization focused on the causes of the phenomena, emphasizing the temporal sequence of events that led to currency substitution.

More recently, Caballero and Krishnamurthy (2000, 2003 a and 2003b) explain credit dollarization as a problem of incom-

¹ As of September 2003, the political system has managed to avoid a legal bail out of debtors in US$. However, political pressure continues to be strong, and has derived in an administrative bail out in public banks.
plete markets at a domestic scale. In countries with financial restrictions national currency denominated external debt would operate as an insurance against real exchange rate shocks. However, when there are financial restrictions, domestic agents would underestimate the risk of borrowing in dollars in order to insure their own financing, generating a negative externality for the economy as a whole.

In Uruguay, the dollarization of assets started as a result of the lack of peso denominated financial alternatives in a chronic inflation country. The process of inflation that started in the 50’s deteriorated the confidence of the population in the national currency. At the same time, interest rate ceilings and the lack of inflation indexed assets forced savings out of national currency and into dollar denominated assets. In the mid 50’s banks started to take dollar deposits. At first, since foreign currency deposits were not allowed by regulation, banks held dollar deposits as off balance sheet obligations. When the monetary authority allowed dollar deposits in 1962, they started to accept them openly.

In 1969, twenty years after the start of the inflationary process and still under a framework of financial repression, the government created a wage indexed unit of account (UR), in what constituted the first attempt to compete against the dollar (not consciously). Even though the UR was limited to housing savings and to issues of the BHU –Banco Hipotecario del Uruguay (public mortgage bank)–, the market of long term papers in UR had a healthy take off, and many Uruguayans saw this unit as an attractive means to save. The stock of UR investment grew steadily until it reached 1.6% of GDP in 1979. Then the BHU, urged by cashflow problems, defaulted on the adjustment mechanism of OHR (long term UR indexed papers). This default killed the UR market, and the public reliance on the BHU. Not surprisingly, BHU would fail some years later in its attempts to open a CPI indexed market.²

With the BHU instruments out of the way, the dollar returned to be the only option for long term savings.

2) Portfolio explanations

Even in economies that developed fair alternatives to the dol-

---

² The CPI instruments of BHU lacked appeal also for two reasons. First, the indexation was monthly (not daily) and the papers had little liquidity. Then, the papers were lagged two months on inflation.
lar, including Chile as the top of the group with its successful experience with the CPI indexed Unidad de Fomento (UF), dollarization had its way whenever there were no explicit bans on dollar denominated assets (as in the case of Brazil). One of the main explanations for this phenomenon is provided by the portfolio approach.

Taylor (1985) adopts this argument to the portfolio choices of households. Ize and Levy-Yeyati (1998) use a portfolio model to explain both the dollarizations of deposits and credit. Calvo and Guidotti (1990) use this approach to explain the dollarization of public debt. Households would demand dollar denominated assets when the correlation of their yield with other assets is negative and the variance of their yield is low. In the case of Uruguay, Licandro and Masoller (1998) have documented the negative correlation between national income and the real exchange rate, meaning that the yield of dollar denominated assets rises when national income falls. This factor shows that, in the case of Uruguay, even if the factors that fostered dollarization would disappear, some dollarization of deposits would remain.

Ize and Levy-Yeyati (1998) extended this argument to the decisions of deposit demand and credit supply of banks. Once more, the stochastic properties of assets and liabilities are the key for the increase on dollarization. It has already been pointed out by Pyle (1971) that when the yield of the credit portfolio has a positive correlation with the cost of the deposits, and a positive expected excess return, there are economies of scope on banking this kind of deposits. Furthermore, if there are a negative correlation between national and foreign currency assets, the incentive is even greater. Ize and Levy-Yeyati find that this explanation can only explain partially the levels observed of dollarization.

Céspedes, Chang and Velasco (1999) point out that this kind of argument is not able to justify the high levels observed of dollarization.

3) Time Inconsistency and lack of credibility of Monetary Policy

As we stated in point (1), the time inconsistency problem of monetary policy has been one of the factors that contributed the most to the dollarization in Latin American countries. The sys-

3 In Brazil the demand for dollar denominated assets was canalized through the black market. These resources were held either abroad or outside the formal financial system.
tematic use of monetary surprise as a means of both prompting economic activity and reducing the real value of public debt, eroded the credibility of monetary policy, keeping Latin American countries in the high inflation equilibrium of Kydland and Prescott (1977) and Calvo (1978).

The credibility of exchange rate policies was also depleted by the use and abuse of fixed exchange rate regimes that did not have the fiscal fundamentals to prevent the standard type of crises described by Krugman and Obstfeld. The sharp depreciation of the national currencies with respect to the dollar generated an additional reason to hold dollar denominated assets and stay away from national currency.

