

Dollarization and Monetary Unions: Implementation Guidelines

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INTRODUCTION

The purpose of this paper is to discuss the main aspects of the implementation of a dollarization plan or of a monetary union, once the appropriate authorities have decided either course of action. Thus, the paper stays away from any normative issues. It is devoted to answering the question of *how* to dollarize or form a monetary union rather than the question of whether any given country *should* adopt any particular monetary regime.

It is important to emphasize also that the paper does not attempt to address all of the issues of implementation that will emerge before, during, and after a dollarization plan or the creation of a monetary union. Rather, the paper tries to complement the material on dollarization covered by previous work on the topic, paramount among them Hausmann and Powell (1999) and the prolific literature on dollarization especially prepared by the Joint Economic Committee of the US Senate. A thorough understanding and anticipation of all the important implementation issues that are likely to surface in the course of a dollarization program would be incomplete without a careful reading of those studies, which have influenced the organization and choice of thematic units addressed in this paper. Likewise, the voluminous literature on Europe's Economic and Monetary Union (EMU hereafter) is an essential starting point for any discussion about the creation of a monetary union in Latin America.¹

Many of the issues that would arise in the process of dollarization would also need to be addressed to form a monetary union, and vice versa. Indeed, dollarization is simply a monetary union by another name, albeit monetary union with important differences. The essential distinction between dollarization and monetary union in the sense generally understood revolves around the issues of seignorage and monetary sovereignty. Figure 1 below presents a simple schema of the different regimes.

Figure 1			
		Retain monetary sovereignty?	
		Yes	No
Share in seignorage?	Yes	EMU	Currency Board
	No	N/A	Dollarization

Monetary unions in the general sense can be differentiated according to the extent that participating countries obtain a share of the seignorage revenue generated by the shared currency and the extent to which they have a say in the management of the shared currency, or rather retain a degree of sovereignty in monetary affairs.

The simplest type of monetary union is where one country adopts another country's currency without obtaining any say in how that currency will be managed or even a share of the seignorage revenues. This type of asymmetric monetary union is what we will refer to as "dollarization."² A second type of asymmetric monetary union comes

¹ Essential references include Kenen (1995), Eichengreen (1997), Ungerer (1997), De Grauwe (1997) and Gros and Thygesen (1998).

² We will note that there have been proposals to set up some sort of seignorage sharing arrangements with countries that dollarize. This hybrid form of dollarization would be similar in many respects to a currency board arrangement.

about when a country adopts a currency board and backs its currency with a foreign currency. The degree of asymmetry involved in this type of monetary union is less than under dollarization, as the country adopting the currency board at least retains the seignorage revenue generated by the domestic money stock. A more symmetric monetary union again involves the adoption by one country of another country's currency, but the adopting country also obtains some say in the management of the currency. That would be the case, for example, if Canada and Mexico adopted the US dollar as their currency and obtained voting seats on the Federal Open Market Committee (FOMC hereafter.)³ This type of monetary union was created when East Germany adopted the Deutsche Mark in 1990. A more ambitious form of symmetric monetary union occurs when two or more countries agree to abolish their national currencies and replace them with a new currency that will be jointly managed by representatives from all of the countries involved. This type of "symmetric" monetary union is what the European Union has recently adopted, abolishing the national currencies of the eleven (soon to be twelve) participating nations and replacing them with a new currency, the euro. Symmetric monetary unions can themselves take different forms. The shared currency could be a completely new, unbacked fiat currency, such as the euro. Alternatively the currency could be backed (in the sense of a currency board) by one or more other currencies (such as the dollar, euro or Yen).⁴ In what follows we will use the term monetary union to refer to symmetric monetary unions of the former type. It is also important to mention that although the issues of implementation of monetary unions discussed in this paper will be frequently framed having Latin America in mind, they are general enough that can be readily applied to other regions.

1. DOLLARIZATION

1.1 - CONDITIONS FOR DOLLARIZATION

A theme that will appear consistently throughout the paper is that dollarization or the creation of a monetary union should be considered part of an integral process of institutional, political, and economic reforms with the ultimate goal of full financial and commercial integration of a country with the rest of the world, and not just as a mere monetary reform capable of magically solving all of a country's economic maladies when implemented in isolation. In fact, there is the danger, frequently perceived in private or public statements by their advocates, that dollarization or monetary unions will be enthusiastically embraced with the secret hope that they will provide a painless substitute for other much needed but perhaps painful economic reforms. Such a motivation to dollarize or adopt a monetary union would certainly be detrimental to the success of either regime.

Therefore, a first step in the process of dollarizing an economy or adopting a monetary union is to make the countries and policymakers considering any of those regimes aware that the choice of either of them will inevitably entail the explicit or

³ Say, in the form of one member of the Board of Governors from each country and the appointment of the Governors of the Bank of Canada and the Bank of Mexico as permanent voting members of the FOMC.

⁴ As in Edwards' 1998 proposal.

implicit commitment to implement all of the complementary reforms that are crucial for the final stability and success of the regime.

For that reason, dollarization or monetary unions are likely to bring about lively discussions about the correct order in which those complementary reforms should be introduced. Those discussions conjure up the “correct order of liberalization” problem that dominated policymaking forums until not long ago, when several countries all over the world, from Latin America to the former Soviet Union, were considering or had engaged already in sweeping structural reforms of their economies.

Should fiscal reform pre-date, follow, or be simultaneous with dollarization? Should a sound financial system precede dollarization or, will dollarization help to make the financial system sounder? The issue of whether financial, fiscal, and labor reform should precede or not dollarization has been addressed in a recent paper that Prof. Barry Eichengreen, from the University of Berkeley at California, presented in a conference on dollarization organized by the Federal Reserve Bank Dallas in March 2000.⁵ The paper shows economists divided in the two predictable camps: the “just-do-it” approach and the “dollarize-last” or “coronation” approach.

The “just-do-it” camp argues that dollarization will act as a catalyst for all the other necessary reforms, because it will induce fiscal discipline, it will weed out the financial system from weak institutions, and it will give societies the right incentives to revise legislation and regulations responsible for labor market rigidities. The “dollarization-last” camp insists instead that dollarization must be the “coronation” of a concerted effort to bring about fiscal discipline, a solid financial system, and flexible labor markets. This is the approach effectively followed by the European Union (EU) in creating the Economic and Monetary Union (EMU).

Eichengreen provides some evidence suggesting that the “coronation” approach is the ideal one. However, it can take a long time to crown the required reforms with dollarization, as it was the case with the common currency that crowned the Maastricht Treaty and the long sequence of intermediate steps that preceded the emergence of the European Monetary Union.

Unfortunately, dollarization is most likely to be proposed first for those countries whose currencies are under heavy pressure, as it was the case of Argentina after the devaluation of the Brazilian real in January 1999, or are experiencing out of control inflation, as it was the case of Ecuador at the time of launching its dollarization program in April 2000. Policymakers of countries facing those circumstances will be most likely pressed to act without much time to discuss which reforms should take place first. Dollarization may appear to them as an experimental drug that, lacking others of proven success, may offer the only chance for survival, at least for the time that it will take to work out the planning and implementation of all the other necessary complementary reforms that, in ideal conditions, should have preceded the ingestion of the experimental “dollarization” drug.

The theoretical debate and practice of dollarization could take, therefore, a course reminiscent of the one followed by the discussions and events that accompanied the liberalization programs of the last two decades mentioned earlier. The needed reforms continued moving ahead while the experts continued debating what their “correct” order

⁵ “When to Dollarize.” This paper, along with the proceedings of the conference, can be found in the Dallas Fed Website: www.dallasfed.org.

was, until the object of their speculations became a moot point when most liberalization processes had concluded, in all shapes and forms, without providing any definite conclusion on which of them had been implemented in the “right” order.

The same fate may be awaiting the debate prompted by different dollarization proposals. Perhaps several years from now, the conclusion from the dollarization experiences that may have taken place by then will be something like *“it is... in the credibility sphere where the most important lesson on the sequencing of [dollarization] lies. In a sense, the implementation of a consistent and credible policy package is more important than determining ‘the correct’ order of [dollarization],”* which is exactly the same statement Edwards and Cox Edwards (1987, p.193) used to summarize the lesson from the liberalization programs of the 1980s and 1990s, except that the word “dollarization” appears in lieu of the word “liberalization” in the original text.

1.1.1 - The institutional requirements

The sort of “order of reforms irrelevance” proposition just presented suggests that the credibility of dollarization as a process of several inextricably intertwined reforms is more crucial for its success than any considerations regarding the sequence in which those reforms will be implemented. Broad, solid political support can go a long way toward building credibility of the ultimate sustainability of the difficult dollarization effort. Only with the support of a substantial fraction of the population will the government be able to push forward not only the perhaps psychologically traumatic, albeit mechanically simple, operation of replacing the domestic currency with the dollar, but also the other more challenging reforms that must necessarily be part of the process as well. As vigorously stated in the related contribution by Hausmann and Powell mentioned in the introduction, *“It is critical that the countries considering dollarization carry out a serious, open and broad discussion of the subject and go forward only on the basis of strong political consensus”* (p. 3).

In this spirit, the citizens of a dollarizing country ought to be able to fully evaluate the goals of the dollarization process, its advantages and disadvantages, its short as well as long term consequences. After all, replacing the national currency with a foreign one is not a minor historical event. In this regard, it is critical that societies do not interpret the substitution of the domestic currency with a foreign one as a surrendering of national sovereignty or the loss of dignity and identity of the country in the community of nations.⁶

These considerations immediately suggest that the first step on the road to dollarization should be a national referendum whose results will be binding for the government. A simple majority approval should be enough to get the dollarization process started.

⁶ Drazen (1999) shows how a monetary regime such as dollarization is consistent with the democratic principle of popular control. The loss of exclusive domestic sovereignty over monetary policy that such a regime entails is in keeping with constitutionalism, as long as the electorate supports the decision. The difference between dollarization or monetary union and simply granting a central bank independence to pursue sound monetary policy is one of degree, not substance. A society may well decide that the putative gains from dollarization or monetary union outweigh the costs in terms of loss of domestic sovereignty over monetary policy.

The subject of the referendum should be the simple one of whether or not the national currency should be replaced with the dollar. The appropriate institutional channels should deal later with more complex details, such as the timetable of the dollarization process and other technical aspects of it.

The practice of direct consultation with citizens on the matter of a major monetary reform is not new and has a recent important precedent in the institutional steps that preceded the launch of the euro on January 1, 1999. The Maastricht Treaty that governs EMU was ratified by the national parliaments of all the countries in the EU, and in some countries was put before the electorate in national referenda.⁷ Both the United Kingdom and Denmark negotiated protocols to the Maastricht Treaty that allowed them to abstain from participation in EMU. Both countries subsequently announced that the decision to join EMU would only be taken after national referenda (and in the case of Denmark, a referendum in September 2000 ruled out Danish participation for the foreseeable future). In fact when EMU was launched Sweden also abstained, although technically it met the conditions for membership.

The referendum may appear as a nuisance in countries that, under the pressure of adverse economic circumstances, might prefer to skip it and dollarize right away. However, bypassing the referendum stage has the serious drawback of the lack of an explicit and clear mandate to the government. Without it, the dollarization process may get stuck in factious political infighting and noisy minorities who oppose it might be able to derail it, even if a majority of the population were in favor of it.

1.I.1.1 - A timetable for dollarization

As the recent experience of Ecuador indicates, dollarization can be implemented relatively fast, perhaps in just a semester. It is hard to think, however, that any feasible timetable could make the process faster than that, once the national referendum has approved the decision to dollarize.

For reasons given later, when discussing the treatment of existing contracts in section 1.II.3, the timetable for dollarization will likely be different for countries that are experiencing high inflation rates from those experiencing low ones. In the latter, existing contracts will tend to have longer maturities, and the parties to them may therefore need more time to adjust to the new dollarized environment.

Timetables will depend not only on the prevailing inflation rate, but also on the institutional features of the financial system. Countries that already allow contracts and financial transactions to be denominated in dollars at the time of the national referendum will have a much easier time adapting to the new conditions than countries in which that is not the case. For the latter group of countries, the timetable for dollarization should prescribe a transition period of at least a year during which contracts in dollars and the domestic currency will be allowed to coexist.

These idiosyncratic considerations aside, a reasonable timetable should specify the following sequence of events:

⁷ It is significant that the Maastricht Treaty was not put to a referendum in all EU countries, and in particular Germany. It is well documented that support for EMU among the German electorate has always been at best lukewarm. Some have argued that the failure to solidify popular support before moving to EMU may doom the monetary union in the long run.

- 1) Date of the national referendum.
- 2) If the referendum approves dollarization, date at which the relevant legislation will be submitted to Congress. Typically, not all the necessary legislation will require a constitutional amendment, and therefore the Congress can consider it while the process leading to the Constitutional reform, if needed, is set in motion. A strong mandate from the referendum should help to speed up the passage of the legislation, perhaps within one or two months of its submission to Congress. Simultaneously, the constitutional reform process should be initiated in countries where the dollarization requires a Constitutional amendment.
- 3) Length of the transition period. Countries with low inflation rates and/or where contracts denominated in dollars were forbidden should contemplate a transition period of at least a year during which the domestic currency will coexist with the dollar to the extent that economic agents freely choose to do so. However, all the parties to contracts entered during this transition period should be made aware that outstanding obligations and contractual agreements in the domestic currency, including wages, will be transformed into dollars at a specified date and at the exchange rate that will be established by the procedure described later in section 1.II.1, and that except for the issue of the denomination, all the other terms and conditions of the corresponding contractual agreements, *including the nominal interest rate*, will remain in effect (this procedure is thoroughly justified in section 1.II.3.)
- 4) The date at which the central bank will start to replace the domestic currency in circulation with dollars and in which this latter currency will be recognized as legal tender. Care must be taken that this date will not predate the eventually required constitutional reform.
- 5) The date at which the domestic currency, except for small change in coins, will be definitely phased out from circulation.

1.I.2 - The complementary economic reforms

Once the approval of dollarization by a national referendum has cleared the way to start the process, the more technical aspects of the dollarization program come into play. Besides the measures indicated in the timetable just presented, the dollarization program would have to consider the timing of implementation of other associated reforms.

For the reasons given earlier, and lacking any insights from economic theory, this paper stays away from recommending any order of reform measures in the process of dollarization. It is possible to agree with the “just-doers” that a long list of pre-requisites is the best way to make sure that dollarization will never happen.

