Dollarization in Argentina

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Introduction and summary

In January 1999, Argentina announced that it was considering adopting the U.S. dollar as its sole medium of exchange. This policy proposal, which is known as "dollarization," received considerable attention from both policymakers and the media, generating an ongoing debate. This article discusses from a critical perspective some of the issues raised in this debate. Although we do not reach a definite answer on whether Argentina should dollarize, we believe that our work sheds considerable light on the costs and benefits associated with it.

The debate over dollarization is part of a broader, longstanding, and ongoing debate over the relative merits of monetary arrangements. The general question is whether a country's currency should be tied to some anchor, and, if so, to which anchor and how tied. The question involves a variety of issues, depending on the context in which it is raised. In the international context, this question becomes the debate about fixed and flexible exchange rates and optimal currency areas.[1] Dollarization is simply the most extreme form of a fixed exchange rate. When one abstracts from international considerations, as one would for a relatively closed economy like Argentina's, in which international trade matters less, the context is the debate over "rules versus discretion": Should monetary policy be tied to a rigid rule or should central bankers be allowed discretion in their conduct of policy? Dollarization is the ultimate rule, or the total absence of discretion.

While the choice of anchor for monetary systems has been debated for centuries, the question of dollarization has been posed relatively recently. Indeed, Mundell wrote in his classic paper (Mundell, 1961) that "it hardly appears within the realm of political feasibility that national currencies would ever be abandoned in favor of any other arrangement." More recently, Schwartz (1993) wrote in her review of the history of currency boards that "central banks seem to me strongly entrenched and unlikely to be dislodged even if their policies create hyperinflations." Yet currency boards have made a comeback of sorts, with Hong Kong since 1983 and Argentina since 1991 as the most prominent examples.[2] Dollarization has been evoked in Argentina. But the debate has sprung up elsewhere. Just as the European common market led to European monetary union, some have argued that the members of the North American Free Trade Agreement, particularly Mexico, should seriously consider dollarization. Most recently, on January 9, 2000, the president of Ecuador announced plans to immediately dollarize his country's economy, retaining the local currency only for small change.

American officials have repeatedly taken a very balanced position on the matter; while not rejecting the idea out of hand, and while admitting that the U.S. could not prevent a country from adopting the dollar as currency, they have issued strong cautionary notes. At present, following the election of a new president on October 25, Argentina has stated a strong commitment to the current currency board arrangement, and U.S. Secretary of the Treasury Lawrence H. Summers recently concluded that the question of dollarization is not on Argentina's agenda. The topic, however, has now raised interest in academic and business circles.

This article restricts attention to the particular case of Argentina. Argentina has a long history of

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disastrous monetary policies and repeated hyperinflations, which have led it to peg its currency to the dollar since 1991. Since Argentina is in practice already quite close to being fully dollarized, it presents a good illustration of what is (and is not) required for a successful dollarization and what are the costs and benefits associated with it.

We first present the facts about Argentina's case, in particular the historical background to Argentina's peg to the dollar since 1991. We then describe the possible forms that dollarization could take, present the benefits that have been suggested, consider possible costs and objections, and carry out a rough cost–benefit comparison.

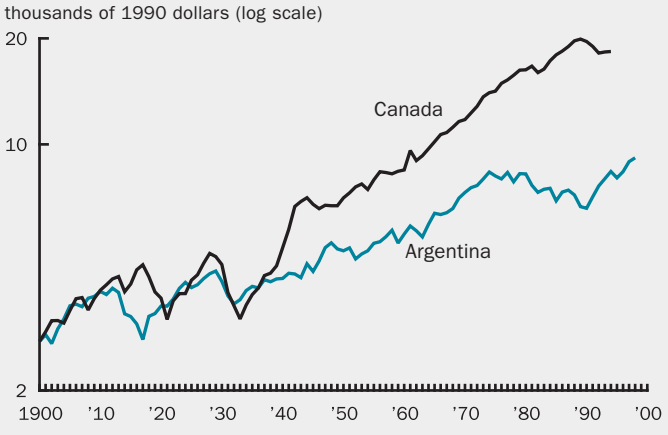
The facts of Argentina's case

At the turn of the twentieth century, Argentina was one of the ten or 15 richest countries, and its gross domestic product (GDP) per capita was only 40 percent lower than that of the world leader (the United Kingdom). In fact, GDP per capita in Argentina stood at the same level as in Canada, a country similar in many respects in terms of physical and human endowments.

Figure 1 shows the subsequent paths taken by Argentina and Canada over the course of the twentieth century. Both were similarly affected by the Great Depression of 1929 and the trade wars that followed in the 1930s. After World War II, however, their paths begin to diverge noticeably. And, while Canada's growth is strong and smooth, Argentina's growth is weaker, and subject to greater fluctuations. The paths take opposite directions in the 1970s, when Argentina's income actually falls. At present, Argentines are half as rich as Canadians. The gap depicted in figure 1 is often viewed as a measure of Argentina's wasted opportunities.

FIGURE 1

GDP per capita, Argentina and Canada



Sources: Maddison (1995) until 1994, Ministerio de Economía (MECON) thereafter.

Perhaps not coincidentally, Argentina has a very long history of unstable monetary policies, stretching back to the nineteenth century. After independence in 1810, it took the country until 1853 to reach a constitutional agreement. Until 1881, the currency consisted mainly of paper money, issued by various local administrations, that was not redeemable in gold or silver. Attempts to set up a monetary system on a gold standard began in 1881 but were not successful until 1899, when the outstanding mass of paper money was made convertible into gold. Convertibility, suspended on August 8, 1914, when World War I broke out, was not resumed until 1927. It was suspended again in December 1929, when the country was hit by a combination of falling commodity prices, mounting government deficit, loss of access to foreign capital markets, and incipient currency speculation (Eichengreen, 1992). A coup in 1930 overthrew the elected government and inaugurated a long period of military regimes interspersed with occasional elections, until full democracy returned in 1983.