Calvo and Guidotti (1990) pointed out that both the indexation and the dollarization of debt are ways to fight disbelief in monetary policy. As the existence of nominal debt on national currency is recognized by the households as an incentive to generate inflation, both the dollarization and the indexation of debt are ways of convincing the public of the commitment of the policymakers to inflation stabilization. This argument is extremely relevant to explain the dollarization of public debt in the case of Uruguay, Argentina and most recently Brazil, and the indexation of debt in the case of Chile. Fifty years ago, most debt was issued at a fixed rate in national currency. As inflation reduced the credibility of monetary policy, the cost of public debt issued in national currency skyrocketed. Additionally, most of these countries implemented stabilization plans in the early nineties characterized for the use of the exchange rate as a nominal anchor. Obliged to issue debt to face its obligations, the Governments were forced or tented to consider the use of “cheaper” sources of financing: indexed instruments.\(^4\)

4) Warranties and Risk Miscalculation

Caballero y Krishnamurthy (2000) formalize the idea that, in equilibrium, when there are incomplete markets, agents tend to miscalculate the macroeconomic effect of their microeconomic decisions. According to this authors, a private contract can internalize the currency mismatch risk embedded in the balance

\(^4\) These sources seem to be cheaper in terms of interest rates, but what is gained in cash flows, is lost in strength. The dollarization of public debt increases the fragility of public accounts, as the recent crisis in Latin America, namely, Argentina and Uruguay have shown.
sheets of the parts of the contract, but cannot internalize the systemic consequences of a generalized process of dollarization. Burns, Eichbaum, and Rebelo (2000), on the other hand, show that the existence of warranties on the financial system, despite having expansionary effects in the short time, incentives the risk taking behavior of the private sector and, therefore, results in excessive exchange rate positions. As the government covers the risk, it is not priced in the interest rate, and foreign currency credit is perceived as “cheap”. A broad interpretation of this idea would categorize a fixed exchange rate system as a warranty. The private sector internalizes the future exchange rate path and this gives further incentives to the dollarization of credit. In Uruguay this argument is appealing both on the sense that we have had different kind of warranties on the financial system and because fixed exchange rate regimes have been a constant of our economic history.

Warranties, in Uruguay in particular, have been part of a misdesigned Safety Net. One of them is the Implicit Deposit Insurance scheme. Such scheme, supported by the Government, makes dollar-denominated deposits and loans cheaper for banks and depositors respectively both because, there were no limits for the insurance and the insurance itself was free (Bergara and Licandro 2000). Another important historical reference is the tradition of generalized bail outs for debtors through “administrative” decisions on public banks or compulsive refinancing on private banks by law. In this way, all agents involved in this moral hazard cocktail are completely insured by the State. More so since the regulation of the banking sector does not incorporate the obligation of banks of having more capital if they are going to take on dollar credit to the non tradable sector. Broda and Levy-Yeyati (2003) call this prudential regulatory mistake as “currency-blindness” of regulation.

II.2. Consequences of dollarization

1) Credit dollarization and financial fragility

The financial crisis of Argentina and Uruguay in 2001 and 2002 reinforced the arguments for regulation punishing currency mismatches. Prudential regulation in several countries, particularly in Uruguay, recognized this need only partially after the

5 After the 82 debt crisis, three laws were passed to “restructure” the debts of the private sector.
1982 debt crisis, attacking the mismatch on the balance sheets of banks. However, since the same considerations did not apply to the credits of the banks, exchange rate risk remained disguised as credit risk. When bank debtors have a currency mismatch, large swings in the real exchange rate will generate large capital variations in the portfolio of the bank.

The existence of implicit warranties, as argued in the previous section, reduces the incentives of the banking sector to recognize the risks involved in lending in dollars to sectors that have their income in national currency. Then, that risk is not priced and it is not incorporated in the interest rates charged in the credits to those sectors, further incentivizing the dollarization of credit. In equilibrium, the share of this kind of assets in the portfolio of the banks is larger than what would be socially optimum.

Other aspect of the emerging countries financial fragility is linked to the role of lender of last resort. Recently, Broda and Levy-Yeyati (2003) suggest that the cost of the lender of last resort is larger in the case of foreign currency than in the case of national currency. National Central Banks cannot issue dollars, but they can issue national currency. The recent experience of Uruguay and Argentina supports this view. Therefore, similar liquidity requirements in both cases are implicit subsidies to the dollarization of the portfolios of banks. Therefore, the authors suggest that both liquidity requirements and the cost of deposit insurance should be higher for foreign currency deposits. Regulatary provisions preventing the deepening of dollarization were also suggested by the IMF on their document on Monetary Policy on dollarized economies.

2) Dollarization and fiscal policy

In financially open chronic inflation countries, the evergrowing

6 In both cases a banking panic and a run on public debt formed part of a vicious cycle in which the deterioration of the sustainability of fiscal accounts worsened the panic on the banking sector, which in turn worsened the sustainability of fiscal accounts. In the case of Uruguay, this perverse spiral was worsened by the implicit warranty of the government on the banking sector. Furthermore, in the Uruguayan case, deposits in domestic currency in public banks were not rescheduled.