However, although dollarization can act as a catalyst in setting in motion the necessary complementary reforms, it will not just make them happen as if a magic automatic pilot were turned on to guide the process all the way. As it was argued at the beginning of this paper, dollarization should not be implemented *instead of* but *along with* all other complementary reforms. In particular, a deliberate, conscious effort will be required to introduce, sooner or later, fiscal reforms to allay any fears of default on the

sovereign debt, financial system reforms to allay fears of recurrent banking crisis, and labor market reforms to allay fears that nominal wage rigidities will result in high unemployment rates. Each of these reforms is discussed in some detail below.

1.1.2.1 - Fiscal reform

Without any doubt, fiscal reform must be part of any dollarization process because one of the much-proclaimed goals of dollarization is to bring about a substantial reduction of the country-risk premium and, therefore, in the borrowing costs dollarizing countries face in international capital markets. Needless to say, fiscal profligacy would raise the specter of default and upset whatever interest rate reductions the dollarization program may have otherwise induced.

As mentioned earlier, whether fiscal reform should precede or follow the dollarization of the currency is a matter of controversy and theoretical arguments can be found on both sides of the debate. A modest attempt to rationalize the claim that dollarization will contribute to create better conditions for fiscal discipline can be found in Zarazaga (1999), in the context of a game-theoretic, political economy model of endogenous fiscal profligacy where the level of government spending is not invariant to the monetary regime in place.

On the other hand, Sims (2001) has argued in a recent paper especially prepared for a dollarization conference organized by the Federal Reserve Bank of Cleveland that dollarization may eventually increase, rather than decrease, the probability that a country will default on its sovereign debt. The basic argument is that, while the domestic currency is still circulating, reducing the real value of the fiat debt outstanding through a higher inflation can absorb unanticipated shocks to the government budget constraint. Because dollarization forces a country to relinquish the ability to default on the real value of nominal commitments, it may end up increasing the likelihood that governments will be forced to suspend payments on dollar-denominated sovereign debt more often than they would if they could inflate away at least their liabilities in the form of non-interest bearing domestic currency.⁸

1.1.2.2 - Financial reform

A country considering dollarization either must strengthen its banking system or run the risk of significant real-sector consequences from financial crises. The reason, of course, is that countries that dollarize cannot print money to bail out the banking system – as they can when they have their own currencies.

Dollarization advocates' response to this alleged shortcoming of dollarization is that many developing countries' financial systems are fragile because of currency and maturity mismatches. These mismatches are easily recognized by foreign investors, who

⁸ It is important to mention, however, that Sims's results hinge critically on the standard assumption that government spending is invariant to the monetary regime in place. This assumption is the one likely to be targeted for criticism by those who maintain that monetary and fiscal institutions do matter for the ability of societies to choose fiscal policies that do not include default in the sovereign debt along the equilibrium path.

will pull their funds from a country at the hint of an exchange rate crisis. That is, leaving open the options for currency depreciation can pave the way to recurrent banking crises – even when a nation can print money so as to serve as a lender of last resort for the financial system. One reason is that devaluations mean a reduction in the prices of non-tradable goods (office buildings, for example) relative to tradable goods. Whether the government uses the printing press or not, an associated real estate crash can mean a banking crisis with long-lasting real effects – as certainly Thailand, Indonesia and even Mexico have found out within the last decade.

In a study of the relation between banking crises and exchange rate regimes over the period 1975-92, however, Eichengreen and Rose (1997) find that it is not true that more stable exchange rates are associated with fewer banking crises. Moreover, in an update of this result Eichengreen (2000) shows that hard pegs (including currency boards and dollarized economies) are more fully associated with banking crises than soft pegs (other fixed rate arrangements). While it may be true that the removal of some of the lender of last resort function discourages risky bank behavior, the results obtained by Eichengreen suggests that this “moral hazard reduction” effect may be not enough to offset the increase in bank difficulties originated in the lack of a lender of last resort function.

It is important to point out that much of the discussion in the preceding papers fails to evaluate the welfare implications of the alternative policies. It may be true that countries with access to a discount window will experience fewer financial crises than those without that facility. But that doesn't mean that a society is necessarily better off than one in which those crises are more frequent. The recent experience with several financial crises (Mexico 1994, South East Asia 1997, Russia 1998, Turkey 2001) suggests that assistance to ailing financial institutions do not end up solving just a liquidity problem, but a solvency problem. As a result, discount window operations become the instrument of massive bailouts that increase the public debt (as much as 15% of GDP in some cases, as Mexico or South Korea) and, therefore, the burden of future taxation. It is fair to conclude then that a heavier tax burden seems to be the price to pay for reducing the frequency of financial crises. Given the distortionary nature of most taxes in practice, it is not clear then that a society will not be better off by simply doing away with lender of last resort functions and the higher taxation eventually associated with them, even if doing so implies more frequent financial crises. An additional benefit from severely restricting or eliminating altogether lender of last resort facilities is the more efficient allocation of risk by financial institutions now subject to the discipline of the market and, therefore, the elimination of the moral hazard distortions that those facilities typically induce in the portfolio choices of financial institutions.

It should be clear then that the issue of whether or not a lender of last resort function is welfare-improving is empirical in nature. Unfortunately, as already mentioned, economic models capable of evaluating the welfare implications of the relevant trade-offs just stated are still in their infancy.

1.1.2.3 - Labor markets

The presence of nominal wage rigidities would certainly be problematic for the adjustment of the labor market in a country that has forfeited the ability to choose the

inflation rate necessary to eventually bring real wages in line with labor market equilibrium conditions. Herein perhaps lies the Achilles' heel of the "just-do-it" approach, because the empirical and theoretical evidence that hard currency regimes motivate labor markets flexibility is certainly weak to nonexistent.

Argentina's currency board system has been in place for more than a decade but only very minor relaxations of labor markets regulations have accompanied the double-digit unemployment rates observed in that country during that period. Therefore, the notion that a "drastic monetary reform" will in and by itself induce a relaxation of labor market regulations seems suspect when confronted with the fact that the implementation of even moderate labor market reforms typically faces fierce opposition in many countries with different monetary regimes.

It may be that dollarization will induce labor market reforms that otherwise would have never happened, but experience suggests that the pace of progress may be extremely slow and therefore, that it is not possible to rule out that dollarization countries may eventually experience a long spell of unemployment in the initial stages of the dollarization program. Rather than being in denial, and as a way of mitigating the social consequences of this problem, countries about to dollarize should consider some form of unemployment insurance in their budgetary provisions, a requirement that without doubt will make fiscal reform all the more urgent.

1.II - THE MECHANICS OF DOLLARIZATION

1.II.1- The choice of the exchange rate: does it matter?

An obvious step in the dollarization process is the determination of the exchange rate at which the domestic currency will be converted into dollars. It seems sensible that the selection of an exchange rate should be consistent with the stated purposes of dollarization of giving back to the public the reserves accumulated over time by the central bank, in exchange for the domestic currency. This naturally suggests that dollarization should take place at that exchange rate at which *exactly all* the relevant liabilities of the central bank are exchanged by *exactly all* the international reserves of the central bank *at the moment of dollarization*.

In other words, the laws enacting the dollarization do not need to establish a specific exchange rate in advance of the effective date of enactment of the dollarization but rather, the procedure by which such exchange rate should be determined at that date.

Accordingly, rather than picking a specific exchange rate, the legislation would establish an official date for dollarization and mandate that starting that date each unit of local currency will be exchanged for the amount of dollars that resulted from application of the following formula:

$$\text{Exchange rate at which conversion will take place} = \frac{\text{Stock of international reserves}}{(\text{Money base} + \text{interest bearing securities denominated in domestic currency issued by the central bank})}$$

in which the amounts in both the numerator and denominator are determined as of the specific date at which the domestic currency will start to be exchanged for dollars.

Four remarks about this procedure are in order.

First, this formula guarantees that the central bank will have enough reserves to buy back not only the entire money base in circulation but also all the liabilities in domestic currency that it issued for the purpose of open market operations in the past.

Second, as long as the international reserves position of the central bank is positive, there is not such a thing as an “insufficient level of reserves” with which to start the dollarization process.⁹

Third, this is a very simple, market based procedure that guarantees that the government of the dollarizing country will not manipulate the process to take advantage of its last opportunity to extract seignorage revenues through the inflation tax. That would be the case, for example, if the central bank decided to set aside part of its reserves with the purpose of acting as a lender of last resort later on and, in determining the exchange rate, applied instead the following formula:

Stock international reserves at the central bank/ (Money base + interest bearing securities denominated in domestic currency issued by the central bank + desired level of lender of last resort funds)

Use of this alternative formula would result, of course, in fewer dollars per unit of the domestic currency than with the previous one and should be considered part, therefore, of a “devaluation-followed-by-dollarization” strategy that could seriously undermine the credibility build-up that the dollarization process is meant to accomplish.

Fourth, use of the first formula has no consequences for the real economy under the assumption of perfectly flexible prices. Under such an assumption, the simple procedure summarized by the formula would not result in anything like “a wrong exchange rate” because all prices will adjust to restore equilibrium conditions in all markets. After all, what matters for real allocations are the relative prices, not their absolute levels. If markets are flexible enough, individual prices will adjust downwards or upwards in whichever unit of account, to reflect the relative scarcity and social value of the goods and services involved.

Thus, the issue of the choice of the “appropriate” exchange rate is only relevant in the presence of significant frictions, such as in the labor market. In that case, the choice of an initial nominal exchange rate would be equivalent to the selection of a real wage in dollars. The “wrong” exchange rate choice might impair the proper functioning of the labor market for a long time, and create social frictions that would conspire against the success of the dollarization program.

It follows, as emphasized in the previous section, that an important condition for a successful dollarization plan is price flexibility in all markets, and in particular labor reforms that guarantee that nominal wages and any other forms of labor compensation can freely adjust downwards or upwards, depending on the economic conditions

⁹ The only source of concern is that the exchange rate resulting from the application of the above formula gave rise to a serious currency denomination divisibility problem. For example, that would be the case if the exchange rate determined by the above procedure turned out to be a penny, the smallest denomination in the US currency system. However, this is a theoretical possibility that may emerge only in extreme hyperinflationary conditions that have driven the real value of the money base virtually to zero. In such economies the dollar will be typically widely used as currency and the dollarization process will do nothing but to formalize what it is already standard practice.

prevailing at each point in time. In this sense, the discussion of the initial exchange rate should not be much of an issue. One could argue that economies where nominal rigidities are pervasive and long lasting should never dollarize. Accordingly, implicit in the recommendation to dollarize must be the assumption that nominal wages and prices eventually adjust fairly quickly to market conditions, or at least the conviction that any remaining frictions will be eliminated, through deregulation and the appropriate legislation, fairly soon after the economy is dollarized. Thus, the alternative procedures to select the initial exchange rate suggested by some dollarization advocates do not seem very consistent with their underlying belief in the efficiency of markets. For example, the proposals prepared by the staff of the Joint Economic Committee of the US Senate, discussed in more detail in section 1.III.2.1, maintains that the domestic currency ought to be allowed to float cleanly for a brief pre-established period but not longer than thirty days before the exchange rate at which dollarization will take place is definitely fixed. It is unclear why a transition period is needed at all. The only possible answer is that some market frictions prevent the immediate adjustment of prices. But then the recommendation of the thirty-day transition period must be inspired in the belief that such a period is long enough to remove those frictions, a presumption whose empirical underpinnings need to be better justified.¹⁰

1.II.2 - The substitution of the domestic currency (money base) with dollars

The dollarization process requires specifying the procedures by which different monetary aggregates, financial assets, and contracts in general, will be converted into dollars.

With respect to monetary aggregates, recall the various definitions of money that apply in virtually any country – going from the monetary base through M1, M2, and so on, through decreasingly liquid distributions of medium of exchange, store of value, and unit of account. There is an important difference between the money base and all the other components of different monetary aggregates: the former represents a government liability, in particular, a non-interest bearing one, while all other monetary aggregates involve typically private sector liabilities. This difference may suggest that dollarizing the monetary base will involve different steps from dollarizing, for example, the less liquid components of M2.

Indeed, that is the case. In particular, dollarization will require that the public *physically* hand over its domestic currency holdings to the central bank in exchange for dollars. By contrast, as we demonstrate in the next subsection, the conversion of the components of the monetary aggregates other than the money base, financial obligations, and contracts in general is a fairly straightforward process that involves only simple accounting entries.

The rest of this section discusses the procedures for dollarizing the money base. The procedures to dollarize all other monetary aggregates, financial obligations, contracts, etc. are discussed in the next subsection.

¹⁰ Perhaps in making such a recommendation the Joint Economic Committee staff had in mind situations like the one that preceded the recent dollarization of Ecuador, where bank deposits had been frozen prior to the dollarization of the economy. Such a suspension policy would represent a friction that needs to be removed before dollarizing and a transition period of thirty days may be enough to that end.

How is the conversion of the money base, a non-interest earning government liability accomplished?

A first step is to make sure that there will be enough dollar notes to redeem the domestic ones at the set exchange rate. To that end, the central bank will have accumulated a considerable stock of dollar notes by selling, over a prudential period of time previous to the day scheduled for the initiation of the dollarization process (see section 1.I.1.1,) securities and other financial instruments in its reserves portfolio.

At closing of business on the day prior to the one on which the dollarization process has been scheduled to start, the central bank will distribute cash payments to financial institutions, as it normally does as part of the daily settlement of accounts with the private sector, except that such payments will be made in dollars notes--and not in local currency as it was previously the case--applying to that effect the exchange rate determined by any of the procedures discussed in the previous section.

In that way, some financial institutions in the system will open the following day, the day officially set for the initiation of the dollarization process, with part of the cash in their vaults in dollar notes. The dollarization process can then be initiated by instructing all financial institutions to change the denomination of all existing deposits and obligations from domestic currency to dollars, applying the “dollarization” exchange rate previously announced. Likewise, from that day on financial institutions will be instructed to honor deposit withdrawals in dollar notes. The use of the domestic currency to that end will be allowed only after the daily stock of dollar notes in each financial institution’s vaults has been depleted.

Simultaneously, the appropriate authority will have mandated already that from the day scheduled for the initiation of the dollarization process, all wages and salaries will be paid in dollars. This regulation will considerably speed-up the dollarization process by forcing all businesses in the country to turn a considerable fraction of their holdings of domestic currency into their banks, which in turn will proceed to convert them to dollar notes at the central bank. In the meantime, the central bank constantly replenishes its stock of dollar notes by selling securities and financial instruments in its reserves portfolio. As financial institutions receive domestic currency notes for payments and deposits, turn them to the central bank, and receive dollars notes in the daily settlements of their accounts with that institution, the domestic currency notes are progressively replaced by their dollar value in dollar notes.

