

SUMMARY

Dollarization occurs when residents of a country extensively use foreign currency alongside or instead of the domestic currency. Dollarization can occur unofficially, without formal legal approval, or it can be official, as when a country ceases to issue a domestic currency and uses only foreign currency. The idea of dollarization has gained prominence in the last year because several countries have considered official dollarization. As of late January 2000, Ecuador is seriously considering it.

Since interest in official dollarization is fairly new, published information on the subject is scarce, though it has been expanding in the six months since the original version of this study appeared. This study explains the basic features of dollarization: what varieties it takes, where it exists, how it works, what the costs and benefits of official dollarization are, and what issues arise in implementing official dollarization.

The earlier version of this study is also available online in a [Spanish](#) translation.

1. INTRODUCTION

Dollarization occurs when residents of a country extensively use the U.S. dollar or another foreign currency alongside or instead of the domestic currency. Unofficial dollarization occurs when individuals hold foreign-currency bank deposits or notes (paper money) to protect against high inflation in the domestic currency. Official dollarization occurs when a government adopts foreign currency as the predominant or exclusive legal tender.

Unofficial dollarization has existed in many countries for years. It has attracted much study by economists, but far less political attention because it is to a certain extent beyond the control of governments. Dollarization has been in the news lately because of interest in official dollarization. In early 1999 the government of Argentina stated that it sought a formal agreement with the United States to become officially dollarized. Argentina or any other country can become officially dollarized even without a formal agreement, but there may be economic and political benefits to a formal agreement. Argentina's action sparked discussion of official dollarization in other Latin American countries, including Ecuador. On January 9, 2000, Ecuador's president proposed dollarization as a way of helping his country out of a deep recession and political turmoil. On January 21 political unrest forced him out of office, but his successor has expressed support for dollarization. As of late January it remains to be seen whether Ecuador will implement dollarization. On January 24, administrators of the United Nations announced that for the time being, the dollar will be the official currency of East Timor, which recently regained independence from Indonesia.

The largest independent country that currently has official dollarization is Panama. However, dollarization potentially has widespread application in developing countries because few have currencies that have performed as well as the U.S. dollar. Consider a simple three-part test of currency quality from 1971 (the last year of the gold standard) to the present: no years of inflation over 20 percent, loss of value against the dollar of no more than 25 percent, and no restrictions on buying foreign currency since the end of the gold standard. The United States passes the test, but among developing countries that are members of the International Monetary Fund (IMF), only Panama passes. This indicates that many developing countries could have had much higher-quality currencies by replacing their domestically issued currencies with the dollar. Had they not wanted to use the dollar, they could also have done well by using the German mark or Japanese yen, the two other leading international currencies.

Until 1999, official dollarization received practically no attention because it was considered a political impossibility. Published information on official dollarization is therefore scarce, though it has been expanding since the original version of this study appeared in July 1999. (1) To make information more widely available, this report explains the basic features of dollarization: what varieties it takes, where it exists, how it works, what the costs and benefits of official dollarization are, and what issues arise in implementing official dollarization.

A previous Joint Economic Committee staff report (JEC 1999) focused on official dollarization from the standpoint of the United States and discussed "dollarization" in terms of the U.S. dollar only. This report has a broader focus, so "dollarization" here refers to any foreign currency used alongside or instead of the domestic currency, whether officially or unofficially. Official dollarization using the U.S. dollar will, however, receive special emphasis since it is the variety of dollarization most relevant for policy discussion in the United States. This report focuses on practical aspects of dollarization. A companion staff report from the Senate Banking Committee (Stein 1999a) surveys economic arguments for and against official dollarization.

2. VARIETIES OF DOLLARIZATION

Dollarization has three main varieties: unofficial dollarization; semiofficial dollarization; and official dollarization.

Unofficial dollarization. Unofficial dollarization occurs when people hold much of their financial wealth in foreign assets even though foreign currency is not legal tender. (Legal tender means that a currency is legally acceptable as payment for all debts, unless perhaps the parties to the payment have specified payment in another currency. Legal tender differs from forced tender, which means that people must accept a currency in payment even if they would prefer to specify another currency.) The term "unofficial dollarization" covers both cases where holding foreign assets is legal and cases where it is illegal. In some countries it is legal to hold some kinds of foreign assets, such as dollar accounts with a domestic bank, but illegal to hold other kinds of foreign assets, such as bank accounts abroad, unless special permission has been granted.