7 The IMF concerns were more on the side of finding effective tools to reduce dollarization to improve a country’s ability to manage monetary policy. Despite lacking a general equilibrium back up, their recommendations are pretty much on line with what has been suggested by the literature later on.
distrust on fixed interest rate bonds on national currency made it prohibitively costly to issue that kind of debt. When Uruguay made its first serious attempts to control inflation this problem became evident, leading to the dollarization of public debt. Uruguayan public debt was fully dollarized by the mid 70’s. When Uruguay had to abandon the “tablita” in November 1982, its debt to GDP ratio almost doubled, reaching unsustainable digits. This happened despite the Uruguayan government kept until 1981 what most analysts, including the IMF, considered as a solid fiscal stance. Besides, the effect of the relative price adjustment on the credit portfolio of banks led to the generalized insolvency of the payment system, causing the bankruptcy of several banking institutions whose bad credits ended up being bought by the government (Váz (1999)).

Licandro (2000) shows that with a dollarized debt, public finance systems characterized by stability in an interval like the Uruguayan, small variations in the real exchange rate can move public finances, out of the stable interval and into a divergent path.

Tragically, the same kind of threshold effect operated in the 2002 crisis. Uruguay still held an investment grade rating by the main three rating agencies early in 2002. However, the sudden change created by the regional crisis in the expected long run real exchange rate implied a very large adjustment. With the new equilibrium relative prices the finances of the government fell outside the stable interval (if there were any) damaging the perception of sustainability of public debt. At the same time, the banking sector started to experience a serious run on the deposit base that depleted more than 40% of that market, liquidifying the international reserves of the Central Bank. On the one hand, the reserve evaporation occurs because the Central Bank should act as a Lender of Last Resort in a dollarized framework. On the other hand, such evaporation was related with public warranties mentioned before and materialized in governmental assistance to the banks in trouble. International reserves were also depleted because the Government was not able to roll over debt. The public started to feel that the implicit warranty of the government did not have value and that the backup of the government was disappearing, speeding up the run on the deposits of the banks.

---

8. The Investment Grade for the Uruguayan sovereign debt was conferred in the first half of the 1997 by Standard & Poor’s, Moody’s and today’s merged Duff & Phelps and Fitch-IBCA.
run, further accelerated by the sudden change of the exchange rate following the decision to allow the exchange rate to float on June 2002, determined the closure of activities of five banking institutions. As in the 80’s, depositors, despite having to cope with some of the costs of the banking bankruptcy, were partially, and in some cases completely, bailed out by the government with the support of the IMF.

The example of the Uruguayan crises give us a powerful example of the kind of financial fragility that dollarization poses on the public finances. On the one hand, the relative price adjustment has a direct impact on the government’s balance sheet, increasing the cost of debt. In fact, the negative correlation between activity and real exchange rate causes a procyclical effect in the burden of interest payments, pushing up fiscal deficit in recessions. Simultaneously, the relative price adjustment raises the debt to GDP ratio, affecting debt sustainability. On the other hand, the crisis triggers the activation of potential liabilities of the government, which were not previously accounted for. To further worsen the situation, the relative price adjustment is accompanied by a large-scale recession that shrinks tax revenues. To manage this holocaust without incurring in the default of the public debt requires a large fiscal adjustment or generous external financing.⁹

3) Dollarization and exchange rate regime

After a large period in which this topic did not seem to matter, the late 90’s witnessed a surge in the literature on this issue. In the 80’s and early 90’s the focus was in the role which dollarization could play on the choice of nominal anchor in an inflation stabilization program. In this literature, highly dollarized economies, therefore with a high degree of indexation to that currency, would find it more suitable to fix the exchange rate to bring down inflation. Besides the efficacy of the anchor, it has been pointed out that stabilization programs anchored on the exchange rate are accompanied by an initial boom of consumption, in opposition to monetary anchors that generated an early bust (Kiguel and Liviatan (1992) and Végh (1992)).¹⁰ Then, a fixed ex-

⁹ Uruguay had to restructure public debt in 2003 despite reducing real expenditures by 13.8% and receiving a large support from the IMF.
¹⁰ Among the reasons given to that initial boom stand out: lack of credibility in the program, wealth effects, nominal rigidities, etc.
change rate program would tend to have more political support than a monetary one.

More recently, the academic discussion concentrated on the role of dollarization on the optimal choice of long run exchange rate systems. The main question is To Fix or to Float?