After enough time has elapsed, this process will have eventually allowed the central bank to buy back all the money base with dollar notes through the financial intermediaries, without any need of a direct interaction with non-financial entities or the public. The more financially integrated and developed a country, the faster the replacement of the domestic currency with dollar notes will be accomplished. In Ecuador, for example, the dollarization process was completed in six months.

In any case, it is only fair to admit that, if the process is left to its own, a small fraction of the domestic currency may continue circulating for a long time after the dollarization process was started. That could be the case, for example, in small and fairly isolated communities in which almost all transactions are typically carried out in cash. A complete dollarization of the economy, therefore, is unlikely to occur unless the legislation specifies a date after which the central bank no longer will exchange the domestic currency for dollars. However, that “expiration date” clause has the

inconvenience that individuals in isolated communities without proper financial services could end up stuck with piles of worthless domestic currencies, that they could not exchange on time simply because the value of the notes was lower than the cost of traveling to the nearest central bank agency, possibly several thousands of miles from their homes, where the transaction could be conducted. To avoid this kind of situations, the central bank should reduce the transaction costs of exchanging domestic currency notes for dollar notes by opening, two or three months before the scheduled domestic currency phase out, temporary agencies in the locations where the problem has been identified to be particularly severe. Of course, this task could be delegated also to properly monitored and supervised private contractors for a fee.

1.II.3 - The treatment of existing contracts

The dollarization of the money base described in the previous section is a fairly simple process and should not be the subject of much controversy once the exchange rate at which the conversion will take place has been determined. This simplicity reflects, of course, that of the underlying financial instrument: although currency is a government liability, it does not commit the government contractually to anything. The government does not have to redeem the notes at any time, it does not pay interest on them, and it does not have to keep their value in real terms at any agreed target level. The lack of explicit contractual arrangements between currency holders and its issuer, the government, makes it possible to avoid the lengthy considerations otherwise required in deciding how to proceed to dollarize the more complex components of the monetary aggregates or other financial instruments.

Explicit contractual arrangements between two parties (one of which could be a government agency) for which the dimension of time is of the essence may be particularly challenging for the design of the appropriate dollarization procedure of the underlying financial instrument.

Even the treatment of contracts already denominated in dollars may raise some thorny issues. In principle, the parties to those contracts should be indifferent to the dollarization process because the corresponding contractual obligations were in dollars to start with. However, the debate on dollarization often maintains (see the paper by Powell and Sturzenegger in this volume) that even the devaluation risk-free interest rate of those contracts may contain a country-risk premium that is not invariant to the monetary regime in general and, in particular, to the act of dollarization.

The problem may come from the claim that the dollarization of a country will bring about a decline in the country-risk premium component of the interest rate in dollar-denominated contracts. Materialization of such a reduction in post-dollarization contracts may create among some of the parties to existing contracts the perception that, as written in their original terms, those contracts are unfair because the conditions (such as the nominal interest rate) agreed upon some time into the past did not contemplate the possibility that the economy would be dollarized in the foreseeable future. The government might receive pressures, under such circumstance, to coerce a renegotiation of the original contract to grant borrowers, for example, access to the new, more favorable interest rate environment.

Even more questions are likely to emerge regarding the treatment of existing contracts denominated in the domestic currency. To take a concrete example, should time deposits (a contract between a financial institution and a deposit holder) denominated in the domestic currency be converted into dollars as of their expiration date or as of their initiation date? Should the conversion of the principal and accrued interests take place at the same point in time, or could they be converted at different dates? In either case, should the conversion of the nominal denomination of the contract be accompanied with any other modifications, such as a change in the nominal interest rate established in the original contractual arrangement?

The purpose of the following sections is to demonstrate that despite that appearance to the contrary, the dollarization of *all* financial instruments and existing contracts is a fairly straightforward process that involves only simple accounting entries. This simplicity does not emerge as obvious without a thorough discussion of the theory of contracts and the revision of a relevant historical experience discussed below.

1.II.3.1 - A digression on the theory of contracts and the time-inconsistency problem

Contracts were born to overcome what is known in the economics jargon as the time-inconsistency problem. This term refers to the tendency of economic agents to renege on commitments made in the past. For example, not mediating a written policy enforceable in a court of law, an insurance company will have every incentive to renege on its commitment to pay for damages once a casualty has occurred, because by that time it will have pocketed anyway the premiums that the customer may have been paying perhaps for many years.

Therefore, after-the-fact modifications of contracts not freely agreed upon by the parties to them should not be allowed because such alterations will tend to reintroduce the time-inconsistency problem that contracts were meant to solve. Unfortunately, often times well-meaning governments are not aware of the bad side effects associated with mandatory alterations of contracts and proceed with them anyway in the perception that the new terms will reflect better what the parties to them originally meant and intended. Such perception is rather questionable.

In the first place, it is unclear how an outsider, such as the government, can interfere with a contract on the grounds that, under current circumstances, the terms of the contract no longer reflect the intentions or expectations the parties had when they entered into it. Because intentions and expectations are not observable, such a justification implies formidable mind reading capabilities denied to most regular citizens.

That is not to say that expectations and intentions do not influence the terms of contractual arrangements. Good or bad intentions, wishful thinking, wrong or right perceptions about the likely turn of events, foolish or wise attitudes toward risk, lack of information or excess thereof, and even brilliant insights or outright incompetence, are all elements that influence how a contract is written, but unfortunately they are not observable. That's precisely why contracts exist: to avoid the frustrating attempt of second-guessing what each party to a deal meant or intended.

True, some or all of the parties to a contract may have entered into it out of miscalculation. But it is not the role of the government to protect parties to a contract from their own mistakes. Such intervention would only introduce serious moral hazard

elements and lead economic agents to consider the terms of contracts more carelessly, in the conviction that the government will step in to protect them from whatever mistakes they made in assessing the implications the contractual obligations had for them.¹¹

The prestigious Argentinean jurist Dalmacio Vélez Sarsfield understood all too well the dire consequences of ex post modifications of contracts when he refused to incorporate in the Argentinean Civil Code he was commissioned to draft the doctrine of *lesión enorme* present in other legal traditions. He explained his rejection of the doctrine in the following terms: *...we should cease to be responsible for our acts if the law should permit us to make amends for all errors or all our acts of imprudence. Free consent given without fraud, error or duress, and with the solemnities required by law, should make contracts irrevocable.*” (As cited by Berensztein and Spector, 2000) Nor did the code, enacted in 1869, accept the theory of imprevision, which authorizes the judicial termination or modification of the terms of the contract when the payment owed by one of the parties has become excessively onerous because of extraordinary or allegedly unforeseeable events.

In summary, it will be important to keep in mind, when examining modifications of contracts in past experiences, that contracts are based on ex-ante considerations of different contingencies, some of which will materialize and some of which will not. But that doesn't mean that the contingencies that do not materialize influenced the terms and conditions of the contract, while those that did materialize did not. In particular, it is not necessarily true that the contingencies that do materialize (such as a dollarization plan) were not fully taken into account, in some way or the other, in the decision process that led to a contractual agreement in the past. And in any case, letting some of the parties to a contract introduce after-the-fact changes to it on the grounds that they would have not agreed to its terms and conditions had they known the events were not going to turn up their way is to defeat the purpose of contracts, which is to overcome the time-inconsistency temptation to renege ex-post on commitments acquired ex-ante.¹²

However, it is only fair to recognize that policymakers have often times shrugged off the concerns about government mandated alterations of contracts raised by the time-inconsistency literature. That is a fortunate development for our purposes, because the analysis of the treatment that outstanding contracts have received in past experiences involving fairly drastic changes of economic policy can help to develop some guidelines for the conversion of existing contracts under dollarization.

1.II.3.2 - Some insights from past experiences

A very interesting “case study” for the purpose of deciding the treatment of existing contracts under dollarization is the anti-inflation plan implemented in Argentina in June 1985, that has come to be known in history as the Austral Plan, in reference to the fact that the plan included, among other things, a monetary reform that replaced the existing domestic currency, the peso, with a new one, the “austral.”

¹¹ In this sense, government intervention in private contracts will have the same effect as a lender of last resort has on risk management. It is well known that the prospect of financial bailouts induces financial institutions to take more risks than they would otherwise.

¹² Unfortunately, Argentinean courts seem to have missed Velez Sarsfield's insights when in the 1960s they made several rulings validating the doctrine of *lesión enorme* and the theory of imprevision, paving the way to their formal incorporation in the Civil Code in 1968.

At the time the plan was implemented, in June 15, 1985, inflation in Argentina was running high. It had been at an average of 8% a month in the preceding decade, and at about 30% a month, or roughly 1% *a day*, immediately before the Austral Plan. Understandably, nominal interest rates were running high as well, reflecting the investors' attempt to preserve the real value of their investments in domestic currency. Thus, in the first two weeks of June, time deposits of 30 days maturity carried *on average* a 30% monthly nominal interest rate. From an ex-ante perspective, this nominal interest rate would have been barely enough to make up for inflation if prices continued to rise at the 30% rate of the immediately preceding month. But of course, this same interest rate would be associated with hefty real returns if, by contrast, inflation came abruptly to an end.

The authorities behind the Austral Plan were worried of the consequences of the second contingency. In particular, they were concerned that the combination of the high nominal interest rates prevailing before the plan with the very low inflation rates they were convinced the Plan would bring about¹³ would result in transfers of wealth that none of the parties to many existing contracts had originally intended.

This preoccupation is clearly described in a report of the Economic Commission for Latin America and the Caribbean of the time, when asserting that the concern of the intellectual architects of the plan was that “*an abrupt decline in the inflation rate would cause in and by itself an equally sudden change in the real conditions of existing obligations.*”¹⁴ Therefore, the program “*included a system of conversion of contractual obligations, whose purpose was to neutralize the transfers of wealth that could have otherwise taken place as a result of the disinflation, without at the same time modifying the terms of the contracts.*”¹⁵

Restoration of the real terms in which the contracts were meant to be settled--in the interpretation of the administrators of the Austral Plan, rather than that of the parties involved--required, therefore, the implementation of a mechanism that would preserve “justice.” To that end, the plan included the novelty of an unusual conversion mechanism between the old currency, the peso, and the new one, the austral, that in practice was equivalent to a government mandated modification of the original terms of almost all existing contracts denominated in pesos (the old currency.)

The mechanism essentially established that at maturity all contracts in pesos should be converted to australes (the newly introduced domestic currency) according to a sliding scale that implied that the amounts of australes received for each peso declined at a rate of 0.85% per day. In other words, contractual obligations denominated in pesos were converted into australes at an exchange rate that devalued the peso (with respect to the newly introduced currency, the austral) at a daily rate of 0.85%, which reflected the daily inflation corresponding to a 29% monthly inflation rate.

The guiding principle behind this mechanism was that under the previous regime, “*nominal amounts committed to be paid in a future date depreciated, in real terms, at a daily rate of approximately 1%. In other words, the purchasing power of the sums*

¹³ Despite this declaration of faith, the policymakers of the time sought reassurance in a very sophisticated array of price controls throughout the economy.

¹⁴ Estudio Económico de América Latina y el Caribe, 1985, p. 96.

¹⁵ “El Plan Austral: Una Experiencia de Estabilización de Shock,” pp. 156-57, in “Tres Ensayos sobre inflación y políticas de estabilización.” Documento de Trabajo 18, Economic Commission for Latin America and the Caribbean, Buenos Aires, February 1986.

involved declined with the maturity of the obligation... Therefore, the nominal amounts [of existing contracts in pesos] had to be corrected according to the erosion that the purchasing power of that currency [the peso] would have experienced [should the change in regime had not occurred].”¹⁶ “In the assumption of a perfectly anticipated and uniform inflation rate, this system would have exactly validated (in real terms) the expectations implicit in the existing contracts.”¹⁷

From the operational point of view, this mechanism was equivalent to changing the interest rate on existing contracts. An example will help to clarify this implication. Consider a thirty-day time deposit for an amount of 100 pesos at a 30% monthly nominal interest rate made the day just before the Austral Plan was implemented. For the sake of simplicity, assume also that the price level that day was 1, so the value of the deposit in real terms was 100 units of some basket of representative consumption goods. The deposit slip (a contract with the financial institution,) therefore, established that the deposit holder should receive 130 pesos at maturity. If the inflation rate were going to be also thirty percent in the intervening month, the price level by the time the deposit was due would have been 1.3 and the transaction would have preserved intact the real value of the deposit at 100 “consumption baskets.”

On the other hand, if that same inflation turned out to be zero, the price level would still be one at maturity and the real value of the deposit would be 130 consumption baskets. The intellectual architects of the Austral Plan thought that the latter outcome was unfair and needed to be corrected, by essentially taking away all the nominal interest accumulated in the period, on the ground that that nominal interest was meant to “exactly” compensate for the loss of purchasing power of the principal and not to entitle the deposit holder to a 30% return in real terms.

More metaphorically, the conversion mechanism worked as a time travel machine, that put the deposit holders back at the window of the financial institutions at the date in which they had made their deposits, and forced them to make the deposit again, but this time denominated at the new currency and at a zero percent nominal interest rate.

It is interesting to note that in the view of the policymakers of the time, that metaphorical travel to the past was doing nothing but validating in real terms “*the expectations implicit in the existing contracts.*” This claim is really intriguing because, as it was pointed out earlier, expectations are not observable. How can a policymaker know why a depositor accepted one interest rate and not any other? How can the policymaker be certain that the deposit holder did not attach, at the time he made the deposit, a positive probability to the implementation of an anti-inflation program and that, therefore, he accepted what he regarded as a low (given the inflation rate) 30% monthly nominal interest rate precisely and only because of the possibility of a large reward in real terms if the change in regime did occur?

That was precisely the argument of those angered investors for whom the application of the conversion mechanism in the Austral Plan turned out to be equivalent to a *negative* nominal interest rate on the original contract. This situation was not uncommon and emerged for those contracts whose original nominal interest rate was below the inflation rate at the time the Austral Plan was launched. The government

¹⁶ Estudio Económico de América Latina y el Caribe, 1985, p. 96. LAC, 1985, op. cit., p. 96

¹⁷ See footnote 15.

responded that the unusual situation appeared because, at the inflation rate prevailing before the plan, the real value of those contractual obligations would have been lower at maturity anyway, and that the recontracted negative nominal interest rate just reflected the same reduction in purchasing power that those contractual obligations would have experienced at a real, rather than a nominal, negative interest rate.