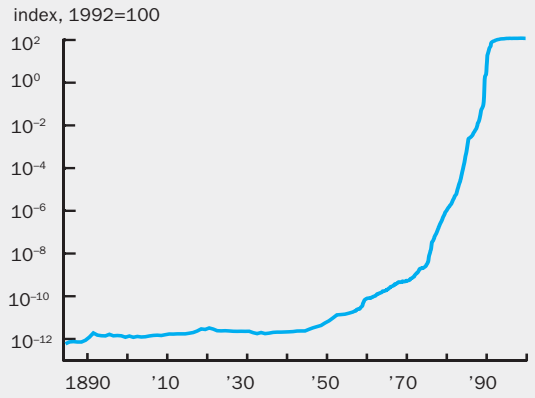
Figure 2 plots the price level over time. It shows how Argentina's familiarity with inflation is long-standing. For example, the price level doubled from 1889 to 1891. Such experiences pale in comparison with what happened after the end of the gold standard in 1929, the establishment of the central bank in 1935, and its role in monetizing deficits (that is, financing deficits with the printing press) from 1943 on. From 1943 to the present, the price level has gone up by a factor of 10 in the U.S.; in the same period, it has gone up by 10^{12} in Argentina. The main recent episodes of high inflation, in 1975, from 1982 to 1985, and from 1987 to 1990, are visible in figure 2 as sharp accelerations of the price level.

Figure 2 also shows that a remarkable change took place in the early 1990s. When Carlos Menem was first elected president of Argentina in May 1989, the inflation rate had reached 78 percent per month. To put an end to inflation, Congress passed the "convertibility law" in March 1991, establishing the convertibility of the *austral* (the Argentine currency since 1985) into the U.S. dollar at a rate of 10,000 australes per dollar. In January 1992 the *peso* replaced the austral, at a rate of 1 peso for 10,000 australes.

The regime instituted by these reforms places strict limits on the Argentine Central Bank's policy. Under the convertibility

FIGURE 2

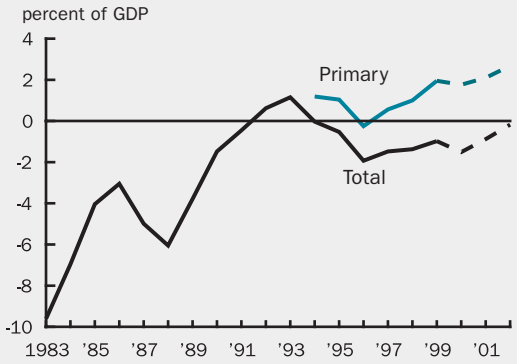
Consumer price index, Argentina



Sources: Rolnick and Weber (1997) and International Monetary Fund.

FIGURE 3

Government surplus as share of GDP



Note: Projections, indicated by dashed lines, for 1999–2002 from budget submitted to Congress in September 1999.
Source: MECON.

law, the central bank must stand ready to sell dollars for pesos at the rate of 1 U.S. dollar per peso. Free reserves, consisting of gold, foreign currency, or deposits and bonds payable in gold and foreign currency, must be maintained at a level no less than 100 percent of the monetary base.

The central bank is forbidden by its charter, passed in 1992, from lending to the government. However, the formula for the classic currency board requires full backing of the currency with foreign reserves only. In Argentina, the bank is allowed to hold Argentine government bonds as part of the backing of the monetary base. But this departure from the classic currency board is minor, for the following reasons. Those holdings must be purchased at market price (so they are not direct loans to the government), they cannot exceed 33 percent of total reserves,[3] and they cannot increase by more than 10 percent in any year.

The peso (or its predecessor the austral) has been convertible with the dollar at a constant rate for over eight years. As figure 2 shows, the Argentine price level was quickly stabilized and has remained stable. Implementation of the currency board arrangement has been accompanied by a number of other reforms. The Argentine government reduced both spending and taxes, and quickly eliminated the deficit, as shown in figure 3.[4] It also privatized many state-owned companies and carried out other major reforms, including trade liberalization, freeing of international capital flows, and deregulation of the banking industry.

These reforms appear to have had beneficial effects in the Argentine economy. Figure 4 shows an index of real GDP. After a long period of stagnation, the growth rate of output went from a –1 percent annual average between 1980 and 1990 to 4.3 percent between 1991 and 1998. The effect on a per capita basis is strikingly displayed in figure 5 (which also plots monthly inflation). Real output per capita fell 23 percent during the 1980s, and this fall was more than reversed up to 1998.

The expansion of the 1990s was interrupted twice, as shown in figure 4: in the aftermath of the Mexican balance of payments crisis in January 1995 (the so-called Tequila effect), and again in the recent international turmoil following the Russian default of August 1998 and the Brazilian devaluation of January 1999 (the "Vodka–Caipirinha effect").

Although the Argentine peso has remained pegged at 1 dollar since 1991, it has not been immune

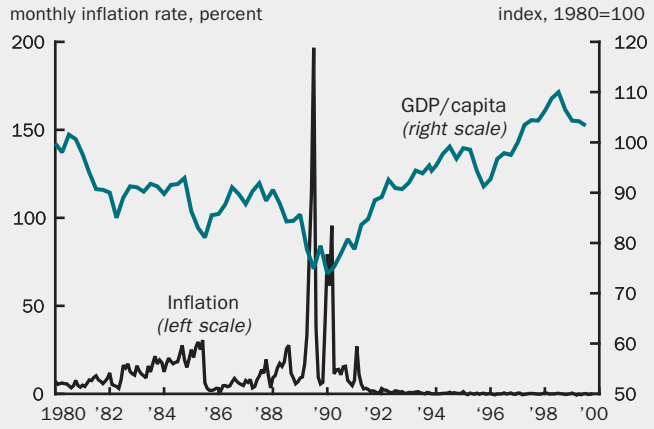
FIGURE 4

Index of Argentine real GDP, 1980:Q1 to 1999:Q2

Note: Based on 1986 prices to 1993; 1993 prices thereafter.
Source: MECON.