Calvo and Reinhardt (2000) pointed out that countries in the emerging world have “fear of floating”. According to this authors countries that claim to float have extremely large International Reserves, and the exchange rate behaves as if it were controlled by the Central Bank. Indeed, they point out that the volatility of the interest rates in countries like Mexico, Colombia, Perú, among others, exhibit a larger volatility of Central Bank interest rates than in the exchange rate, a typical outcome under a fix but not under a float.11,12

The question is then whether a dollarized country should fix or float. Calvo (1999), using Pool’s optimal exchange rate system line of reasoning, argues that dollarization not only reduces money demand increasing the volatility of the LM curve as it was argued in the 70’s, but also has a direct effect over the IS curve. He argues that a radical change on the relative prices drags firms into insolvency, restricting investment and production. This way, the IS could have a negative slope on the nominal exchange rate, and would be much more volatile. If the aim is to minimize the volatility of output, the existence of a very volatile IS would point out to the need of a fixed exchange rate system, much more so under a negative sloped IS that would magnify the volatility of the IS curve.

Céspedes, Chang and Velasco (1999, 2000 and 2001) and Bernanke, Gailchrist and Gertler (2002) have pointed out that balance sheet effects are not enough to justify the fixing of the exchange rate when the volatility of the relative prices is low. According to this series of papers, and using a general equilibrium framework with balance sheet effects inspired in Bernanke and Gertler (1991), if an economy is perturbed outside the steady state by a external shock, the trade effect of the exchange rate adjustment would overpower the balance sheet effect. Despite the undeniable elegance of their analysis, the kind of shocks they work with do not resemble the earthquakes emerging countries

11 Levy-Yeyati and Sturzenegger (1999) use cluster analysis to determine whether countries fix or float
12 More recently, Schmidt-Hebbel and Werner (2002) argue that countries like Mexico, Colombia and Chile have grown out of “fear of floating”.
have to go through, and could not resemble them because they work with linearized steady state dynamics. Furthermore, even though the model allows the default of the individuals on banks, i.e. credit risk, it does not incorporate the possibility of massive bankruptcy of the banking sector as it was the case in Uruguay and Argentina in 1982 and 2001-2002. Finally, the comparison they make between fix and float does not rule out the possibility that an intermediate form of adjustment would perform better. Calvo and Mishkin (2003) argue that floating might not be the right answer at any point since timing and institutions matter. The recent Uruguayan experience is a good example of their point. On June 2002, Uruguay faced both a run on public debt and a panic on the banking sector. However, there were no run on the currency yet. The country was losing international reserves fast, but not a penny on the exchange rate market. The approximately US$ 1.3 billion of international reserve assets held by the Central Bank of Uruguay on June 18th, the day prior to the float, were clearly insufficient to back up US$ 10 billion of deposits or US$ 4.0 of debt service in the next two years, but were at least three times the monetary base and more than two times the monetary aggregate M2. Then, the country let go the only commitment that could be sustained in the short run. By doing so without solving the two basic challenges the economy was facing, it worsened the panic on the banking sector and, eventually, the run on public debt. Both effects were foreseeable. The float made clear that the credit portfolio of the banks, and therefore their capital position were weakened suddenly. Furthermore, the evident generalized bankruptcy problem made very likely a bail out scenario, prompting the lobbying reaction of pressure groups. Even though the adjustment of the exchange rate was unavoidable, the timing of the decision was clearly wrong.

If we add up all that has been said, and the accumulated experience in dollarized countries like Uruguay and Argentina, even though exchange rate flexibility to adjust permanent shocks is key, the case for some form of exchange rate management remains strong for dollarized economies.

4) Dollarization and monetary policy

Dollarization affects monetary policy mainly through the re-

---

13 See Licandro (2003) for a discussion on the decision to float on the uruguayan 2002 crisis.
duction and increased volatility of the demand for money (currency substitution). Berg and Borenstein (2000) emphasize those aspects and claim that in dollarized economies the relevant monetary aggregates are not the traditional national currency aggregates. Since saving and transactions are performed in foreign currency, the traditional transmission of monetary policy would not work properly if countries would concentrate on traditional aggregates: to have the same kind of control one should work with aggregates that include assets in dollars. However, as the authors point out, the Central Bank has no control over dollar assets.

Céspedes, Chang and Velasco (2001), argue that a flexible inflation targeting with a mixed use of interest rates and exchange rates could be more effective than a fixed exchange rate. However, to date there is no comparison between a controlled devaluation like the one that a target zone or a crawling peg system would obtain, with the float on impact. Moreover, the proposal of Céspedes et al. (2001) and others like Moron and Winkelried’s non-linear monetary scheme for Perú, could be restated using the exchange rate as an instrument. Licandro (2001), considering the Uruguayan case, argues that an interest rate partial reaction rule could be substituted by a controlled devaluation system, with no commitment to the exchange rate, with endogenous interest rates.