But this defense of government interference with existing contracts ignores, once more, that contracts reflect ex-ante considerations that are impossible to elucidate on the basis of ex-post outcomes. The problem is that a nominal interest rate below the current inflation rate did not necessarily imply that investors were knowingly and freely accepting a negative interest rate in real terms. It might have been that they were anticipating the change of regime and, therefore, that the ex-ante expectations of their reward in real terms was positive. Such anticipation of a change of regime is not completely unreasonable in the light of the findings of Cagan (1956) and Flood and Garber (1980). These authors claimed to have detected signs that, right at the peak of the intense inflationary experiences they studied, economic agents were behaving as if an anti-inflation program was going to be implemented (as it indeed was) in the near future.

In the case of the Austral Plan experience, some holders of thirty-day time deposits could have been demanding an expected real return of 2% a month on their investment.¹⁸ This would have translated into a nominal interest rate of 17% if the investor had assessed that there was a 50% chance that the current 30% inflation rate regime would continue and a 50% chance that a stabilization plan like the Austral Plan would bring the inflation rate down to zero. The investor would indeed obtain a -13% return on his investment, in real terms, if the first event had materialized thirty days later, but a hefty positive return of 17% if the anti-inflation program materialized instead. The expected (average) return from those two outcomes was, however, the desired 2% in real terms.¹⁹

Notice that in its attempt to restore “justice”, the conversion mechanism introduced by the Austral Plan may have ended up unfairly penalizing the most optimistic investors, the ones who accepted the more moderate nominal returns in their contracts on the expectations that something would be done, and sooner rather than later, about the high inflation rate prevailing at the time. In other words, modification of contracts with conversion schemes such as those the Austral Plan used may have the perverse effect of discouraging “optimistic” views of the future and of inducing investors to take their capital out of the country on the anticipation that positive (ex-post) real returns on their investment will be taken away from them if they turn out to be “too big” for some government agency eager to “make things even.”

There is another interesting feature of the Austral Plan that is particularly relevant for the issue of the treatment that existing contracts should be given under dollarization: although the plan devalued the domestic currency by 18%, it did not contain any provisions to compensate the resulting transfers of wealth in dollars terms. In making that decision, the architects of the plan must have decided that all that mattered to investors

¹⁸ Such a high real rate would have not been unreasonable at a time when Argentina was in default on its sovereign debt and the country risk premium was extremely high, as reflected in the implicit yearly return of 10% or more on dollar denominated government securities (the so-called BONEX.)

¹⁹ It is not necessarily true, therefore, that those investors suffered from “monetary illusion.” (see CEPAL, *op. cit.*, p. 164.) The only illusion investors may have suffered is that the government would not tamper with their contracts.

was the real returns in the domestic currency. That may not have been true, however, at a time when deposits in foreign currency were not an option.²⁰

Perhaps a more important reason why the Austral Plan may have decided not to compensate losses (or gains) in dollar terms was because the event of a devaluation was not alien to investors at the time. That could be hardly the case in a country that had seen devaluations by the dozen in the immediately preceding past.

The idea that economic agents can anticipate changes in regime with respect to the returns of their investments in terms of a foreign currency, but lose that ability when it comes to returns in the domestic currency, is intriguing, if not logically inconsistent.²¹ In any case, for the purposes of this paper it is not necessary to uncover the reasons for that asymmetric treatment because both, the practice in relevant experiences, such as the Austral Plan and the theory of contracts examined in the previous section, seem to suggest that devaluations are somehow expected and incorporated in all contracts that predate an important change of regime such as dollarization. This coincidence of the treatment actually given to existing contracts in past experiences with the normative prescriptions from the theory of contracts is fortunate, because it will lead to very little disagreement over the guidelines for the conversion of existing contractual agreements under a dollarization program presented in the next section.

1.II.3.3 – Guidelines for the treatment of existing contracts under a dollarization plan

The analysis of the previous section suggests that governments considering different alternatives to deal with existing contracts under a dollarization program should pay heed to the warning that altering a contract on the grounds that its terms implicitly attached ex-ante zero probability to an event that did in the end occur is a policy that would set a precedent with potentially serious moral hazard implications. In fact, it could erode confidence in the enforceability of future contracts to the point of completely undoing the reductions in the country-risk premium the dollarization was supposed to accomplish. To preserve such hardly gained reduction in the risk premium, the legal and operational framework within which dollarization occurs should affect as little as possible existing contractual arrangements.

In particular, a dollarization plan should not be concerned with the transfers of wealth that it can bring about if the conversion of the domestic currency into dollars takes place at an exchange rate significantly different from the one that prevailed before the dollarization, or even its announcement, took place.

On theoretical grounds, because economic agents tend to be forward looking

²⁰ The payment of existing deposits in dollars had been suspended for 120 days and new deposits in that currency forbidden on May 20, 1985, about a month before the Austral Plan was launched.

²¹ Perhaps this apparent inconsistency in the treatment of expectation gives away the true motivation for the conversion mechanism of existing contractual arrangements prescribed by the Austral Plan. It may not have been so much the prevention of “undesired” (however defined) transfers of wealth, but of the stability of the financial system, in very precarious shape since the liquidation of an important private bank (Banco de Italia) the immediately preceding April. The financial institutions would have had trouble to honor the hefty real returns most depositors would have obtained after the deceleration of the inflation rate, unless those institutions were able to recall loans in their portfolio and extract from borrowers an equivalent amount of real resources, a transfer that might have been difficult to implement in the recessionary conditions prevailing at the time.

when they enter into contracts and make them, therefore, contingent on circumstances that will unavoidably result, as they know in advance, in after-the-fact redistributions of risk and wealth among the parties involved.

On more pragmatic grounds, because the preoccupation to compensate transfers of wealth in terms of foreign currencies eventually brought about by changes of monetary regime (such as the initial devaluation of the Austral Plan) do not seem to have been overwhelmingly present in past historical experiences.

Consistent with the theoretical and pragmatic considerations just presented, the guiding principle for the treatment of existing contracts under a dollarization plan is that all their original terms and conditions should be preserved and that when a conversion of the domestic currency into the dollars is required, the contracts should receive the same treatment as they would receive had the domestic currency not been retired from circulation but just suffered a change of its parity with respect to the dollar.

Application of this principle suggests that the government should abstain from any mandatory renegotiation of *dollar denominated* contracts. In fact, to avoid any confusion and prevent political pressures to the contrary, the legislation implementing dollarization should explicitly instruct the courts that such contracts should be considered fully enforceable in their original terms and conditions, including maturities and the convened nominal interest rate (in dollars.)

Preservation of the same principle is not as straightforward for contracts in the domestic currency, however, because the dollarization, by definition, will modify at least one of the terms of the contract: the currency in which the contractual obligations should be settled. The least disruptive way to dollarize those contracts is to preserve their original terms, including the interest rate, and establish that assets, liabilities, installments, or any obligations originated in existing contracts denominated in the domestic currency should be valued in dollars at the expiration of the relevant contractual clauses, using to the effect of the conversion the exchange rate established by the dollarization plan. This was basically the same procedure followed in the introduction of the euro. The creation of the new currency posed the problem of how to convert outstanding contracts denominated in the currencies of the member countries to the newly adopted common currency. The conversion mechanism simply established that starting on January 1, 1999, all contracts, equities, securities, corporate and government bonds, and financial assets and obligations in general, would be expressed in euros using the December 31, 1998 exchange rates between the ecu²² and the European currencies in which those contracts and securities were originally denominated.²³ Because, as discussed in Section 1.II.2, not all the domestic currency notes will be replaced by dollar notes immediately on the date the dollarization process starts, the conversion scheme associated with that process should specify, in addition, that any cash payments originated in outstanding contracts should be settled in dollar notes after that date.

The conversion mechanism just outlined will avoid ex-ante unforeseen transfers of wealth. For example, take the case of a thirty-day loan in 100 units of the domestic

²² Since the euro did not exist yet, the currency of reference was the ecu, the unit of account created in the late 1970s in the context of the European Monetary System and whose exchange rate with the euro was set at 1 as of December 31, 1998.

²³ The legal consequences of this procedure and its ability to withstand scrutiny by Courts of Law were thoroughly evaluated by Lenihan (1997)

currency signed just a day prior to the announcement of dollarization. Because the contract was signed before the announcement, the monthly nominal interest rate on the loan, say 20%, contains most likely an inflation or devaluation risk premium. In other words, the interest rate already contemplates the possibility of modifications of the exchange rate. Therefore, at the time of expiration of the loan, the amount due of 120 units of domestic currency should be converted to dollars at the set exchange rate. Obviously, the resulting amount may or may not be ex-post the same as it was ex-ante at the exchange rate prevailing at the beginning of the contract, but this contingency is precisely what the interest rate meant to capture through its inflation/devaluation risk premium.

If the loan were going to be converted into dollars before maturity, the interest rate should be modified accordingly, to take into account that converting the loan in such a manner turns it into an ex-ante devaluation risk-free asset for the lender. But what should that new interest rate be? The average for dollar denominated contracts prevailing before the announcement of dollarization? Such a choice would ignore the idiosyncratic aspects of contracts and, therefore, it is better to stay away from those complications by applying, instead, the conversion procedure suggested in the previous paragraph.

What would certainly violate the terms of the contract would be a beginning-of-period conversion of the loan without a compensating modification of the nominal interest rate. Such a procedure would deliver, in the example above, a 20% devaluation risk-free return in dollars, which is not certainly what the original contract intended, because the 20% nominal interest was not devaluation-risk free. Conversion of the beginning-of-period loan will be equivalent to the conversion of the loan at maturity (in both cases leaving the original interest rate unchanged) only in the rare circumstance in which the dollarization takes place at the same exchange rate that prevailed at the time the loan contract was signed.

Two factors will contribute to minimize whatever undesired consequences the preservation of the original terms and conditions of existing contracts, especially the nominal interest rate, might have.

First, the timetable for the dollarization plan outlined in the previous section includes a transition period whose main purpose is, precisely, to give all parties to existing contracts time to adjust to the new conditions that are likely to prevail once the dollarization is effectively implemented. Contracts will be typically short term, perhaps one year long at the most, in high inflation environments. A transition period of similar length for those countries will ensure that most contracts that predated the formal announcement of dollarization will have expired by the time the economy is effectively dollarized.

Of course, that does not mean that existing contracts will be protected from the contingencies of the transition period and, in particular, of fluctuations in the exchange rate that can be attributed to the announcement of the plan and that arguably would not have occurred absent that announcement. But as stated earlier, the attempt to protect contracts from the vagaries of economic policy regimes leads to an endless sequence of side effects and of attempts to correct them that end up restoring the damaging time-inconsistent inefficiencies that contracts were supposed to eliminate.

The second mitigating factor of the effects of dollarization on existing contracts is the possibility of voluntary renegotiation. To the extent that the renegotiation of contracts

involves some fixed costs, this option is more likely to emerge in countries in which long-term contracts are a standard practice at the time the dollarization is implemented. In such an environment, many financial institutions will find it profitable to attract customers from other competitors by offering refinancing packages in more favorable interest rates than in the original contract. Competition among financial intermediaries will guarantee that eventually every individual or business can benefit from the lower interest rates environment that dollarization will eventually bring about.

A successful dollarization process will typically be accompanied, therefore, by a wave of refinancing not very different from that observed in many countries which have experienced substantial reductions in their long term interest rates in the recent past. The US, for example, witnessed a wave of voluntary mortgage loans refinancing in the early 90s, when the long-term interest rates experienced a large decline prompted by the expectations of fiscal surpluses that did indeed materialize a few years later.

There is no need, therefore, for the government to step into the renegotiation of existing contracts, except indirectly, by guaranteeing free entry into the financial intermediation industry and by making sure that banks and financial institutions will not have enough market power to keep their customers captive of existing contractual arrangements.

Governments prone to exercise more direct forms of intervention in existing contracts on the eve of dollarization programs should pay heed to the Austral Plan experience related earlier. For the reasons already given, it is possible to make the argument that the government intervention in contracts implied by the conversion mechanisms prescribed by that plan was, in the end, more distorting than intended.²⁴

1.III - THE LOSS OF SEIGNORAGE PROBLEM AND SOME GOODWILL PROPOSALS TO ALLEVIATE IT

1.III.1 - The problem

The literature on dollarization has repeatedly pointed out that a dollarizing country will necessarily give up the seignorage revenues it used to earn on its domestic currency. The loss of income arises because, as already explained in section 1.II.2, the dollarization process requires that the central bank of the dollarizing country buy back the entire outstanding money base with dollars. To accumulate the necessary amount of dollars in cash, the central bank of the dollarizing country must sell first the typically very liquid securities in its international reserves portfolio in exchange for the US currency. In practice, this operation is a simple swap of US securities for US dollars,

²⁴ In fact, it would not be unwarranted to assert that the very high returns investors seem to have been demanding from Argentina during the 1990s and beginning of the 21st century are related to the abuses with existing contractual arrangements they experienced during the past. The investors' fears were specially reinforced in the 1980s when, after a sequence of devaluations in 1981, Argentinean courts made several rulings that implied the modification of contracts, mostly in favor of borrowers, invoking the so-called "imprevision theory" that had been introduced in the Civil Code in 1968, as already mentioned in section 1.II.3.1. A "paranoid" investors' behavior is understandable in a country where not only contractual arrangements have been overridden, but also deposits have been frozen and/or overtly or covertly confiscated in numerous occasions in the past.

because a substantial fraction of the central banks' portfolios all over the world is composed of US securities deposited with the Federal Reserve System.

When any central bank liquidates its position in US securities, the Federal Reserve "swaps" those securities for dollars through a very simple sequence of entries in its books. After the required record keeping steps have been completed, the central bank of the dollarizing country withdraws the cash from its account with the Federal Reserve System and proceeds to exchange the domestic currency for the US dollars.

Notice that in the process, the central bank of the dollarizing country has swapped an interest bearing US security for a non-interest bearing one. This implies that the central bank of the dollarizing country will lose the interest payments it used to earn on the US securities, that is, the seignorage revenues. The opposite is true for the US: the swap implies that the US Treasury no longer will have to pay interest on the US securities that it has been able to buy back in exchange for non-interest bearing ones. In other words, the US will get to keep the seignorage (the interest payments) that before was captured by the dollarizing country.

The loss of seignorage revenues may discourage many countries from adopting the dollar as their currency and has motivated numerous proposals for "seignorage-sharing" agreements. The basic logic behind those proposals is that they are merely compensating mechanisms schemes aimed at restoring the fiscal situation of both the US and the dollarizing country to the same conditions that prevailed before the dollarization took place.