FIGURE 5

Argentina's real GDP per capita and inflation

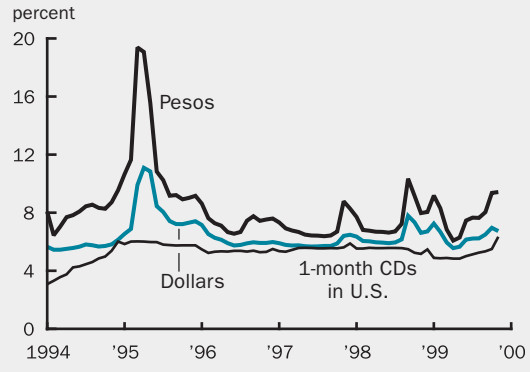


Notes: Real GDP is quarterly from 1980:Q1 to 2000:Q2 and inflation rate is monthly from January 1980 to September 1999.
Sources: MECON and Banco Central de la República Argentina (BCRA).

to speculations about how long this regime will last, and what will replace it. Those questions are raised when currencies elsewhere fall victim to crises. After the Tequila crisis of 1995, and again after the Vodka–Caipirinha crisis of 1998–99, there was intense speculation on a possible devaluation of the peso, in spite of limited links between the affected countries and Argentina. For example, Mexico's share of Argentine exports was only 1.7 percent in 1994, and Argentina's exports overall accounted for just 9 percent of its GDP. Similarly, although Brazil is Argentina's main trading partner, exports to Brazil only represented 3 percent of Argentine GDP in 1998. Interest rates rise sharply with each speculative attack, as shown in figure 6. Furthermore, the premium in interest rates on peso-denominated loans over dollar-denominated loans rises as well, suggesting that the perceived risk of a devaluation is much higher.

FIGURE 6

Interest on 30–59 days time deposits



Notes: Monthly averages from January 1994 to October 1999.
Sources: BCRA and Board of Governors of the Federal Reserve System.

Two days after Brazil devalued the real on January 13, 1999, it became known that Argentina's President Carlos Menem had asked his finance minister to study the feasibility of dollarization. On January 22, the president of Argentina's central bank, Pedro Pou, confirmed that such studies were underway, and that a working group was to be formed by the U.S. Treasury. Over the course of 1999, other events affected the markets' perceptions of Argentina's commitment to the currency board. In mid-May, comments by the creator of the currency board, Domingo Cavallo, were misreported in the *Financial Times* as suggesting that the peg could be modified or abandoned. In August, Ecuador (a Spanish-speaking country south of the Panama Canal, but with no other meaningful relation to Argentina) fell into default on its international debt. The Argentine presidential elections took place on October 25 and ended in the victory of the Radical candidate Fernando de la Rúa, who took over from the Peronist Menem in early December.

Figure 7 shows the response of markets to such news, indicating how sensitive interest rates are to the perception of a possible devaluation. Along with figure 6, it suggests that, most of the time, the level of interest rates in Argentina is not very different from that in the U.S., but that, when doubts are raised about the convertibility of the Argentine peso, interest rates in Argentina can rise quickly to very high levels and be very volatile.

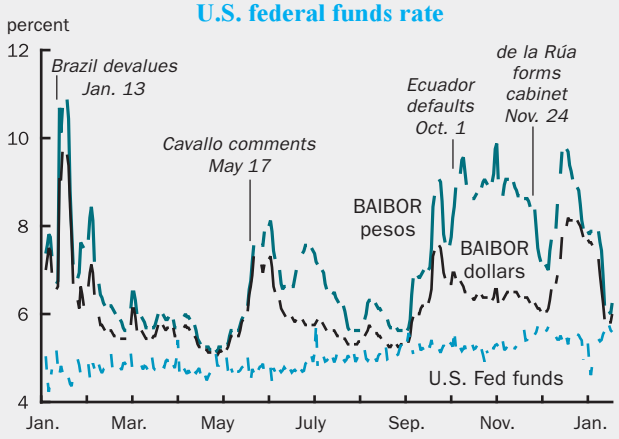
Since markets appear uncertain about Argentina's commitment to its currency board, and since recurrent fears of devaluation have severely affected the economy in the past, it is apparent that Argentina needs to make its currency board fully credible. This is what led the previous Argentine administration to consider the possibility of fully "dollarizing" the economy.

What dollarization is

Dollarization means the total elimination of the Argentine currency, the peso, and its complete replacement with the U.S. dollar. At present, the monetary base in Argentina consists of the peso-denominated currency. If Argentina dollarized, this monetary base would be converted into dollar-denominated currency,

FIGURE 7

Buenos Aires interbank offered rate and U.S. federal funds rate



Notes: Interbank offered rate (BAIBOR) for one-day peso and dollar loans. Rates are graphed daily from January 4, 1999, through January 12, 2000, excluding weekends and holidays.
Sources: BCRA and Board of Governors of the Federal Reserve System.

that is, U.S. Federal Reserve notes. Transactions would be made in dollars, accounts would be kept in dollars, and debts and contracts would be denominated in dollars. The U.S. dollar would be the sole legal tender.

The Argentine economy is already partly dollarized. For example, 61.3 percent of private nonfinancial sector deposits are currently denominated in dollars. The reserve requirements of commercial banks are met with dollar-denominated assets. Argentines are already used to quoting prices and carrying out transactions in dollars. Complete dollarization would not dramatically change their habits and practices.