5) Dollarization and Financial Fragility in the Pension System

Uruguay changed its pension system in 1995. It was added to the old pay-as-you-go system a complementary, but increasingly important, system based on personal savings. The new scheme includes privately-administrated pension funds by specialized firms (the Administradoras de Fondos Previsionales –AFAP’s). Workers save along their active life in those funds, and when retirement time comes, they are required to buy a life annuity from an insurance company. This kind of pension system works like a relay race. The first part of the race is run by the AFAP, which manages the saving’s portfolio of the worker. The second stage of the race is run by the insurance company, which receives the portfolio from the AFAP and pays the pension. When the financial system is dollarized, not only the banking system, also AFAP’s portfolio includes naturally dollar-denominated assets, which should be transferred to insurance companies when a worker retires. However, the insurance companies’ liabilities are in pesos.
indexed to a wage indexed unit known as UR (unidad reajustable) by law, because the Legislator tried to maintain the real value of the pension through this indexation mechanism. The outcome is a currency mismatch in the insurance companies balance sheet and then, a financial fragility issue in the pension system as a whole. The pension system’s fragility works exactly in the opposite direction as the banking system’s fragility. As we pointed out in part (a), the insolvency problem on the banking system occurs when the real exchange rate depreciates. The insolvency problem in the pension system would occur when the real exchange rate appreciates.

In the Uruguayan case, the described financial fragility of the pension system is not a problem today but it is a real threat for the medium and long run. In the same way as the bail outs in the financial system, a generalized bankruptcy in insurance companies would likely result in a liability for the State, mainly because it would generate a huge social problem that would require governmental assistance. Then, the financial fragility in the pension system adds a new and strong argument for the design of a de-dollarization strategy.

III. A SIMPLIFIED EXPOSITION OF THE CASCADING OF BALANCE SHEET EFFECTS IN A DOLLARIZED ECONOMY

As we mentioned before, the literature on dollarization is rapidly growing. Nevertheless, there is some milage left to cover to be able to make a fair representation of the depth of the phenomena in, at least, three strands:

i) The potential for banking default.

ii) The fiscal impact, both on public debt and potential liabilities.

iii) The long run impact. When a banking crisis occurs, a legacy of property rights battles reduces the incentives to investment and damages the ability of countries to grow.

In this section we will try to stage the first two effects as the first step in a research program on dollarization. In that sense, we will try to show how the cascading of balance sheet effects due to dollarization emerge, starting with the firms up to the triggering of potential liabilities to the government through the banking crisis.
III. 1. The balance of the firms.

We will use the net present value (NPV) of a firm as an indicator of its value, as Fernández-Arias and Talvi (2000). If the firm sells non tradable goods and has dollar liabilities, and assuming for simplicity that the project last only one period, the NPV can be expressed as:

\[
NPV = \frac{y - qD}{1 + r}
\]

Where \(y\), the production of the firm, is produced and sold at the end of the period, \(q\) is the relationship between the nominal exchange rate \((e)\) and the price of the non tradable good \((p)\) that will prevail at the end of the period (we will loosely call it real exchange rate). \(r\) is a real discount rate in national currency and \(D\) stands for debt service. Debt is acquired at the beginning of the period and paid for at the end of the period.

If the NPV of the firm is positive, the firm is considered solvent from an economic standpoint.

The NPV of this firm depends negatively on the real exchange rate \(q\). Indeed, every increment of \(q\) reduces the NPV proportionally to the partial derivative \(\frac{\partial NPV}{\partial q} = -\frac{D}{1 + r}\). If there were a change in relative prices strong enough, an initially solvent firm can easily be forced to default on its debt obligations.

Then, a firm that operates on the non tradable sector, with dollar liabilities, whose prices are linked to the conditions of the domestic market, are naturally vulnerable to real exchange rate depreciation.

Such vulnerability hinges exclusively on the fact that this firm was not able to contract its debt in national currency. If this firm were to finance itself in domestic currency, its NPV would look like in the next equation:

\[
(1')
\]

\[
NPV = \frac{y - D}{1 + r}
\]

It is also the case that if the firm is an exporter, the future value of the real exchange rate does not affect the viability of its project. The NPV of such a firm would look like:

\[
(1'')
\]

\[
NPV = q \frac{y - D}{1 + r}
\]
III. 2. The vulnerability of banks

Let's assume that a bank receives dollar deposits at the beginning of the first period \((d_0)\), pays for them an interest rate \(i_p\) and then returns them at the end of the period. The bank gives credit in the same currency \((C_0)\) at an interest rate \(i_a\) to an agent that has a project on the non tradable sector. We would assume that the bank is only subject to a minimum capital requirement and a currency mismatch ban. In this case, the balance sheet of the bank can be represented as follows:

\[
C_{kd} = d_0 + k_0 = C_0
\]

Since both its credits and deposits are dollar denominated, the bank has no currency mismatch on its balance sheet. However, this does not mean that the exchange currency risk has disappeared, it has "evolved" into credit risk. Then, the debtor of the bank, is the one that is directly exposed to the mismatch of currencies in its balance sheet as represented in (1).