Although that basic proposition is true, it ignores an important aspect of the economics of seignorage: the reason why governments keep the monopoly of paper note issue is, precisely, because they want to keep the rents from such a lucrative "seignorage" privilege on money printing activities. Thus, it is not clear why the government of any country will willingly give up any seignorage that it collects from foreigners.

From the perspective of the "seignor" issuing notes, holders of his notes abroad are just happy customers who must pay for the satisfaction that they surely get from willingly holding the sovereign's notes in their portfolios. Nothing of value is given away or obtained for free, and therefore, holders of the notes must pay for whatever service the notes provide to them, in the form of the foregone interest on the alternative interest bearing security they could have bought instead.

In fact, the whole point of producing a very stable currency is, precisely, to increase the market share of that currency in the currency markets. The dollarization of foreign economies is nothing but confirmation of the success of the marketing strategy of producing a very widely recognized and respected currency. It may not appear sensible, therefore, to expect that the producer of such high-quality notes will give back the additional earnings that motivated and justified the pursuit of a high-quality product strategy. Chances are, therefore, that the citizens of a country whose currency is being adopted by other nations will receive seignorage-sharing proposals with the same enthusiasm as a producer of high-quality tires would welcome the idea of sharing the additional revenues it may obtain from successfully displacing from the market the low-quality, burst-prone tires of a competitor.

Likewise, most seignorage-sharing agreements circulated in many policy forums ignore that there is a potential trade-off between seignorage-sharing arrangements and the quality, that is, the stability, of the dollar. The lower the seignorage revenues captured by

the US government, the lower the “option value” of the stability of the currency it issues and therefore, the higher the risk that, once many economies have dollarized, the US will not resist the temptation to switch gears to a higher inflation rate. In other words, the lower the seignorage the US gets to keep from a low inflation policy, the lesser the incentives it will have to continue producing “high-quality” money in the future. To continue with the previous analogy, the producer of high-quality tires would have no incentives to keep manufacturing them if he weren’t rewarded with higher profits than a low-quality tires producer.²⁵

Thus, there is the risk that seignorage-sharing agreements may become another one of those instances in which good intentions pave the road to hell. Graciously shared seignorage revenues may not be as generous a gesture as it appears. Shrewd customers may be right to suspect of the free offer, because this one may come with a higher inflation popping out of the box as soon as the package is opened. It might be wiser, in fact, to return the present unopened with a polite “thank you, but it is against our policies” note attached to it.

This normative implication goes no doubt against the conventional wisdom behind many seignorage-sharing proposals and might be received with uproar and skepticism, but it follows naturally not only from the analogy with “brand name” products just suggested, but also more formally from the analytical framework developed to address the optimality of “zero nominal interest rate” monetary policies (the celebrated “Friedman rule.”)

It is somewhat unfortunate, therefore, that the exclusive emphasis on the positive aspects of seignorage-sharing agreements has led to consider the issue solely as a matter of “good will” of the US toward the countries adopting its currency. When economic incentives are introduced into the equation, however, the convenience of a commendable good-will foreign policy approach may not be not as clear cut, because it may well end up removing the good predisposition of the US to keep its inflation low, that is, the very reason which made the adoption of the US currency desirable in the first place.

Under the reinterpretation suggested by this more normative line of inquiry, dollarizing countries are not really “giving up” seignorage for nothing. Rather, they are buying price stability with it. And since that is the whole point of dollarizing an economy, it is a price well paid.²⁶ Therefore, the lack of seignorage-sharing agreements should not prevent countries from giving dollarization a serious consideration.

In any case, it is fair to recognize that the normative considerations just presented are based exclusively on the issue of seignorage revenues from dollarization. But, as discussed at the introduction of this paper, dollarization should be viewed only as one step in a more comprehensive, ambitious, and deliberate plan of global financial and commercial integration. To the extent that the US will benefit from a closer integration

²⁵ The basic intuition for this result is that a government will resist the temptation to inflate away an expanded monetary base only if it is rewarded with the future seignorage payments that it will obtain from keeping the currency it produces widely accepted. The government will struggle not to fall into that temptation the minute that the reward in the form of future seignorage revenues is taken away with a seignorage-sharing scheme.

²⁶ Of course, this will lead the citizens of a country considering dollarization to wonder what prevents their own country from producing an equally high-quality note. Dollarization advocates usually conjure up the “original sin” problem, to which dollarization critics wittily respond that the faithful also believe in redemption.

with other economies, as the recent experience with NAFTA (North American Free Trade Agreement) seems to demonstrate, seignorage-sharing agreements may act as the catalytic “good will” element necessary to encourage perhaps otherwise reluctant economies to embrace an effort whose gains can potentially overwhelm, for all the countries involved, including the US, any mean-spirited seignorage revenues “bean counting.”

To that end, it is important to present and evaluate in the next section some proposals for seignorage-sharing agreements that are being circulated and/or considered in different dollarization forums or even political institutions, such as the US Congress.

1.III.2 - Proposals to alleviate the loss of seignorage problem

1.III.2.1- The proposal of the Joint Economic Committee of the US Senate

An important proposal has been prepared by the staff of the Economic Policy Subcommittee of the Committee on Banking, Housing, and Urban Affairs of the United States Senate and presented to the US Congress by the Joint Economic Committee of that US legislative body. It would take up more space than the available for this paper to account for all the details of this carefully crafted proposal. This section will therefore present and discuss its fundamental features and direct the interested reader to the source for a complete version of the proposal.²⁷

The guiding principle behind the Joint Economic Committee proposal (JEC proposal hereafter) is that seignorage-sharing is a gesture of good will from the US and not an entitlement for the countries that benefit from it. This implies that the proposal does not contemplate any international Treaty involving complex multilateral negotiations, but rather a bill that will be subject to the exclusive consideration of the US Congress.

It is important to emphasize to that regard that the JEC proposal leaves open the possibility of a unilateral suspension of seignorage-sharing revenues by the US government. However, the proposal does contain provisions for a “certification process” by which a country would gain access to its share of the US seignorage revenues. The proposal considers qualification criteria in three areas: economic, legal, and political.

a) Certification criteria:

Economic: at least 75 percent of the local currency must have been exchanged for dollars and all commercial and financial transactions must be quoted and carried out predominantly in dollars.

Legal: The dollar must have legal tender status, in the sense that it should be regarded as an acceptable means of payments for settling all contractual obligations and taxes in a court of law.

Political: A country should act in good faith and refrain from exploiting the seignorage-sharing agreement in any way that is detrimental to the US national

²⁷ A more complete rendition of the proposal can be found in the April 1999 Joint Economic Committee Staff Report “Encouraging Official Dollarization in Emerging Markets,” posted in the Website of the Joint Economic Committee of the US Congress: www.senate.gov/~jec, under the JEC reports section. The site contains also other background material of great relevance for the dollarization debate.

interest. However, the US should, in turn, abstain from withholding seignorage payments as a political weapon to interfere in the domestic affairs of the dollarizing country. Only under carefully specified circumstances, such as war against the US or its allies in the event of a military conflict, should a country be decertified.

According to the JEC, only Japan, a few countries in Europe (mostly those West of Ukraine,) and in Africa (those that being formerly in the franc zone belong now to the euro zone) will not be able to meet the criteria for qualification.

b) Formula for seignorage-sharing:

The JEC proposes to distribute the seignorage revenues to the dollarizing countries on a quarterly basis, according to the following formula:

*Dollar amount of seignorage rebated to a dollarized country =
Net seignorage x
dollarized country's share of the US dollar monetary base x
proportion of the seignorage revenue that the United States has agreed to
distribute to the dollarized country.*

where:

*Net seignorage =
total average monetary base of the US over the quarter x
average interest rate on 90-day Treasury bills during the period –
net cost of operating the Federal Reserve System.*

Each of the components of this formula is discussed below.

Net seignorage: the US Central Bank, that is, the Federal Reserve, introduces money in circulation basically through open market operations. These operations swap government bonds for currency: the Federal Reserve buys from the public high-rated securities, such as US Treasury bills, with notes and coins. The end result of an open market operation is that the Federal Reserve has issued non-interest-bearing liabilities, such as notes and coins, in exchange for interest bearing ones.

The Federal Reserve profits from these open market operations because it gets to keep the interest that the US Treasury pays on the stock of government bonds that end up in the Fed's portfolio as a result of those operations. These interest earnings are, precisely, the gross seignorage revenues the Federal Reserve obtains from successfully placing its notes among the public.

However, parts of those earnings must cover the costs of printing notes, minting coins, and operating the Federal Reserve System.²⁸ It seems only fair then that it is the seignorage net of those costs that is distributed back to the dollarized countries.

²⁸ In recent years, those costs have represented an amount of about \$1.5 billion.

Average interest on 90-day Treasury bills during the period: The JEC proposal suggests that the distribution of seignorage to the dollarizing countries should take place with a quarterly frequency. The interest rate on the 90-day Treasury bills seems a logical choice with which to calculate the seignorage revenues for the purpose of its distribution among the dollarized economies.

Dollarized country's share of the US dollar monetary base: strictly speaking, the correct computation of the amount of seignorage that should be transferred to a given country depends on the amount of US currency in circulation in that country. However, keeping track of the amount of dollars in use in any country at any given point in time is an impossible task. Therefore, the JEC suggests that the share of a country in seignorage revenues should be determined by dividing the relevant component of that country's money base by the US monetary base at the time of dollarizing the economy.

The "relevant component" part of the formula for computing the country's share in seignorage refers to the fact that the money base of a country is typically divided between notes and coins in circulation and commercial banks' reserves at the central bank. Central banks typically keep the latter in the form of highly liquid interest bearing securities like US Treasury bills. If all of the money base were used for the purpose of computing the country's seignorage share, the US might eventually be paying seignorage twice: once in the form of the interest payments on the US securities acquired with the money base set aside as reserve requirements and a second time in the form of the seignorage rebates on such a portion of the money base. In other words, dollarizing countries would find a way to artificially increase their seignorage share with the simple expedient of increasing the reserve requirements of the banking system well above the technical ratio.²⁹ To avoid this "double dipping" in seignorage revenues, the JEC proposal suggests calculating the seignorage share using only the currency part of the monetary base of the dollarizing country.

For example, suppose that the money base of a country about to dollarize were \$24 billion, of which \$16 billions correspond to currency in circulation, that is, notes and coins outside banks. That is the amount of the monetary base of the dollarizing country that should be used to the effect of computing that country's share in seignorage revenue. If the US monetary base increased from \$600 billion to \$616 billion as a consequence of that country's dollarization, then that country's seignorage share would be 2.6 percent, as obtained from $\$16 / \$616 = 0.0259$.

It is important to emphasize, however, that dollarizing countries could easily get around this "double-dipping seignorage prevention mechanism." For example, they could reduce reserve requirements to zero right before the dollarization takes place, so that the whole money base is in currency in circulation and the seignorage share is as large as possible. Once this action has guaranteed that this share will be as high as it can get (3.9% in the above example,) the dollarizing country could increase the reserve requirements again. Although there are ways to counteract such actions, they will

²⁹ This recourse will be of limited use under dollarization, however, because it is equivalent to a tax on banking activities that it will be hard to maintain in the environment of more financial integration in global markets that the dollarization should bring about. As pointed out by Hausmann and Powell (op. cit.), too high a reserve requirement will simply put domestic banks out of business at the hands of offshore financial intermediaries.

certainly complicate the administration of the seignorage-sharing agreement, almost to the point of forcing the office in charge of managing and monitoring the system to keep track of changes in the financial intermediation regulatory body of each of the participating countries.

Another complication with the JEC seignorage share determination mechanism is that incorporation of new countries to the system will reduce the share of already participating ones, although the dollar amount of the seignorage rebate received by each country will not fall and in fact will increase over time, with the growth of the US monetary base.

Continuing with the above example, suppose that a year later another country dollarized and joined the system and that its currency in circulation at that time is also \$16 billion. The seignorage shares for each country will be determined therefore by the fraction $\$16 / \$632 = 0.0253$. That is, the share of the country that was already dollarized will fall from approximately 2.6% to 2.5%. The dollar amount of the seignorage rebate will remain unchanged, however. The reason is that the decline in the seignorage share of the already dollarized countries will be exactly offset by the increase that the US money base will experience as a result of the dollarization of a new country.

It should be clear, therefore, that a constant inflow and outflow of participating countries or frequent changes in the reserve requirements imposed by their central banks would undermine the transparency, and therefore, feasibility of the system. This suggests that at the very least the seignorage-sharing mechanism should include provisions that will exclude those countries that exit from the system from participating on it again, at least not until after a long “penance” period.

Proportion of the seignorage revenue that the United States has agreed to distribute to the dollarized country: The JEC does not give any particular recommendation as to which fraction of the seignorage revenues the US should consider to rebate back to the dollarized countries. However, it is unlikely that 100% of the seignorage earned on currency circulating outside of the US will be transferred to the beneficiary countries. First, because the net seignorage did not include the expenses of administering the seignorage-share agreement, not necessarily negligible if the system requires, among other things, to monitor the reserve requirement policies of the countries included in it. Second, because as explained earlier, distributing all the seignorage back to dollarizing countries may not give the US the right incentives not to inflate away the expanded monetary base that will eventually result from a worldwide spread dollarization process.

To help fix ideas, suppose that this proportion were established at 85%. Further, assume that the average interest rate on 90-day Treasury bills were 5% over the period. Continuing with the previous example, the countries in the seignorage-sharing agreement would receive the following amount of seignorage revenue:

$$\begin{aligned} \text{Dollar amount of seignorage rebated to a dollarized country} = \\ (\$ 632 \text{ billion} \times 0.05 - \$1.5 \text{ billion}) \times 0.0253 \times 0.85 = \$647 \text{ million.} \end{aligned}$$

Escape clauses: Aware that dollarization is not necessarily an irreversible process, the JEC proposal contains provisions that require a periodic review process of the dollarization status of the countries receiving the seignorage rebates, to make sure they

still meet the criteria to participate in the system. Failure to recertify would result in automatic suspension of the seignorage payments to that country. The purpose of this recertification process should be only technical and mainly to determine that the dollar continues being the main currency in use and that a country has not switched in the interim period to a different currency zone, such as the Euro or the yen.

Furthermore, the JEC proposal specifically contains provisions clearly stating that the voluntary sharing of seignorage does not imply the intention of the Federal Reserve System to provide lender of last resort assistance to any of the beneficiary countries or perform any multinational central bank functions, such as those the European Central Bank offers to the European Monetary Union.