There are two ways in which dollarization could be implemented. One is for Argentina to proceed on its own; the other is for Argentina to negotiate a formal arrangement with U.S. authorities.

Unilateral dollarization

For Argentina to dollarize, the only requirement is to eliminate the peso-denominated monetary base. Since January 1995, commercial banks have held reserves in dollar-denominated assets instead of peso deposits at the central bank.[5] Thus, the monetary base is just the currency in circulation. To replace the currency, Argentina needs to take the "liquid reserves" that currently back the monetary base, sell them for dollars, and exchange all outstanding peso notes for dollar notes. Once that has been accomplished, the peso has been eliminated, and the only legal tender is the U.S. dollar. Then, all peso-denominated deposits, debts, securities, and contracts are relabeled and become dollar-denominated.

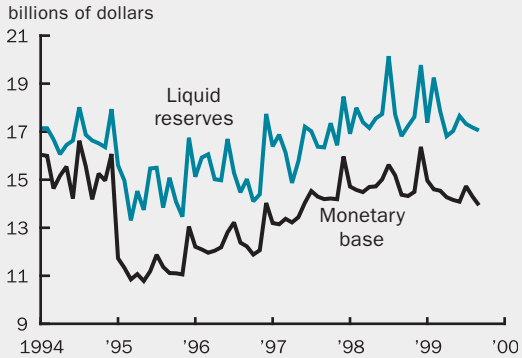
To carry this out, Argentina needs to have enough resources to buy the required amount of dollars. That is already the case under the convertibility law. Figure 8 compares the liquid reserves held by the central bank with M0, the monetary base. As of December 31, 1999, the central bank holds $19.0 billion in reserves (excluding its holdings of Argentine bonds), while the monetary base is $16.5 billion. Thus, Argentina has more than enough to unilaterally liquidate its reserves on the world market and acquire the dollar notes.

In order to dollarize, Argentina has to buy noninterest-bearing dollars with the interest-bearing reserves it has accumulated. These reserves bear interest at present, and therefore are a source of income for Argentina. This income is called seigniorage, and comes from the structure of any central bank's balance sheet: its liabilities (money) bear no interest, while its assets do. But once Argentina's reserves are replaced by dollars, this source of income disappears. Instead, the U.S. will collect the seigniorage. A consequence of dollarization, therefore, is a transfer from Argentina to the U.S.

How large would that transfer be? According to the central bank's income statement, the income on liquid reserves (excluding government bonds) in 1998 amounted to $808 million, an average nominal rate of return of 4.7 percent, or a real rate of return of 3.1 percent (subtracting the U.S. inflation rate) or even 4 percent (subtracting the Argentine inflation rate).

FIGURE 8

Monetary base and liquid reserves



Note: Data from January 1994 through October 1999.
Source: BCRA.

Since liquid reserves averaged $17.2 billion in 1998, in excess of the monetary base which averaged $14.9 billion, only $700 million actually represents seigniorage, that is, income on the reserves that back the monetary base. Since nominal GDP was $298 billion in that year, seigniorage represented 0.2 percent of GDP, or 1.2 percent of government revenues.

This number seems small, seen as a flow. But seigniorage is collected every year. To calculate the value of all future seigniorage that would accrue to the Argentine government from the peso-denominated monetary base if it did not dollarize, we would need to estimate what the monetary base would be in the future and use a discount rate to compute the net present value.

Let M be the current value of the monetary base and R the nominal rate of return on liquid reserves. Suppose that the monetary base grows at a constant rate α, so that, at any future date t, the monetary base is $(1+\alpha)^t M$, and the seigniorage collected on that monetary base is $R(1+\alpha)^t M$. Assume that future sums are discounted at the same nominal rate R. Then the net present value of future seigniorage is given by:

$$\sum_{t=1}^{\infty}\left(\frac{1}{1+R}\right)^t R(1+\alpha)^t M.$$

Using the formula for a geometric sum, the present value of future seigniorage is

$$(1+\alpha)\frac{RM}{R-\alpha}.$$

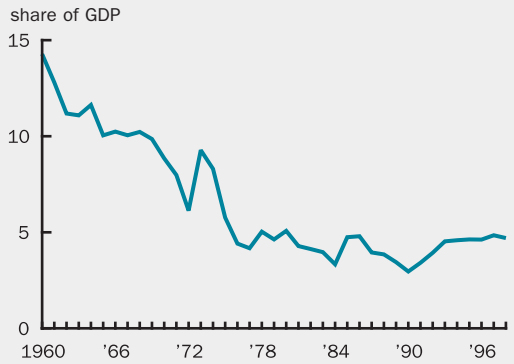
If $\alpha = 0$, that is, the monetary base is not assumed to grow at all, then that net present value is exactly the current monetary base M. If the monetary base grows in the future, then Argentina will continue to bear annual costs, namely, the real assets that it will need to accumulate (through exports) to buy dollars for use at home as currency.

In other countries, the monetary base usually grows at roughly the same rate as nominal output. Figure 9 shows that this has been true in Argentina since the stabilization, although not before.[6] Under the assumption that $M0$ grows at the same rate as nominal output, then α is the sum of the growth rate of real output and the inflation rate. The denominator of our expression becomes the real rate of interest less the real growth rate.

An assumption of 6 percent nominal rate, 4 percent real rate, and 3 percent growth rate yields a present value of six times the current monetary base,

FIGURE 9

Currency in circulation as share of GDP



Source: International Monetary Fund.

or $84 billion. One should remember, however, that this value is very sensitive to the assumptions about rates of interest and growth rates, and that some assumptions will make the denominator of our expression very small. We can, nevertheless, keep in mind a number like 0.2 percent of GDP as the size of the permanent annual transfer from Argentina to the U.S. that would follow dollarization.