To describe the kind of vulnerability that the bank faces, it is convenient to look at its residual value. The residual value can be expressed as the difference between the residual value of the credit portfolio plus the capital of the bank less the deposits and the accrued interest.

\[
VB = \text{Recoveries} - d_0(1 + i_p) - k_0
\]

The residual value of the credit portfolio depends on the ability of the bank’s debtors to repay, asymmetric information issues aside, the debt. We have seen in (1) that this ability depends on the level of \(q\) at the end of the period. We can find two relevant thresholds in the residual value of the bank.

a) There is a level of \(q\) that we would call \(q^1\) below which the debtors of the bank have no problems repaying their debts. In this case the bank can earn the interests of the credit portfolio without pains and the residual value of the bank would look as follows.

\[
VB = C_0(1 + i_a) - d_0(1 + i_p) - k_0 i_a \text{ if } q \leq q^1
\]

b) When the real exchange rate goes above \(q^1\) more and more debtors of the bank start to have problems to repay. We will assume that those debtors are subject to a standard debt contract, and that the bank can appropriate without costs the residual
value of the business from then on. In that case, the residual value of the bank would start to decline smoothly. At first the yield of the rest of the credit portfolio would be enough to generate still some benefits. As q grows, it would eventually reach a point in which the credit portfolio would generate losses that the bank would have to cover with its own capital.

\[ (4') \quad VB = \frac{y}{q} - d_0(1 + i_y) - k_0 \quad \text{if } q > q^1 \]

Eventually, q would reach a value where the capital of the bank would not be enough to cover the losses of the loan portfolio, i.e. the bank becomes insolvent. The story from then on depends on the institutional setting of the Safety Net.

If there is no institutional solution for this outcome, depositors would be the ones to bear the losses.

If a deposit insurance scheme exists, depositors and the deposit insurance institution would share the losses as agreed.

If there is no deposit insurance, but an implicit warranty by the government exists on deposits, the losses of the bank become a liability of the public sector.

We can plot a simplified picture of this financial system as follows:

**FIGURE I**

\[ NPV \]

\[ d_0(i_c - i_y) + k_c \]

\[ d_0(1 + i_y) - k_0 \]

\[ VB = \frac{y}{q} - d_0(1 + i_y) - k_0 \]
III. 3. The impact on the fiscal side. Government as the ultra non-tradable agent

Assuming that the government pays its expenditures \((g)\) and collects its tax revenues \((t)\) in local currency, and that government debt is denominated in foreign currency \((D)\) paying an interest rate \(i\), its balance sheet looks pretty similar to equation (1). The financial fragility of the government is worsened by the potential liability that might arise in the financial system, as a result of the existence of an implicit deposit insurance scheme for the banking system. Then, the State, should a large relative prices shock occur, might become insolvent, in the same fashion as the private sector. Licandro, G. (2000) shows that a dynamic system of public debt like the one we depict in this section has two steady states, one stable and one unstable, meaning that public debt is only sustainable in an interval. Therefore, fiscal shocks, like sudden changes in relative prices, can drive the public finances into a divergent path.

\[
rf = (g - \tau) + q(i_e Dg) \quad \text{if } q < q^2
\]

\[
rf = (g - \tau) + q(i_e Dg) + \left\{ q_i \left( i_0 (1 + i_e) - k_0 \right) - y \right\} \quad \text{if } q > q^2
\]

The equation above represents the balance sheet of the government. The first term is the primary result. Financial vulnerability is introduced in the second term: the interest bill. The third term, which appears when \(q > q^2\), represents the potential liability arising from the implicit deposit insurance scheme.

As a result, it can be fairly said that the government is the most fragile of the dollarized-non tradables: this is because it not only bears its own mismatch risk, but also the one of the sectors that have grounds for a bail out.

IV. A STRATEGY TO COMBAT THE FINANCIAL VULNERABILITY CAUSED BY DOLLARIZATION^{14}

In the previous sections we have analyzed the anatomy of dollarization, and its main pathology: financial vulnerability. As it is the case in every pathology once it has been identified, the next question is: Is there anything we can do to combat this pathology?

To answer this question we first need to determine how far

^{14} This section draws heavily on Licandro and Licandro (2003).
should we go in this fight. Should we fight it at all? Some scholars have argued that, since these countries are already highly dollar-ized, they should go all the way and completely dollarize their economies (See Calvo (2000) and Paniza, Stein and Talvi (2003)). However, even in a dollarized economy a non-tradable sector would exist (at least a government), and the risk of a large adjustment in relative prices would remain, much more so in a region like Mercosur. Then, full dollarization does not reduce the financial vulnerability of the economy on impact, and the long run effects depend on the ability of the country to develop trade with the US. This ability would vary from country to country, but, in the case of Uruguay, it is impaired by the fact that Uruguay is a natural partner (in Krugman’s sense) of Mercosur. Therefore, a unilateral dollarization by Uruguay does not seem a good alternative in a region as unstable as Mercosur: some exchange rate flexibility is needed, as it was the case in the Real and the 2002 crises.

Full dedollarization is not the answer either. The same financial matching principle driving our concerns about the State and the non-tradable sector would apply to the tradable sector if we were to forbid foreign currency operations in the financial system.