1.III.2.2 - The lump-sum payment proposal

The seignorage-sharing system proposed by the JEC involves a constant stream of seignorage payments to the dollarized countries over time. Barro (1999) has recently proposed instead that the net present value of that stream of payments be given to the dollarized country up front in the form of a once and for all lump-sum payment.

The advantage of this system is that it will front load the seignorage payments and provide the dollarizing country with the additional cash necessary to buy back the money base without the need of a large devaluation if international reserves were too low for that purpose at the pre-dollarization exchange rate.

Another advantage of the lump-sum payment proposal is that the part of the payment not used up in the process of retiring the domestic currency from circulation could be applied to perform lender of last resort functions, if required. In addition, this system will certainly eliminate the complications of administering a seignorage-sharing mechanism. The big and perhaps insurmountable drawback of this mechanism, however, is that it will deprive the US from the threat of suspending seignorage payments to countries that decide to reintroduce the domestic currency after they have cashed the seignorage rebate.

1.III.2.3 – The Monetary Association Treaty proposal

A way to circumvent the shortcoming of the previous proposal is that the dollarizing country guarantees its dollarized status with a dollar denominated, non-interest bearing bond, redeemable upon demand only in the contingency that the country fails to pass the recertification process outlined by the JEC proposal. By virtue of a bilateral monetary association treaty, this bond would be swapped with the Federal Reserve for dollar notes.

One potentially serious drawback of this proposal is that the bond that the dollarizing country will issue as a guarantee will result in an increase of its outstanding external debt obligations, which may have the undesirable side effect of inducing an increase in the international interest rate the country will face. This problematic side-effect will be addressed again in the next section, when discussing the lender of last resort functions under dollarization.

It is not clear, anyway, what aspects of this Monetary Association proposal would be the subject of negotiations under an international (bilateral or multilateral) Treaty. International agreements make sense when the parties involved can make mutual

concessions. What a dollarizing country has to offer to the US, within the strict boundaries of a monetary regime, are precisely the seignorage revenues that the US would be asked, paradoxically, to rebate in exchange for perhaps lower-than-investment grade bonds. It is unlikely that the US citizens will find this proposition enticing, unless they see it associated with substantial benefits to the US from the more integrated world markets that a dollarization process will eventually help to bring about.

Finally, it is appropriate to close this section with the observation that an alleged advantage of all the seignorage-sharing proposals considered above is that the dollarizing countries participating of the scheme could apply the seignorage rebates from the US to collateralize international credit lines with which to complement whatever funds those countries may have available to perform lender of last resort functions. However, there are reasons to suspect that this theoretical possibility will encounter substantial obstacles in practice, as explained in the next section, devoted precisely to discuss the challenges that a dollarization regime poses for the lender of last resort functions traditionally regarded as an inalienable attribute of effective, full-fledged central banks.

1.IV - THE LENDER OF LAST RESORT PROBLEM AND HOW TO SOLVE IT

It is often argued that a dollarizing country relinquishes to a foreign monetary authority the power to provide liquidity to its banking system. However, this is not strictly true. A country under a currency board or dollarization regime can still obtain currency with which to assist its banking sector. What it cannot do is print currency not backed by foreign reserves and, dollarization advocates would quickly argue, it is not clear why that is a bad feature of the regime. Quite to the contrary, it may be a blessing in disguise. After all bank bailouts may be an extremely expensive proposition, at least judging by the costs involved in the Mexican crisis of 1994 and the Asian crisis of 1997.

The perception that liquidity assistance through the central bank does not have costs is just an illusion, as has been repeatedly observed in the literature (see for example Hausmann and Powell (op.cit.)). History has proved that massive bailouts are in the end, financed with increases in the public debt hidden in the central bank books. And in disguise or in the open, such bailout packages involve potentially huge government transfers that must be paid for with taxes, as it would be the case, except than in a more transparent fashion, in a dollarized country.

If the citizens of a country are ready to pay taxes to save their financial institutions from dreadful “systemic risks,” they will surely prefer a transparent mechanism with which to do so to one in which they are kept in the dark about the actual monies the bailouts, however “patriotic,” end up taking away from their pockets.

In fact, a dollarizing country wishing to be in conditions of providing assistance to solvent but troubled (allegedly only in the short-term) financial institutions could set up a lender of last resort agency to that end. The fiscal authority will provide the necessary funds with the proceeds from current taxes or increases in the public debt. The exact amount of funds that the fiscal authority should make available to the lender of last resort agency will depend on a number of factors, such as the frequency of financial crises, their impact on the real economy, and the government’s taxation powers.

It is important to emphasize that, however financed, such government agency will still play the role of a lender of last resort and introduce in the economy, therefore, the

moral hazard inherent to its trade. In particular, financial institutions will have incentives to take on riskier investment projects than they would in the absence of such an agency, thus increasing the chances of a “systemic risk” crisis. For that reason, a “banking panic prevention fund” should not be too generous anyway.

In any case, the fact that currency boards have the same implication as dollarization for the lender of last resort issue should be of some assistance in evaluating the options open to a dollarizing country in the contingency of a banking crisis. Countries considering dollarization could model the relevant institutional arrangements after those of the countries operating under currency board regimes, such as Argentina and Bulgaria, to mention a few.

I.IV.1 - A Contingent Liquidity Facility

Argentina, for example, has arranged “contingent liquidity” lines of credit with fourteen private banks that would provide, in total, access to about \$ 7 billion in cash that the Central Bank of Argentina could use to quench an incipient bank run. The contracts with the private banks have, on average, a maturity of 3 years and contain an “evergreen clause” by virtue of which they can be extended every three months for another three months period. The cost of the premium for this “liquidity insurance” policy was roughly 250 basis points over LIBOR at the end of 1999.

The lines of credit are collateralized, basically, with Argentina’s bonds denominated in dollars whose market value must meet a 20% “margin call” requirement. This means that, in the event that it decided to exercise the option to tap those credit lines, Argentina will obtain \$ 1 of cash for every \$1.2 of the market value of those bonds. The contingent liquidity agreements contain provisions that ensure that this implicit 20% margin is maintained at all times. Thus, should the market price of the bonds offered as collateral decline by more than 5%, Argentina will have to deliver additional bonds in the amount necessary to make sure that the market value of all the bonds placed as collateral exceeds in at least 20% the amount of the credit lines used. Should the price of the bonds fall by more than 20%, the necessary additional collateral must be made up in cash, rather than with additional bonds.³⁰

The fact that the credit lines are collateralized with sovereign debt should make apparent that this Contingent Liquidity Facility is, in reality, a fiscal instrument because, in the end, the public debt must be paid for with taxes. Therefore, nothing prevents the fiscal authority, rather than the central banks of dollarizing countries, from reaching similar agreements.

In fact, an argument can be made that, in the interest of transparency, the fiscal authority of the dollarizing country, rather than its central bank, should be responsible for these kind of agreements. After all, the collateral that guarantees those credit lines will increase the public debt, an issue that falls clearly in the jurisdiction of the fiscal authority. This is even more so because the public debt issued to collateralize credit lines supporting lender of last resort functions will, in the presence of borrowing constraints

³⁰ For a more detailed description of the terms of this liquidity facility, see Gavin and Powell (1998.)

(which dollarizing countries almost surely will face,) “crowd out” other credit lines that the fiscal authority could have obtained otherwise.³¹

In any case, contingent lines such as the one just described can provide a dollarizing country with some mechanism with which to confront potential liquidity squeezes in the financial sector. Thus, the amounts that Argentina could obtain under its contingent liquidity program represented about 9% of the total deposits in the financial system at the end of 1999. On the other hand, it is only fair to admit that, although by no means negligible, such an amount would be insufficient to stop a bank run of the magnitude observed, for example, during the so-called tequila crisis that unfolded in the second quarter of 1995, during which deposits fell by as much as 20%.³²

For that reason, some proposals have suggested that arrangements like the one set up by Argentina can be complemented with additional credit lines collateralized with the seignorage rebates contemplated in the seignorage sharing agreements described in the previous section. However, as it was also mentioned there, those schemes come unavoidably associated with escape clauses that impinge upon the seignorage rebates a conditionality that will surely impair their value as a collateral. There are reasons, therefore, to be skeptical that countries that dollarize will be able to perform lender of last resort activities to the same extent as they allegedly could prior to the dollarization program.

On the other hand, it is unclear, as suggested earlier, that central banks should not face strict limits to their lender of last resort functions, lest the citizens of the country involved don't mind their monetary authority to take up taxation powers typically reserved to the fiscal authority. Limits to lender of last resort assistance should be regarded as a strength of a dollarization regime in those countries where past experience indicates that the monetary authority has used that function not just to confront a short-lived liquidity squeeze in the financial system, as it was supposed to, but rather to implement large scale bailouts that more often than not result in corresponding increases of the public debt (and therefore, of future taxes) without the explicit approval of institutions such as the Parliament or Congress, to which such decisions are typically reserved.

In any case, it is perhaps the perception of the clear limits that dollarization imposes to the lender of last resort functions that makes such a regime unattractive to policymakers and politicians who favor unlimited provision of liquidity to financial systems under the stress of “self-fulfilling” panics, that is, bank runs allegedly not supported by fundamentals. In that sense, a monetary union, the regime discussed in the next section, seems to offer a more attractive alternative.

2. MONETARY UNION

The main alternative to dollarization (apart from maintaining the status quo) is a formal monetary union and the creation of a new common currency. This is perhaps the

³¹ In the case of Argentina, for example, its central bank may have obtained the credit lines negotiated under the contingent liquidity facility at the expense of reducing or making more expensive the amounts that the Treasury of that country can borrow in domestic and international capital markets.

³² See Levy Yeyati and Sturzenegger (2000), and Broda and Levy Yeyati in this volume, for other significant limitations of this scheme.

most radical alternative to existing arrangements. It would take a lot longer to put in place than either a currency board or dollarization, but with the right institutional framework and sufficient popular support, it might stand a better chance of delivering long-term monetary stability, while avoiding some of the potentially thorny issues related to sovereignty that would accompany dollarization.

Monetary unions between sovereign nations are rare. The best example is the recently launched Economic and Monetary Union (EMU) between twelve of the fifteen members of the European Union (EU). Prior to the launch of EMU the most significant move to monetary union in recent years was the monetary unification (prior to political unification) of the former West and East Germany in 1990. In the case of EMU the monetary union was overlaid, so to speak, on an existing free trade area.³³ The literature on optimum currency areas suggests that two nations contemplating a monetary union ought to have strong trade ties with one another.³⁴ However, there is no reason in principle why, for example, a Latin American Monetary Union (LAMU) could not also include countries that are not currently members of existing free trade areas like Mercosur.³⁵ Some recent authors however have argued that the optimum currency area criteria are endogenous and increased trade flows will follow the creation of a monetary union.³⁶

A monetary union could take one of two forms. The first is a sort of super-currency board for the participating states, where the countries involved would share a common currency which would be jointly managed by a central supra-national institution but would be pegged to and fully backed by one or more of the world's major currencies (either the dollar, the euro, or the yen). This is the essential nature of the monetary union proposed by Edwards (1998). The benefit from having such an arrangement as opposed to, say, separate currency boards is that it would require an international treaty between the participating states which would presumably make the commitment to the new arrangement all the more credible. Furthermore insofar as there is not an obvious "anchor institution" in potential members of a potential Latin American Monetary Union (comparable to the role played by the Bundesbank in EMU) on which a new supranational institution could be modeled, a super currency board might be the only viable option. The second alternative is a monetary union along the lines of EMU. On which we are going to focus in the rest of this section. We should note that most if not all of the preparatory work that would need to be done for an EMU-like arrangement would also need to be done for a super currency board, and vice versa. The essential difference would be the scope for independent action that the new common central bank would enjoy.

Europe's experience with launching and managing EMU provides a useful blueprint for what it would take to create a Latin American Monetary Union (LAMU) and what the end product might look like. The criteria typically used to evaluate the economics of EMU are the optimal currency area criteria first advanced by Mundell (1961), and subsequently elaborated upon by McKinnon (1963) and Kenen (1969). We

³³ Kohler (1998) elucidates the advantages of having monetary unions coincide with customs unions or free trade areas.

³⁴ This criterion was emphasized by McKinnon (1963).

³⁵ While we focus here on the example of Latin American countries, the conclusions drawn here can be easily extended to other cases.

³⁶ See for example Frankel and Rose (1998).

will not go into the question of whether the candidate countries satisfy the traditional criteria for an optimal currency area. It is interesting to note, however, that the fact that Europe does not seem to satisfy the traditional criteria for an optimum currency area has not prevented Mundell from becoming one of the most prominent supporters of EMU. Mundell's later writings on common currencies have tended to emphasize the gains in terms of monetary stability that monetary unions can bring about.³⁷

It is well known that there is an important political dimension to EMU, the desire to create a European identity separate from that of the individual nation states in the EU, to tie the countries of Europe so closely together so as to preclude the possibility of conflicts of the sort that marred the first half of the twentieth century.³⁸ There does not appear to be a similar drive to create a new Latin American super state to avoid future conflicts. However, arguably the desire to preclude a replay of the hyperinflations that plagued the continent for much of the late twentieth century could provide the impetus to create and sustain a monetary union among the countries of Latin America.

What would such a monetary union entail? The creation of a monetary union would require that a myriad of constitutional and technical issues be addressed. At the constitutional level, a monetary union would require that the participating countries negotiate a treaty that would govern the terms of the union, create the institutions that would manage the common currency and address the issue of how these institutions would be held accountable. At the technical level, a monetary union would require that the institutions charged with the management of the common currency had at their disposal the requisite tools for the job. This would require that the necessary statistical information be available to the new monetary authority, and that the payments systems of the countries participating in the monetary union be integrated to allow funds to be transferred as easily across borders as within countries.

In what follows we will discuss some of these constitutional and technical issues in some detail. Since monetary unions are rare, we will make regular reference to the precedent set by the EU in setting up EMU. However, it should be noted that the Maastricht model is not the only route to a monetary union. An alternative route (and one which was proposed in the European context by Basevi et. al. (1975) in the so-called All Saints Day Manifesto) would be to create a parallel currency that could be freely used in all of the countries interested in forming a monetary union. This currency would circulate alongside the existing national currencies and would enjoy the same legal tender status. The currency would be governed by international treaty and would be managed by a supranational institution according to some rule. The idea behind the proposal of Basevi et al was that if this parallel currency preserved its purchasing power better than any of the existing national currencies, then (by Gresham's Law) it would inevitably drive these currencies out of circulation. The main argument in favor of the All Saints Day approach is that the adoption of the new currency is a matter of choice for individual consumers and is not imposed. The mere existence of the alternative currency may suffice to achieve most of the stability gains of a formal monetary union. Note that the All Saints Day approach would still entail addressing the sort of constitutional and technical issues that

³⁷ See for example Mundell (1973, 1998a, 1998b).