Bilateral dollarization

In view of this transfer, it is not surprising that the Argentine government is currently seeking to dollarize the economy within some form of monetary association with the U.S. that would reduce the size of this transfer.

One possible arrangement, which would allow Argentina to avoid the transfer altogether, would be as follows. Instead of letting Argentina sell its reserves on the open market for dollar bills, the Federal Reserve could print an amount of dollar notes equivalent to the total currency in circulation in Argentina ($14 billion) and hand it over to the Argentine government to retire the outstanding peso notes. This would allow Argentina to retain the reserves that are currently backing the peso notes in circulation and to keep the corresponding interest income. From the point of view of the U.S., this operation only involves costlessly printing pieces of paper and shipping them to Argentina. The pieces of paper would remain in Argentina as a medium of exchange, because Argentina needs a medium of exchange. But if Argentina were to introduce a currency again, then Argentine citizens would not need the pieces of paper as a medium of exchange, and would then redeem them for goods and services in the U.S. The $14 billion initially printed by the U.S. to dollarize Argentina would then

result in a transfer of goods from the U.S. to Argentina and a (undesired) monetary expansion in the U.S.

One problem, then, is guaranteeing that pesos are never reintroduced by Argentina. Retiring the peso is a mechanical operation; committing a government to future actions is much harder. This problem could be handled as follows. The monetary association could require Argentina to put the assets that are currently backing the monetary base in an escrow account in a third country (say, Switzerland). As long as Argentina never issues a national currency, it would receive the corresponding interest income, which is the seigniorage. (This seigniorage income could be shared with the U.S., depending on the terms of the treaty). However, if Argentina ever tried to issue a national currency, the U.S. would seize the assets. This arrangement uses Argentina's reserves (excluding Argentine bonds, obviously) as collateral. By making Argentina pay a high price for reintroducing pesos, this arrangement would give enough assurance to the U.S. that Argentina would never renege the monetary association. Argentina would also benefit from such an explicit commitment device. Since investors would be more easily convinced that Argentina would never reintroduce the peso, they would demand lower interest rates on their Argentine investments.

The problem with this arrangement, however, is that it only allows Argentina to retain the seigniorage on the initial stock of currency. But, as Argentina's output grows, demand for media of exchange may grow as well. After dollarization, Argentina would increase its currency stock by acquiring dollar notes with trade surpluses. This would work through arbitrage: If the demand for currency grows but the supply is constant, the price level in Argentina will fall relative to the U.S., prompting an export of goods from Argentina to the U.S. in exchange for dollars. Future increases in the money stock would thus take place in a decentralized way. There is no simple way to extend the escrow arrangement to account for these future increases without estimating each year the growth rate of the monetary base in Argentina. But that monetary base is in dollars, and it would be just as difficult as counting the dollar bills in circulation in, say, the Seventh Federal Reserve District. Yet these future increases could be quite substantial: As we saw in the previous section, the current monetary base may represent only one-sixth of all future seigniorage.

There are, thus, a number of practical difficulties with the idea of a monetary treaty between the U.S. and Argentina. It is also not clear what advantages the U.S. could draw from such an association, which would have to be approved by the U.S. Congress.[7]

The benefits of dollarization

The previous section described how dollarization could be implemented. But what benefits would dollarization have in a country like Argentina?

Credibility

Fixed exchange rates always present credibility problems and are subject to self-fulfilled speculative attacks. The reason is that if investors believe that the central bank will devalue the currency, they will want to exchange their peso assets into dollars, reducing the reserves of the central bank. If, for some reason, everybody believes that a devaluation will take place, the reserves of the central bank could be depleted, forcing it to devalue the peso. The advantage of having a currency board is that investors are guaranteed that the central bank will never run out of reserves (since its reserves exceed the currency in circulation).

Despite the fact that Argentina has been under a currency board since 1991, fears of devaluation are still present, as the Tequila and Vodka–Caipirinha effects have shown. Apparently, what investors fear is that the Argentine government will not be willing to lose all its reserves to maintain the convertibility of the peso, and that it will devalue if the run against the peso is large enough. At first glance, these fears seem unwarranted since the currency board has been, after all, established by law, and it would take another law approved by both houses of Congress to repeal it. However, the Argentine executive does have emergency powers that would allow it to suspend convertibility immediately by decree, subject to ratification by Congress after the fact. Going to the extreme, one can always imagine that a dishonest central bank may disobey the law, or that a coup may take place. (Argentina had coups in 1930, 1943, 1946, 1951, 1966, and 1976.) Certainly a currency board provides a stronger commitment device than having the government promise that it will never devalue the peso, but it is not perfect.

Dollarization would provide a much stronger commitment device, especially if it were done through a bilateral arrangement. If Argentina proceeded unilaterally, one can imagine that the Argentine government could find ways of reintroducing a national currency in the future. But it would be extremely difficult for Argentina to do so if an international treaty explicitly prohibited it. In this sense, a bilateral agreement would make Argentina's commitment more credible than unilateral dollarization.[8] In any case, even if dollarization were done unilaterally, it would be difficult for Argentina to reintroduce a national currency in an unanticipated manner.

It should make foreign investors feel safer about the returns of their investments.

Debt crises

Debt crises can be thought of as situations in which the repayment prospects of a country's sovereign debt (or its private sector debt) are sharply downgraded by international capital markets. In other words, the default risk is reevaluated. A debt crisis can occur because of objective, "fundamental" reasons, such as a radical modification of the components of the government's budget constraint: increased spending (either present, or in the form of future liabilities) or reduced revenues (because of a recession or internal turmoil). Such reasons have been put forward by Burnside, Eichenbaum, and Rebello (1999) to explain the Asian crises.