Acknowledging that neither full dollarization or full dedollarization are the solution, the question is: how can we live in the middle? What can we do to reduce financial vulnerability? An obvious answer is that agents should have the chance and the incentives to hedge the risks involved in their portfolio. To do that it is necessary to develop an strategy based on two pillars.

i) Strengthening of the Safety Net of the financial system. Financial regulation in several countries does not fully incorporate the risks involved in the dollarization of their business. That was particularly clear in the cases of Argentina and Uruguay in 2002, but it is also true for several other countries. It is necessary to rethink this situation that undoubtedly has favored dollarization. Prudential requirements have to be stricter when the financial system lends to an agent that perceives its income in domestic currency, even more so if that agent is the State itself. Liquidity requirements have to be higher in dollar business, reflecting the inability of Central Banks to perform the lender of last resort in foreign currencies. The recognition of those risks will likely give us a smaller financial system, but a healthier one.
ii) Recreation of domestic currency asset markets. It is necessary to have a domestic unit of account that can be the basis of a future credit system. With nominal domestic currency markets long lost to past misconduct, a new alternative is needed. In this sense, the experience of Chile with the UF appears as a benchmark to study, and a path to explore. Uruguay and Argentina are moving in that direction, with the issue of CPI indexed debt. However, to obtain a viable alternative to the dollar, creating a new unit of account will not suffice: The government will have to step up and have a proactive position to develop CPI indexed markets.

The following scheme shows how a strategy like the one depicted in the previous paragraphs should start in the case of Uruguay.

### IV. 1. Recreation of domestic currency markets: the case of Uruguay

The elimination of the commitment to the exchange rate is a valuable first step. Under a floating exchange rate regime the real yield of dollar assets is more volatile, incentivating the use of other inflation hedging instruments like the UI. In the future, even though it is not clear either the possibility nor the desirability that Uruguay could manage a pure float, the commitment of
macroeconomic policy should lie on inflation stability rather than on the exchange rate. Other reforms that would surely benefit the development of the financial system in general, and markets in domestic currency in particular relate to macroeconomic stability: central bank independence and fiscal sustainability.

The second logical step in the recreation of markets in a domestic currency is to develop a unit of account that the public could trust. In a future stained by inflationary uncertainty, the obvious candidate to take on that role is a CPI indexed unit. Uruguay created the UI in July 2002. This unit is a copycat of the Unidad de Fomento in Chile, and it is quoted daily.

During 2002 the Uruguayan government took the first steps in the creation of a yield curve on UI denominated assets by issuing the first series of UI indexed government bonds. This has created the opportunity for the first private issues of UI assets by the private sector. However, there is still plenty to do in order to generate a viable alternative to the US dollar.

First, the government has to continue with its policy of issuing UI indexed bonds, both to ensure a reference yield in the new unit of account and to reduce its own financial vulnerability. A long-term preannounced calendar of debt issuance will contribute to reassure the public of the Government resolve, further deepening the market.

Then, the financial system should start allowing UI deposits. In Uruguay, the government has an opportunity to make a decisive move in this direction by using the market power that the State owned Banco de la República (BROU) has in domestic currency markets. BROU, with a nearly 40% share of domestic currency markets, both credit and deposits, has traditionally played the role of the leader of this segment. Then, if BROU embraces the UI business, it is highly likely that the rest of the system would follow.

The government has already made use of its leadership by switching Banco Hipotecario’s financial activities to UI. It is early to assess the result of this move that was already proposed by Licandro and Licandro (2001), but, as the system develops, it should give a push to UI markets. Traditionally, saving deposits in BHU have been big part of the domestic currency portfolio of residents. Until 2001 the mortgage system hinged on the UR and the US dollar as the indexing units. The switch, to be made on the marginal deposits and credits, is both a sign of coherence on the long run monetary choices of the State, and a direct move towards the development of UI markets.

Regulation has to incentive both the financial system and the pension system recognition of the risks involved in currency mismatches. We have shown that the regulation has been unable to do that at several levels:

i) Solvency regulation, both capital requirements and provisions, do not penalize lending to non-tradable sectors in foreign currencies, even though their risk is higher.

ii) Liquidity requirements not only did not penalize dollarization, but, in some cases they even encouraged intermediation in dollars. In Uruguay, until 2002, while short term deposits in pesos had a reserve requirement of 30%, dollar deposits only had 10%.

iii) The deposit insurance scheme not always incentives banks to account for risks properly. In the Uruguayan case, until 2002 the market behaved as if there were a complete and free (implicit) deposit insurance scheme. After the financial crises of 2002, the fiscal situation has made clear that no further assistance from the State can be expected.