³⁸ The political dimension to monetary union was present in spades when the decision was made to create a monetary union between West and East Germany. For a recent discussion see, for example, Lindsey (1999), especially pages 97-114.

arose in the creation of EMU by the Maastricht route. And whether it would succeed is open to question. As noted above, there is a significant collective good aspect to currency. Money is useful because others are willing to take it. Currency users will only be willing to switch to an alternative currency if they are reasonably confident that many others will switch also. Experience with hyperinflations suggests that even when a currency is losing its value rapidly, consumers are reluctant to switch to alternatives.

2.I - CONSTITUTIONAL ISSUES

The first step towards creating a monetary union would be to negotiate an international treaty creating the common currency and the institutions that would manage it. Such a treaty would need to have four key components. First it would set down the timetable for the launch of the monetary union. Second it would elaborate criteria to be used to determine whether countries that wished to participate would be allowed to do so. Third, it would create the institutions that would manage the currency of the new monetary union. At a minimum a monetary union would need a supranational central bank to conduct monetary policy. The treaty would have to specify the objectives of this new institution and various other institutional matters such as appointment procedures, voting rights and capital subscription standards.

2.I.1 - Negotiating and ratifying a treaty

The first step towards the creation of a monetary union would be the negotiation and ratification of an international treaty between the interested parties. Senior civil servants and central bankers from the different countries would work out the details of the treaty and would then put it to the heads of state or government of the various countries for approval. Depending on the national constitutions of the countries involved, the treaty would have to be ratified by one or both houses of the national parliaments and possibly put to the electorate in a referendum. It would seem that for a step so dramatic as abolition of national currencies and creation of a monetary union a referendum is essential even if not required by the national constitutions so as to ensure full public support for the new monetary regime.

The Maastricht Treaty, which forms the constitutional basis for EMU, was the outcome of negotiations between the (then twelve) governments of the EU that lasted about a year.³⁹ Prior to the negotiations, the heads of government had appointed a committee (the Delors Committee) to examine the ways in which monetary union might come about. The Treaty was agreed upon by the heads of state and government of the EU at a summit meeting in Maastricht in December 1991, and subsequently ratified by national parliaments (albeit not without some difficulty) and electorates. It is important to note that the proposal for monetary union was not put to a referendum in all of the EU member states. In particular, in Germany the decision to proceed with EMU was taken by the government and approved by parliament but was never put before the electorate. Furthermore, support for the greater integration that monetary union implies is significantly greater among the business and political elites in the different countries than

³⁹ For details on the negotiations leading up to the Maastricht Treaty, see Italianer (1993), Sandholtz (1993), Bini-Smaghi, Padoa-Schioppa and Papadia (1994), and Dyson and Featherstone (1999).

it is among the general electorate. When the Maastricht Treaty was first put to a referendum in Denmark in 1992, it was rejected by the slimmest of margins (50.7 percent of the electorate). It was only after the Treaty was amended to address Danish concerns that it was approved, and it finally entered into force on November 1, 1993.

2.1.2 - Timetable for Monetary Union

The creation of a monetary union is not something that could be easily accomplished overnight. Rather it would need to follow a timetable to allow the necessary preparatory work to be done. The preparations that would need to be made would be along two dimensions. First, some degree of “convergence” will be needed if two or more countries are to adopt a common currency. The exact form that this convergence should take is a matter for debate, and we will return to this issue below. Second, at a more mundane level, time will be needed to take care of the various technical issues that will need to be addressed prior to the creation of a monetary union.

At the level of economic policy and performance, it is essential that countries considering a monetary union begin coordinating their economic policies long before the formal launch of the monetary union. This would start with a sharing of information on proposed spending and taxation plans, but more importantly would involve beginning to think of policy as a matter of common concern. There is some debate over just how much harmonization of fiscal policies is needed for a monetary union to work, but clearly of a group of countries are going to share a currency and jointly manage they might not want to spring policy surprises on each other. A treaty creating a Latin American Monetary Union would need to specify when the formal union would be launched. There are two options. One would be to make the launch date conditional on the achievement of some degree of convergence (however defined) by all of the countries involved. A risk associated with this approach is that the decision to launch the monetary union might be postponed indefinitely. Alternatively, the treaty could specify a set date for the beginning of the monetary union and the replacement of the national currencies with the new currency.

Again, looking to the precedent set by EMU is instructive. The Maastricht Treaty specified a three-stage transition to full monetary union. Stage I was deemed to have begun on July 1, 1990 with the abolition of all restrictions on movements of capital within the EU. Stage II of EMU began on January 1, 1994 after the Maastricht Treaty had been ratified by all of its signatories. Stage II of EMU was to be a period of enhanced monetary cooperation between the state members of the EU with the objective of facilitating the transition to full monetary union at some specified future date. Article 109j of the Maastricht Treaty stipulates: “...If by the end of 1997 the date for the beginning of the third stage has not been set, the third stage shall start on 1 January 1999.” The Treaty also provided for a further three-year transition period before the circulating stocks of national currencies are replaced by euro notes and coins. The transition to EMU will be complete by July 2002 at the latest when the legacy currencies of the participating currencies have been completely replaced by the euro. There is some debate as to whether the three-year transition period between the formal start of EMU and the introduction of the euro notes and coins was really necessary. In retrospect it appears that a shorter transition period might have been preferable, although at the time the

Maastricht Treaty was being written it was probably not obvious that the launch of EMU would go as well as it did.

From initiation (with the appointment of the Delors Committee in 1988) to completion (with the introduction of euro notes and coins in 2002), the launch of EMU will have taken nearly fifteen years. Arguably this is the minimum amount of time needed to launch a monetary union between sovereign states. It is worth noting that the countries of the EU had considered monetary union proposals before (most notably in the Werner Report of 1970). It was only in the late 1980s and early 1990s that the confluence of economic and (importantly) political factors was just right for the launch of the EMU process. We should also bear in mind that the process leading to EMU was very nearly derailed by the ERM crisis of 1992-93, and up until launch there were concerns that the project could collapse because of constitutional challenges in individual members states (the project was not and is not uniformly popular across the EU) or speculative attacks on candidate countries.⁴⁰

2.1.3 - Convergence criteria

Any treaty creating a monetary union will also have to specify the criteria (if any) to be used in assessing the suitability of individual countries for participation in the union. The traditional literature on optimum currency areas suggested a number of criteria that countries should satisfy if they are to share a common currency. In Mundell's (1961) original contribution the emphasis was on factor mobility, in particular, labor mobility. If a group of countries are to share a common currency it is important that factors of production be mobile between them so as to ease adjustment following shocks. The subsequent literature emphasized additional factors such as a high degree of trade integration, the degree of diversification of production and the extent to which national business cycles are synchronized.

The Maastricht Treaty laid down four convergence criteria that were used to assess the candidacies of EU countries for EMU.⁴¹ Interestingly none of these convergence criteria dealt with the sort of real factors emphasized by the academic literature as making for successful monetary unions. The Maastricht criteria were (and remain for countries contemplating entry to EMU at some point in the future):

- An annual rate of inflation that was no more than one and a half percentage points above the average of the three best performing countries.
- A sustainable fiscal position, as reflected in a government budget deficit of no more than 3 percent of GDP and a government debt-GDP ratio of no more than 60 percent of HDP.
- Observance of the normal fluctuation bands of the ERM without devaluation against the currency of any other member state during the previous two years.
- An average nominal long term interest rate that is no more than 2 percentage points above that of the three best performing countries in terms of price stability.

⁴⁰ In the event it turned out that the certainty of membership in EMU helped insulate some European countries (in particular Italy, Spain, Portugal and Finland) from the spillover effects of the Russian default in late 1998.

⁴¹ See Buiter, Corsetti, and Roubini (1993) for a skeptical discussion of the Maastricht convergence criteria.

Some observations on these criteria are warranted. The inflation criterion was specified in relative rather than absolute terms – inflation performance was to be judged relative to the three best performing countries. Likewise the sustainability of convergence (as reflected in the level of long term interest rates) was assessed in relative terms. The requirement that candidates observe the normal fluctuation bands of the ERM for at least two years essentially means that inflation rates and interest rates had to converge to German levels prior to the start of EMU. Finally, the public finance criteria were arrived at somewhat arbitrarily. The chosen target value for the debt to GDP ratio of 60 percent happened to be about the average ratio in the EU at the time (see Bini-Smaghi, Padoa-Schioppa and Papadia 1994) and was not chosen because it was in some sense felt to be the optimal level. Likewise the choice of a 3 percent deficit to GDP ratio was arrived at somewhat arbitrarily, although as a matter of arithmetic a 3 percent value is consistent with a long run debt to GDP ratio of 60 percent if long run nominal GDP growth is 5 percent a year.⁴² Furthermore, these criteria were to be applied with some flexibility. Article 104c of the Maastricht Treaty allowed that countries could be judged to have met the deficit criterion if “...the ratio had declined substantially and continuously and reached a level that comes close to the [3 percent] reference value’ or if “...the excess over the reference value is only exceptional and temporary and the ratio remains close to the reference value.” The same article also allows for the possibility that the debt to GDP criterion could be deemed to have been met if “...the ratio is sufficiently diminishing and approaching the [60 percent] reference value at a satisfactory pace.” When the time came to make the decision about which countries would enter EMU in the first wave, both Italy and Belgium were deemed to have satisfied the criteria for participation despite having debt to GDP ratios in excess of 100%.

2.I.4 - Institutions

The treaty governing a potential LAMU will also have to create the institutions needed to manage the monetary union. At a minimum, the treaty would need to create a central bank to manage the common currency. Would national central banks be abolished, and replaced by a single supranational institution charged with management of the new common currency? Or would the national central banks continue to exist and play a role like the regional Federal Reserve Banks in the Federal Reserve System or the National Central Banks in the European System of Central Banks? If the option of a federal system of central banks was chosen, with a Latin American Central Bank at the center, how would power be distributed between the existing national central banks and the new institution? Would the central policy making committee be dominated by the center (as in the Federal Reserve System) or by the national central banks (as in the European System of Central Banks)? It is worth noting that the present highly centralized structure of the Federal Reserve System was not how the system was originally set up. When the Federal Reserve System was first set up, the regional banks were more powerful than the Board of Governors, with the Federal Reserve Bank of New York playing a particularly important role. It was only with the passage of the banking Acts of 1933 and 1935 that the institutional structure that we know today was created (with a Federal Open Market Committee for making monetary policy decisions dominated by the

⁴² Since $d(DEBT / GDP) / dt = ((dDEBT / dt) - (DEBT / GDP)(dGDP / dt)) / GDP$

Board of Governors). Some have argued that the more diffuse distribution of power in the European System of Central Banks poses an important threat to the viability of EMU.⁴³ Would the new central bank or system of central banks operate as a central bank in the traditional sense or as a super currency board? This question gets to the very heart of the issue of just how much monetary sovereignty countries would be willing to give up for the sake of monetary stability.

Again, looking to the experience of Europe with EMU is instructive. The Maastricht Treaty specified the institutions that would manage EMU. It contained provisions for the creation of the European Central Bank, which manages the euro, and the European Monetary Institute, which managed the transition from Stage II to Stage III.⁴⁴ It also laid down the primary objective of the ECB (“price stability”), the terms of office for members of the Executive Board of the ECB and the myriad of other details needing to be addressed to allow the ECB to take over the conduct for monetary policy for the euro area. The Treaty also specified the nature of the relationship between the ECB and other EU institutions. Here the EU is at a distinct advantage relative to other groups of countries contemplating monetary union. The process of integration that began with the creation of the European Coal and Steel Community in 1952 has lead over the years to the development of an array of supranational institutions such as the European Commission, the European Parliament and the European Court of Justice that play a key role in managing the EU. For example, the European Commission plays a crucial role in harmonizing statistical practices across the EU, something that is essential if the ECB is to have the statistical information available to it to allow it to conduct monetary policy for the euro area. The ECB must address an Annual Report to and testify before the European Parliament on a regular basis, thereby meeting the needs of democratic accountability of an independent central bank.⁴⁵ The European Court of Justice ensures that the various treaties governing the EU and European law are interpreted correctly and applied uniformly across the EU.

2.1.5 - Is a lengthy transition needed?

We have been taking EMU as a model for how a Latin American Monetary Union might be created. One of the key features of EMU was the lengthy transition period and the requirement that candidate countries satisfy the convergence criteria laid down in the Maastricht Treaty. It is important to note that the approach to monetary union laid out in the Maastricht Treaty is not without critics. Some have argued that the convergence criteria unnecessarily subjected most of Europe to a decade of slow growth and high unemployment.⁴⁶ The critics point to the fact that German monetary unification was accomplished in a little more than six months: the decision to create a monetary union

⁴³ See, for example, Begg, De Grauwe, Giavazzi, Uhlig, and Wyplosz (1998).

⁴⁴ The European Monetary Institute was essentially an embryonic European Central Bank. The last president of the European Monetary Institute became the first president of the European Central Bank, and almost all of the staff of the European Monetary Institute (which no longer exists) transferred to the European Central Bank when the latter was formally established in 1998.

⁴⁵ Although it is argued (with some justification) that the European Parliament lacks the power to make the European Central Bank fully accountable to the citizens of Europe.

⁴⁶ See for example De Grauwe (1997).

between the former West and East Germany was taken in late 1989, and by July 1, 1990 German monetary union was a reality.

However, even if it is *feasible* to implement a monetary union quickly, there remains the question of whether it is in all circumstances *desirable* to do so. There are important differences between German monetary union and monetary union between the countries of the EU or a potential Latin American Monetary Union. German monetary unification amounted to the adoption of an existing currency by a political entity that was to be merged with an existing state. No new institutions needed to be created to manage the currency of the unified entity: the Bundesbank was simply reorganized to include representative from the former East German states. German monetary unification is similar to a symmetric monetary union between the countries of NAFTA where Canada and Mexico adopt the dollar and obtain the right to vote on interest rates.⁴⁷ It is true that asymmetric monetary unions can be implemented relatively quickly (as the recent example of Ecuador shows), but symmetric monetary unions based on a new currency of their nature take time to put in place.