Alternatively, a debt crisis can be driven purely by expectations on the part of international markets that the government of said country is about to default, resulting in a drying up of lending to that country. The country's government is then faced with the choice of repaying the maturing debt (and thereby maintaining some hope of convincing lenders to return in the future) or simply defaulting and sparing itself the trouble of repaying the existing loans. Cole and Kehoe (1998) have shown that a government may, under normal conditions, have no incentive to default, but would decide to default if faced with foreign lenders who are convinced that it will. Such a default is purely driven by expectations.

At first glance, dollarization per se seems to have little relation to the mechanics of a debt crisis. In fact, the ability to default does not appear to depend on the ability to issue domestic currency. For instance, even in the U.S., where states have not repudiated debt in over a century, bond ratings vary from AAA (Minnesota) to A (New York). When debt crises are due to "fundamental" reasons, dollarization cannot do much to prevent them.

However, dollarization may play an important role in preventing debt crises that are driven purely by expectations. Let us suppose, for example, that the government cares mainly about the revenues it raises over time, say, to spend on its constituents. Defaulting spares the government from having to meet its obligations, increasing the funds available for spending now and in the future. The costs stem from severely diminished access to foreign credit, which can impair the country's growth and the government's tax base. If seigniorage is an option that becomes available after a default (because the government does not care about its international reputation anymore), the cost of default is smaller than if it does not become available. As a consequence, investors will rationally believe that the government will move more easily toward default if seigniorage is an option. This increases the likelihood of a self-fulfilling debt crisis. Since dollarization takes away the government's ability to raise seignorage, it may be a factor in reducing country risk.[9]

Some common objections

Certain issues raised in the debate over dollarization, in our opinion, have obscured the debate. These are issues related to the role of a lender of last resort and to the independence of monetary policy.

The role of a lender of last resort

One of the most frequent objections raised against dollarization is the loss of a domestic lender of last resort. Central banks have long performed the function of providing emergency funds to otherwise sound banks suffering a run, and fulfillment of this function was the main objective of the U.S. Federal Reserve Act of 1913, which established the Federal Reserve System.

The function of a lender of last resort is to be able to instantaneously provide liquidity to a bank. Given that banks obligate themselves to provide funds on demand to depositors, but hold assets that can be difficult to sell quickly, a bank can be in a situation where depositor demands exceed its liquid assets, and the bank is forced to suspend its payments and cease to operate. This can adversely affect the economywide system of payments.

Central banks that are free to create money have a particular ability to provide such liquidity. Since dollarization takes away that ability from central banks, it is feared that it would make bank runs more likely. But there are other ways to marshal liquidity. Furthermore, there are other ways to prevent bank runs. In fact, Argentina has devised such ways, in the wake of the Tequila crisis.

The Tequila crisis in Argentina can be seen in large part as a run on the Argentine banking sector, prompted by speculation and fears about the convertibility of the peso. After Mexico abandoned the peg of its currency in January 1995, total deposits fell 13 percent from January to March 1995, but the composition of deposits remained virtually the same: Dollar-denominated deposits fell from 57.7 percent to 57.2 percent of the total. Withdrawals were affecting dollar deposits as well as peso deposits.

Argentine officials learned the lesson, and implemented several mechanisms to deal with bank runs. One mechanism is the traditional imposition of liquidity requirements on banks. Originally, Argentine banks were required to hold peso reserves at the central bank, just like banks in the U.S. But the banking crisis of 1995 was brought about by doubts over the convertibility of the peso, and, at such a time, peso reserves did not offer strong assurances. This led to a radical change in the reserve requirements. As of August 1995, there are no longer any reserves held at the central bank. Banks now meet the requirements with a variety, broadened over time, of interest-bearing, dollar-denominated financial instruments, either foreign assets or domestic assets held with a put option against an A-rated foreign bank (the put option allows the bank to sell the domestic asset to the foreign bank in exchange for foreign assets). The central bank has total discretion in setting the reserve requirements. Each depositor has a claim on these reserves up to $5,000. In October 1999, these reserves amounted to $17.1 billion, about 21 percent of deposits. By way of comparison, the reserves of the U.S. financial system amount to 1.3 percent of deposits.

A second mechanism is the use of the foreign exchange reserves that the central bank has accumulated in excess of the requirements of the convertibility law. A law passed in April 1995 authorizes the central bank to lend these excess reserves to illiquid banks on a short-term basis against collateral. As of November 23, these reserves stood at about $3.4 billion, or about 4 percent of private sector deposits.

A third mechanism is a deposit insurance fund, created in May 1995, to which banks must contribute on a risk-adjusted basis; it is intended to reach the level of 5 percent of deposits. Deposits are insured up to $30,000 each. Again, by way of comparison, the U.S. Federal Deposit Insurance Corporation's bank insurance fund amounts to 1.3 percent of total insured deposits.

Finally, in December 1996 Argentina arranged a collection of contingent repurchase contracts with a consortium of (currently 14) private foreign banks. Each contract gives the central bank the right to enter at any time t of its choosing, and for a duration T of its choosing up to T_{max} (between two and five years depending on the contract), into a repurchase agreement of Argentine government bonds for U.S. dollars with that foreign bank: The central bank sells the bonds at t and repurchases them at $t + T$. The repurchase price implies a rate of LIBOR (London interbank offered rate) plus 200 basis points. The contracts are renewed every three months by mutual consent. Thus, if a bank cancels its contract at t, it is still obligated to enter into the repurchase agreement up to $t + T_{max}$. In this manner, the central bank can avail itself of liquidity quickly in case of a crisis. In October 1999 the facility amounted to $7.35 billion, about 9 percent of total deposits; the goal is to keep it at about 10 percent of deposits. The cost of the facility is 32 basis points per year ($23 million per year). An interesting clause in the contracts is that the facilities are all void and the foreign banks are freed from all obligations if Argentina defaults on its sovereign external debt.