All these defects need to be addressed in the regulation. Both solvency and liquidity requirements have to be made up to avoid inducing financial vulnerability, even more so after the recognition of the inability and impropriety of the government to fully back up deposits. On the liquidity side, a differential requirement between pesos and dollar denominated deposits is advisable. On the solvency side, capital requirements and provisions should be higher for dollar denominated credit to non-tradable sectors than in the credit with no currency mismatch. Also, a deposit insurance scheme should be created. This scheme should take into account the risk of currency mismatches into the premiums charged to banks (as suggested by Broda and Levy-Yeyati (2003)).

In the short run, this kind of regulatory measures reduces the vulnerability of the financial system even in the case dollarization should not be reduced significantly. Indeed, even in the case UI credit would not boom, the financial system would be stronger, reducing the chances of both a systemic and fiscal crisis. First, because there will be a more capitalized and liquid banks. Second, because there will be a better Safety Net.
It is highly likely that credit in dollars would be more expensive than it was in the past, but a healthier financial system should improve the country’s growth path. A more expensive credit is the logical result of regulatory recognition of risks. However, in the long run the overall cost and effectiveness of the credit activity should be better for several reasons. For starters, a fairly priced risk should provide a better incentive for resource allocation. A healthier financial system would reduce the chance of systemic crises, avoiding all the political economy issues related to property rights that arise in those episodes. In every financial holocaust like the ones experienced by Uruguay and Argentina in the debt crisis and 2002, societies fight to determine who should bear the burden of the shock. Somewhere along the way, as it has been widely documented, institutions fall, change and even disappear. The institutional change brings about institutional uncertainty and hampers the confidence of private agents on the economy, with a long run effect on private investment and growth.

The same strategy should be oriented to reduce the financial vulnerability in the new pension system, as it was mentioned in section II.5. Regulation on the pension system should aim to minimize the currency mismatch in the system’s portfolio. To achieve that it would be necessary that both, assets and liabilities of the system were denominated in the same unit: the UI. Why the UI and not the UR as the Uruguayan Constitution instructs? First because social security savings are aimed at ensuring future consumption and the UI is the only unit of account that actually gives a fair reference in that sense. Secondly, the UR’s yield is positively correlated with income, meaning that nobody would want to save in that currency in the long run. Proof of that is that the UR has existed for more than twenty years and, it has never been used other than for housing financing in public banks. Then, it is almost impossible that a viable domestic-currency alternative to the US dollar could emerge other than the UI.

Some people have argued, regarding the constitutional indexation of the Uruguayan social security system to the UR, that saving in UI also involves a mismatch for the system for as long as the constitution is not changed in that respect. And they are right in an obvious sense. However, the kind of risk a dollar portfolio poses on the system, as shown by the graph below, is much larger than a portfolio based on UI assets.

In order to mitigate the mismatch of the Uruguayan pension system some legal and regulatory changes need to be made. First, it would be convenient to switch the reference of the system from
the UR to the UI. This issue can become potentially difficult since some law experts affirm that a constitutional amendment is necessary. Even if first is not possible, the Regulator should determine the limits to dollar investments in the system’s portfolio, nowadays managed by the AFAP’s.

**FIGURE II. URUGUAY: REAL VOLATILITY OF WAGES AND THE US DOLLAR**

As a by-product, if the country takes this kind of measures in the pension system it is probable that the dynamism and growth needed by the peso-denominated markets would be provided by the pension funds. In this sense, the different regulatory agencies: the bank regulator, the pension founds regulator, the insurance companies regulator and the stock market regulator -all included in the Central Bank of Uruguay-, should work together in a unified and consistent regulatory strategy.

In the end, we want to emphasize two important points. First of all, the exposed strategy and agenda are preliminary and should be deepened and perfected in order to achieve the sought reduction in financial vulnerability. We are convinced that a successful strategy involves the unified efforts of several battlefronts, oriented to both incentive the development of domestic currency markets and strengthen the safety net of the financial system. Second, the strategy presented herein does not try to (neither could) eliminate the presence of the dollar in the economy, endeavour that we see as neither desirable nor convenient in the
normal workings of an economy in which the two pillars of our strategy are working properly.

REFERENCES


Bergara, Mario, and José-Antonio Licandro (2000), “Una propuesta para hacer expílico un fondo de garantía para el sistema bancario”, Revista de Economía (Banco Central del Uruguay), vol. 7, n° 1, Segunda Época, Mayo.


Burnside, C., Martin Eichember and Sergio Rebelo (2000), Hedging and Financial Fragility in Fixed Exchange Rate Regimes, Mimeo, Northwestern University.


Calvo, G. (2000), Testimony on Dollarization, Mimeo


Licandro, Gerardo (2003), *La experiencia de Uruguay con las bandas de Flotación*, Banco Central de Venezuela (Serie Foros, n° 8).

Licandro, Gerardo, and José-Antonio Licandro (2001), *Una estrategia para desdolarizar la economía*, Banco Central del Uruguay (Serie Informes y Notas).


Copyright of Money Affairs is the property of Centro de Estudios Monetarios Latinoamericanos and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.