While some transition period thus seems warranted, arguably the transition in EMU was longer than was necessary to accomplish all of the technical tasks (discussed below) that need to be carried out to create a viable and credible single currency area. As noted, it will be almost fifteen years from when the Maastricht Treaty was signed to when euro notes and coins fully replace existing national currencies. It has been argued that the final three years of this transition period, when the euro came into being as the de facto currency of the participating nations but did not yet exist in the form of notes and coins, is essentially redundant and the notes and coins should have been introduced as soon as the decision had been made to proceed with EMU. Arguably, by introducing the notes and coins at the same time the new currency is introduced makes the monetary reform associated with monetary union all the more real for the man in the street. By allowing a final transition period between the creation of the monetary union and the introduction of the notes and coins, participating nations are given one last chance to opt out.

2.II - TECHNICAL ISSUES

Creating a monetary union entails addressing a myriad a technical questions that typically are not addressed in the academic literature on optimum currency areas or monetary unions. These issues are all relatively straightforward, and range from the mundane issue of what denominations the new currency will be issued in and where the “coin-note” boundary will be, to harmonization of statistics (either for the purposes of assessing compliance with convergence criteria or for the purpose of putting the statistical infrastructure in place for the new central banking institutions), to linking national payments systems together so as to create a single money market.

2.II.1 - Statistical infrastructure

Consistent application of convergence criteria for participation in a monetary union (assuming that the Maastricht route is followed) requires that government accounts

⁴⁷ Of course, German monetary unification was followed quickly by the creation of a single political entity, something that no one has proposed for possible monetary unions in the Americas.

be kept on a consistent basis across all countries; that GDP be measured on a consistent basis across all countries; that inflation be measured on a consistent basis across all countries; and that there be a long term bond with common liquidity characteristics issued by all countries.⁴⁸ Within the EU, national accounts are constructed using the ESA95 version of the European System of Accounts under the aegis of Eurostat, the statistical office of the EU. Inflation measurement is based on the Harmonised Index of Consumer Prices (HICP). The HICP program uses a common pricing concept for all fifteen EU countries (household final monetary consumption) and differs in significant respects from the national CPIs. However even after almost a decade of harmonization there are important differences in how the different countries that participate of EMU go about measuring inflation at the consumer level.

Statistical harmonization prior to the creation of a LAMU would greatly facilitate the job of the LACB after monetary union starts. Monetary policy for the LAMU area would require an area-wide perspective, which (assuming that statistics continue to be collected primarily at the national level) will require measures of real activity, inflation and the financial sector for different countries that can easily be aggregated. Measurement of broad monetary aggregates (such as M1, M2 and M3) will need to be done on a consistent basis to allow the construction of area-wide aggregates.⁴⁹

Again looking at the experience of Europe in establishing EMU gives one a sense of the magnitude of the task involved. Prior to EMU there were significant differences in measures of the money stock across the EU. While this might to some extent be expected when looking at broad aggregates, even the narrow aggregate (money base) was not defined the same way in all countries. These differences are discussed at some length in European Central Bank (1999).

2.II.2 - Payments system

The second major technical challenge to the creation of a LAMU would be the creation of an integrated infrastructure for the payments system. A single monetary policy will require that individuals be able to move funds as freely within the single currency area as they now do within national borders. One of the key challenges facing the architects of EMU was to create a EU-wide payments system that linked together the payments systems of the fifteen countries. The result was the TARGET system (which stands for Trans-European Automated Real-time Gross settlement Express Transfer), which consists of the fifteen national settlement systems and the ECB payments mechanism. This system began operation on January 4, 1999 and handles the bulk of the high-value transfers within the euro area. The success of the system is apparent in the rapid elimination of money market spreads shortly after the start of EMU.

⁴⁸ On the statistical requirements for EMU see European Monetary Institute (1996). For an example of some of the difficulties that arise in creating harmonized statistics see European Commission (1998).

⁴⁹ Note that at the December 1999 summit meeting of the four Mercosur presidents in Montevideo the leaders agreed on three measures that could begin to pave the path towards a Maastricht type agreement. First it was agreed that the four countries would begin to harmonize their statistics so as to facilitate comparisons between them. It was also agreed that the four countries would work towards establishing common standards for fiscal responsibility that would constrain public spending. Finally, it was agreed that the countries would report at future summits progress in their efforts to achieve stability.

2.II.3 - Currency

A third technical issue that will need to be addressed is the design of the new currency. What will the common currency be called, what will it look like and what symbol will be used to denote it? The new European currency is known as the euro. Prior to the decision to name the new currency the euro, other proposals were to name the currency the ecu, the Eurodollar, the eurofranc, the euromark or the Europa. What denominations will be issued? In creating EMU, the EU agreed that euro banknotes will not carry any national symbols, but will instead be representative of Europe as a whole.⁵⁰ Note issuance is the exclusive domain of the ECB. Euro coins will be issued by national treasuries, subject to ECB approval, and will carry national symbols. The denominational structure settled on by the EU follows the so-called binary-decimal (1-2-5) pattern. Coins will be issued at the 1, 2, 5, 10, 20, 50 euro cent denominations and the 1 and 2 euro denominations. Notes will be issued at the 5, 10, 20, 50, 100, 200, and 500 euro denominations.

The current denominational structure of the Argentinean peso and the Uruguayan peso approximately follow the binary decimal pattern, while the denomination structure of the Brazilian real and the Paraguayan guaraní follow the fractional decimal (1-5) system. A common currency with a denominational structure that followed the binary-decimal system would probably offer the most flexibility to currency users. Finally, the nations will need to agree on the location of the coin-note boundary: What will be the highest denomination coin and the lowest denomination note? At the time of writing the purchasing power in dollars of the lowest denomination circulating note in Argentina (the one Argentine peso note) was almost twice the purchasing power of the lowest denomination circulating note in Brazil (the one real note), although Brazil also issues a coin at this denomination. The highest denomination circulating note in Brazil is the 100 real note, whose purchasing power in dollars is (currently) about half that of the highest denomination circulating Argentinean note.

Once the design of the currency is agreed, it will need to be decided when the notes and coins will be introduced. As noted earlier, the EU took a rather conservative approach in this regard, allowing for a three-year transition period following the start of EMU before the euro notes and coins are introduced. At the time it was argued that a long transition period was needed to allow all of the needed coins to be minted and the notes to be printed. Plus, the private sector operators of the physical payments infrastructure (vending machines etc.) needed time to recalibrate their equipment. In retrospect, it now seems that the three-year transition is longer than necessary. Some European governments have been looking for ways to introduce the currency sooner. For Latin American countries contemplating a monetary union, the costs of adjusting the physical payments infrastructure to handle a new currency are probably smaller than the costs faced by Europeans, due to the recent experience of most Latin American countries with high inflation. Also, it might be possible to introduce the notes before the coins: it is with the latter that the largest costs of adopting the payments infrastructure would be incurred. Experience with monetary reforms in Latin America over the past two decades suggests

⁵⁰ It is interesting to note that one of the arguments advanced by euroskeptics in Britain is that the Queen of England's head will no longer be depicted on the currency should Britain adopt the euro (although Britain will be free to put the Queen's head on euro coins).

that it should be possible to completely replace the existing stocks of national notes with a new common currency relatively quickly. Finally recall that the three-year transition between the creation of the euro and the introduction of euro notes and coins is interpreted as many as giving countries that are less than enthusiastic about EMU one last chance of opting out: the costs of doing so will be a lot greater once the national currencies have been completely eliminated. If one of the objectives of monetary union is to shift to a new, more stable, monetary regime, and the move has popular support, delaying it any longer than is absolutely necessary makes little sense.

2.II.4 - Allocation of seignorage

Under monetary union seignorage income will accrue to the new central bank or system of central banks rather than to the national central banks. It will need to be decided how this revenue should be used. Will this revenue be retained by the new central bank, or used to finance other expenses of other institutions created to manage the monetary union, or rebated to national governments? Will the seignorage be booked by the national central banks (if the federal model is adopted), with the central institution obtaining a share only after submitting a budget? One option would be to use it to finance the operations of other common institutions created to manage the monetary union and make the new central banking institutions accountable to the electorate. Alternatively, the revenue could be returned to national treasuries to finance national government expenditures. This is the option chosen by the EU. Article 32 of the Statute of the ECB provides for the allocation of the seignorage income of the ECB to the national central banks on the basis of a weighting scheme where each country's weight is equal to the sum of 50 percent of the country's share of EU population and 50 percent of its share of EU GDP.

2.II.5 - Other issues: Institutional setting, financial stability etc.

What other institutions, if any, would be needed for a Latin American Monetary Union to succeed? A common assembly along the lines of the European Parliament to which the LACB would be accountable for its actions? A court for adjudicating disputes? Restrictions on fiscal policy at the national level? An economic government to balance the new monetary institutions? A new financial regulator? Let us consider each of these issues in turn.

In recent years there has emerged a consensus among students of monetary policy that independent central banks typically do a better job at delivering long-term price stability than do banks that are subject to a lot of direct political control. The growing appreciation of this fact on the part of politicians has led to significant reforms of central bank legislation in a number of countries granting central banks the sort of independence that for much of the postwar period was enjoyed only by Germany's Bundesbank. In May 1997 the just-elected Labor government in the UK granted the Bank of England full operational independence, while the Maastricht Treaty stipulates that "...neither the ECB, nor a national central bank, nor any member of their decision-making bodies shall seek or take instructions from Community institutions or bodies, from any government of a Member State or from any other body." However, the quid pro quo for independence of

this sort is that the central bank should be accountable for its actions and decisions. The Bank of England is accountable to the Chancellor of the Exchequer in Britain, and through him to the UK parliament. The ECB is accountable to the European Parliament, although some have argued that the European Parliament lacks the stature needed to fulfill the needs of accountability. Critics claim that EMU (and the EU in general) suffers from a “democratic deficit” which threatens to undermine the enterprise in the long run. The long-term viability of EMU, they argue, requires strengthening the Parliament and eventually a move towards political union.

To whom would an independent Latin American Central Bank be accountable for its actions? Making the LACB accountable to each of the national parliaments is not really feasible. It would hamper the development of a monetary-union wide perspective on policy. Furthermore, even in a well functioning monetary union regional, conflicts of interest will develop, as different regions will occasionally find themselves at different stages in the business cycle. Absent a directly elected common deliberative body, a committee of representatives from each of the national parliaments might serve the needs of accountability in the short run. However, longer term the question of political integration of some sort would have to be addressed.

In addition to an elected body to which the LACB would be accountable, there would also be a need for an institution to adjudicate disputes between participants in the monetary union. Even with the best of intentions, disputes will arise over the interpretation of the treaty that creates the monetary union, and about the decisions of the LACB. Clearly it would not be feasible to leave the adjudication of these issues to national courts: some form of supranational or international court will be needed and the decisions of this court will need to be binding on all participants in the monetary union.

Is there a need for an “economic government” to act as a counterweight to the central bank in LAMU? A source of ongoing tension in EMU is the issue of whether the power of the ECB needs in some sense to be balanced on the fiscal side by an economic government for the euro area. Does the existence of a single monetary policy for the euro area mean that a single fiscal policy is needed also? Creation of a monetary union will make tax differences within the monetary union all the more transparent, and will promote the flow of mobile factors to low tax regions. This will put pressure on the high tax states to either cut taxes or seek to have tax rates harmonized (up) across the monetary union. A more controversial line of argument for fiscal rules in a monetary union can be made from the perspective of the fiscal theory of the price level. Sims (1998) argues that the rigid de-linking of the fiscal and monetary authorities in EMU (through Treaty prohibitions on ECB financing of national government deficits) will create problems. Arguing from the perspective of the fiscal theory of the price level, Sims argues that the fiscal policy provisions of the Maastricht Treaty call for a passive fiscal policy. When combined with an active monetary policy (one that stabilizes a monetary aggregate or increases interest rates when inflation rises) the possibility emerges of a self-sustaining inflation that drives the value of the money stock to zero. This possibility can only be ruled out by a commitment on the part of the fiscal authorities to put a floor under the value of the currency. However, with fiscal policy decentralized to the national governments, such a commitment might be difficult to make, and certainly difficult to make credible.

Finally, we come to the issue of financial sector supervision and regulation. Assuming that the creation of a Latin American Monetary Union is accompanied by free trade in financial services, it seems reasonable to expect that financial institutions will begin to operate on a monetary-union wide scale. The question then arises of how these institutions will be supervised and regulated, and who will act as lender of last resort in the event of a financial crisis. One option would be to leave these responsibilities with the institutions that currently have them, but to promote closer ties between national regulators. This would be in keeping with the narrow concept of central banking found in the Maastricht Treaty, where the ECB focuses on price stability and financial sector supervision and regulation is left in the hands of national authorities.⁵¹ The risk of this approach is that when a crisis hit the central bank does not have at its disposal the sort of information needed to assess the need for it to provide lender of last resort services. A superior arrangement would appear to be to consolidate the supervision and regulation functions in parallel with the central banking function when creating the monetary union, and ensure that the new central bank had full and regular access to information on the health of financial institutions based in the monetary union.

Steps	Time
• Decision taken to create a Latin American Monetary Union between two or more members of Mercosur	• T
• Negotiate Treaty	• T+1-2 years
• Creation of Latin American Monetary Institute	• T+2-3 years
• Convergence Period	• T+3-5 years?
• Creation of Latin American Central Bank	• T+6 years
• Formal Launch of LAMU	• T+5-7 years
• Introduction of notes and coins	• T+5-7years

3. CONCLUSIONS

In this paper we have attempted to give a basic description of what either dollarization or the creation of a monetary union would entail for the countries adopting either regime. As noted in the introduction, we do not address the question of whether adoption of either regime would be welfare enhancing in an economic sense. Rather we have attempted to explain what the move to such a regime would entail given that it had been decided that such a move was in the best interest of a nation.

⁵¹ For a detailed analysis of the arrangements for financial stability under EMU see Prati and Schinasi (1999).

In our discussion of dollarization we have addressed a number of technical issues that would arise in the process of replacing a national currency with the dollar. Foremost among these issues is what other reforms would be needed to make dollarization a success. We also examined the question of seignorage losses that would accompany dollarization, and various proposals that have been put forward to offset these losses.

Many of the theoretical issues that arise in contemplating dollarization are relevant to monetary union proposals. However, as our discussion of monetary union should have made clear, the creation of a Latin American Monetary Union (along EMU lines) would be a massive undertaking. We noted that the Maastricht Route to EMU was probably excessively cautious, leaving plenty of time for less than fully committed countries to back out. However, the massive amount of technical work that would need to be done prior to the creation of a Latin American Monetary Union means that it would be unrealistic to expect that such an arrangement could come about in less than 7-10 years. As mentioned in the introduction, all these guidelines and issues are general enough to be valid for prospect monetary unions in any regions of the world.

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