This last mechanism is of interest because it suggests that, ultimately, the ability to play the role of lender of last resort rests on the government's taxing power. The contingent repurchase facility allows the central bank to translate this future source of funds into immediately available funds without any need for the printing press.

Put together, these mechanisms provide Argentina with protection for about 39 percent of its deposits (that is, M3), or more than 2.4 times the monetary base. How extensive is this protection in comparison with that afforded by a central bank with the discretionary power to act as lender of last resort? The most notable use of the lender-of-last-resort power by the U.S. Federal Reserve in recent times occurred after the stock market crash of October 1987. In the week that followed, the monetary base increased by 1.3 percent, the largest weekly increase of the past 25 years. That action was deemed sufficient to prevent a liquidity crisis in the U.S. financial system. The Argentine central bank's contingent repurchase facility alone provides it with the ability to increase the monetary base by 50 percent. Argentina's protections are thus substantial.

Independence of monetary policy

Another common objection to dollarization is that Argentina would lose its ability to conduct monetary policy: It would be unable to pursue expansionary monetary policy during recessions. On top of this, Argentina may be subject to increases in the U.S. federal funds rate precisely when it most needs the rate to go down, that is, during recessions in Argentina.

The concern that Argentina will not have an independent monetary policy is an important one. However, we need to keep two key points in mind.

First, it is admittedly not clear that dollarization will lead to better outcomes than a *good* independent policy. However, a choice between a good independent policy and dollarization may not be the choice that Argentina faces. Argentina's independent monetary policies of the past are illustrated in the high inflation rates of figure 5. It appears that successive

Argentine governments could not resist the temptation of using the printing press to finance persistently large deficits, with disastrous consequences for the economy.[10] There are theoretical reasons to believe that the country could be better off tying itself to a simple monetary policy rule than resorting to discretionary policy, as box 1 illustrates.

The second key point is that Argentina has already made the decision of surrendering its ability to pursue discretionary monetary policy by introducing a currency board. But Argentina is now in an unpleasant situation. With the currency board, the country has lost the ability to pursue an active monetary policy, but it is still unable to obtain the full benefits of that act of abnegation. Dollarization, for Argentina, is thus not a question of choosing between a rule and discretion, but rather of reaping the benefits of a choice that it has already made.

The worry that dollarization will make Argentina too vulnerable to U.S. interest rate policies is unwarranted. Whether Argentina is vulnerable to U.S. interest rates does not depend on dollarization but on how open the economy is to capital flows. In principle, Argentina could dollarize its economy at the same time as it closes its economy to capital flows, completely isolating itself from U.S. interest rates. Argentina will be vulnerable to U.S. interest rates only as long as it allows for unrestricted capital flows.

In fact, Argentina is extremely open to capital flows at present. Consequently, it is already subject to the effects of variations in international interest rates. Argentina has decided that the benefits of international capital flows more than compensate for the costs of having its interest rates tied to the international interest rate. As figures 6 and 7 show, changes in U.S. interest rates are negligible compared with the sharp increases in interest rates associated with the Tequila and Vodka–Caipirinha effects. Those sharp increases are the source of concern and are what Argentina wants to eliminate by completely dollarizing the economy.

Another concern that has been raised is that once Argentina dollarizes, the U.S. Federal Reserve will be under pressure to take into account economic conditions in Argentina when deciding its interest rate policy. But as we have mentioned, Argentina is already subject to the full consequences of the Fed's decisions, yet exerts no influence on policymaking in the U.S. We would not expect Argentina's influence to become any larger than it is at present.

A cost–benefit analysis

Assuming that dollarization would eliminate Tequila type of crises, would it be in Argentina's best interest to dollarize even if had to do it unilaterally? We estimated earlier that the annual cost in terms of seigniorage is 0.2 percent of GDP. If we think of the loss of seigniorage following dollarization in the same way as the contingent repurchase facility, namely, as an insurance premium against crises of the Tequila type, under what circumstances would 0.2 percent be an actuarially fair price? To answer this question, we have to model the risk that is being insured, however crudely.

As figure 4 shows, the Argentine economy grew at a steady 8 percent annual rate from 1990:Q1 to 1994:Q4 and then again at the same rate from 1995:Q4 to 1998:Q2. The Tequila effect appears as a permanent shock to the output level in 1995, which did not affect growth rates before or after. (Had output continued to grow without interruption, it would now be higher than it is: The loss was never made up).

Let us think of Tequila effects as follows. Every year, a Tequila shock might occur, with some probability, independently of previous occurrences. If the shock occurs, output is lower than it would have been in the absence of a shock. Afterwards, growth resumes at its normal rate, but output is permanently lower than it would have been without the shock. This model embodies what we see in figure 4, namely, that the growth rate was not permanently affected by the Tequila effect, but a sharp reduction in output occurred in 1995. Output is adversely affected through the sharp increases in interest rates shown in figure 7, due to a higher perceived devaluation risk. Dollarization would eliminate this risk, protecting the real economy from these "contagion effects."

For the Tequila effect, the permanent output loss turned out to be about 14 percent. Current forecasts for GDP growth in 2000 suggest that the impact of the Asian crisis will be the same size or greater. We do not know what the annual probability of a Tequila effect is, but we can calculate what it would have to be in order to make Argentina indifferent between dollarizing and not dollarizing. That probability is the annual cost of dollarization (0.2 percent of GDP) divided by the benefit of dollarization (14 percent of GDP), namely 1.4 percent. Given that Argentina has been hit twice in ten years, unilateral dollarization is unambiguously desirable under those assumptions. Put another way, if the annual probability of a Tequila effect is 20 percent (consistent with two occurrences

BOX 1

Rules versus discretion

One of the great lessons of the macroeconomic literature in the past 20 years has been to highlight the temptations inherent in monetary policy, which have come to be known as the time-commitment problem. Aside from raising seigniorage, the other reason for governments to resort to inflation is the Phillips curve. Originally thought of as a firm statistical law that offered a trade-off between inflation and unemployment, it is now mostly seen as a trade-off that depends on the degree to which the private sector fails to correctly anticipate the actual inflation rate (the "expectations-augmented Phillips curve"). The particular temptation that this relation induces was shown by Kydland and Prescott (1977). The following very stark presentation draws on Sargent (1999). The story has two variables, unemployment U and inflation y. It has three components: the government, the private sector's expectations, and the Phillips curve.

The government wants to minimize both unemployment and inflation. Its objective is of the form

$$1) \quad -\frac{1}{2}\left(U^2 + y^2\right).$$

Obviously, the best outcome for the government is $y = 0$ and $U = 0$. The government chooses inflation y from a set of possible values $Y = [0, \bar{y}]$. It does not choose U directly: that is determined by the Phillips curve.

The Phillips curve relates unemployment with its "natural rate" U^* and the degree to which inflation is unanticipated. Let x represent private-sector expectations of inflation:

$$2) \quad U = U^* - \theta(y - x),$$

where $\theta > 0$ is the slope of the Phillips curve; the higher the slope, the more effective unanticipated inflation is in stimulating the economy.

Finally, the private sector sets its expectations of government. We will assume rational expectations in the simplest form, that the private sector is always correct and accurately predicts y:

$$3) \quad x = y.$$

The commitment problem can be thought of as a problem of timing of moves between the government and the private sector. In one configuration, the government moves first and sets inflation before the private sector sets its expectations. The government cannot revisit its choice later on. The predicted outcome is then the solution to the government choosing y to maximize equation 1 subject to equations 2 and 3. Since equation 3 must always hold no matter what the government does, equation 2 becomes $U = U^*$: Unemployment is what it is. All that the government can do is set the inflation rate as low as possible, at $y = 0$.

In another configuration, the government moves last. The problem then becomes the solution to the government choosing y to maximize equation 1 subject to equation 3, *given* x, and, *separately*, equation 2 holding. No matter what x is, the government will want to choose a high value of y to take advantage of the Phillips curve. But the private sector, while moving first, will anticipate this action (equation 2). The result is the same unemployment U^* with high inflation.

This is, of course, a very stylized model, but it conveys the nature of the temptation inherent in the expectations-augmented Phillips curve. One way to resolve it is to somehow arrange for the first timing configuration to prevail rather than the second. But, aside from Athenian democracy and the odd Swiss canton, delegated government is a necessity, which means the government always moves last. The other way to resolve it is to accept the second timing configuration, with the government moving last, but to change the choice set of the government. Dollarization is a way to reduce Y to the single point $\{0\}$. The best outcome is then achieved.

per decade), a permanent loss of output of 1 percent would make the insurance premium actuarially fair.

Conclusion

Argentina's history has made it painfully aware of the risks involved in allowing a central bank, or government, full discretion in the setting of monetary policy. This led Argentina to establish a currency board in 1991, which is one step short of dollarization. In doing so, it has demonstrated that it is feasible for a country to relinquish control over its monetary policy. It has also shown what steps can be taken to address the loss of a lender of last resort.

Nevertheless, Argentina has suffered from several recessions that can in part be linked to speculative attacks on the currency. These attacks, in turn, were prompted by fears that Argentina's commitment to the currency board was less than full. Thus, full backing

for the currency is not enough to instill full confidence in the currency. Investors' fears are understandable, given Argentina's history.

The main argument for Argentina's dollarization above and beyond the currency board is that it would prevent or attenuate the crises that have stunted Argentina's growth in the 1990s. However, before Argentina decides to dollarize it must weigh very carefully the consequences of losing the ability of pursuing an independent monetary policy. The fact that Argentina has followed bad monetary policy in the past does not mean that it could not do much better in the future.

NOTES

[1]An optimal currency area is a geographical area that would benefit from sharing a common currency.

[2]Under a currency board, a country's currency is fully backed by foreign reserves.

[3]As of November 23, 1999, only 3 percent of reserves were actually held in that form.

[4]The projections shown in figure 3 reflect the Fiscal Convertibility Law, passed in August 1999, which requires a balanced budget by 2003.

[5]On January 12, the central bank dollarized the banks' reserves. This explains the sudden drop in the monetary base in figure 8.

[6]Figure 9 shows only the currency in circulation, since the monetary base at present consists of nothing else.

[7]In addition to the political issues involved, it is not clear what would be the best strategy for the U.S. from a revenue maximizing point of view. It is true that the U.S. could obtain some of Argentina's seignorage by joining it in a monetary union, but the U.S. could obtain all of Argentina's seignorage by letting it dollarize unilaterally. The risk of following such a strategy is that Argentina may not be willing to dollarize at all.

[8]No commitment device is absolute. Unless Argentina becomes the fifty-first state of the (North American) Union, it remains a sovereign state, and its Congress has the constitutional authority to establish and regulate a currency, just as the U.S. Congress does. However, if Argentina's reserves were put in an escrow account as collateral in the form discussed in the previous section, Argentina would have no incentives to renege the agreement.

[9]Such an argument hinges on dollarization being difficult to reverse, once accomplished. It is plausible that a government that has just defaulted on its debt would have difficulty generating much of a demand for a new currency it proposed to issue. Without a demand for money, there is no monetary base on which to collect seigniorage. It thus appears that dollarization might reduce the perception of default risk.

[10]Argentina is not the only country in which an independent monetary policy has had bad consequences for the economy. The calculations in Schmitt-Grohé and Uribe (1999) show that dollarization would cost Mexico 2 percent of consumption compared with a variety of reasonable independent policies. But, they find that the actual independent policy that Mexico followed in the past has cost the country 95 percent of its potential consumption.

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