Unofficial dollarization can include holding any of the following:

- foreign bonds and other nonmonetary assets, generally held abroad;
- foreign-currency deposits abroad;
- foreign-currency deposits in the domestic banking system; or
- foreign notes (paper money) in wallets and mattresses.

Unofficial dollarization often occurs in stages that correspond to the textbook functions of money as a store of value, means of payment, and unit of account. In the first stage, which economists sometimes call "asset substitution," people hold foreign bonds and deposits abroad as stores of value. They do so because they want to protect against losing wealth through inflation in the domestic currency or through the outright confiscations that some countries have made. In the second stage of unofficial dollarization, which economists sometimes call "currency substitution," people hold large amounts of foreign-currency deposits in the domestic banking system (if permitted), and later foreign notes, both as a means of payment and as stores of value. Wages, taxes, and everyday expenses such as groceries and electric bills continue to be paid in domestic currency, but expensive items such as automobiles and houses are often paid in foreign currency. In the final stage of unofficial dollarization, people think in terms of foreign currency, and prices in domestic currency become indexed to the exchange rate.

Where unofficial dollarization exists. Measuring the extent of unofficial dollarization is difficult. Accurate statistics on how much people hold in foreign bonds, bank deposits, or notes and coins are usually unavailable. However, estimates of the extent to which notes of the U.S. dollar and a few other currencies circulate outside their countries of origin give a rough idea of how widespread unofficial dollarization is. Researchers at the Federal Reserve System estimate that foreigners hold 55 to 70 percent of U.S. dollar notes, mainly as \$100 bills (Porter and Judson 1996, p. 899). The amount of

dollar currency in circulation is currently about \$480 billion, which implies that foreigners hold roughly \$300 billion. A study by the Bundesbank, Germany's central bank, estimates that foreigners hold 40 percent of German mark notes (Seitz 1995).

Another way to measure unofficial dollarization is by the proportion of foreign-currency deposits in the domestic banking system. A recent survey of selected developing countries by the IMF found 52 that were highly or moderately dollarized as of 1995 (Baliño and others 1999, pp. 2-3).⁽²⁾ The notes to Table 1 list the countries.

In most unofficially dollarized countries, the U.S. dollar is the foreign currency of choice. That is particularly true in Latin America and the Caribbean, where the United States is the largest or second-largest trading partner and the largest source of foreign investment for almost every country. Russia is also dollarized unofficially to a large extent: it has been estimated that Russians hold as much as \$40 billion of dollar notes (Melloan 1998). The German mark is the foreign currency of choice in the Balkans. Like the French franc, Italian lira, Spanish peseta, and a number of other Western European currencies, the mark is now a subdivision of the European euro. Euro notes and coins will replace national notes and coins throughout the "Euroland" in 2002. The euro should then become a stronger rival to the dollar as the foreign currency of choice in the former Soviet Union, Africa, and the Middle East.

Table 1 lists countries that have unofficial dollarization in the sense of widespread use of any foreign currency, not just the U.S. dollar. The dollar and the German mark are the only currencies so widely used outside their countries of origin as to have worldwide significance. The use of other currencies abroad is limited; in particular, despite the large size of Japan's economy, the Japanese yen seems to be little used abroad.

Semiofficial dollarization. More than a dozen countries have what might be called semiofficial dollarization or officially bimonetary systems. Under semiofficial dollarization, foreign currency is legal tender and may even dominate bank deposits, but plays a secondary role to domestic currency in paying wages, taxes, and everyday expenses such as grocery and electric bills. Unlike officially dollarized countries, semiofficially dollarized ones retain a domestic central bank or other monetary authority and have corresponding latitude to conduct their own monetary policy. Table 1 lists semiofficially dollarized countries.

Official dollarization. Official dollarization, also called full dollarization, occurs when foreign currency has exclusive or predominant status as full legal tender. That means not only is foreign currency legal for use in contracts between private parties, but the government uses it in payments. If domestic currency exists, it is confined to a secondary role, such as being issued only in the form of coins having small value.

Officially dollarized countries vary concerning the number of foreign currencies they allow to be full legal tender and concerning the relationship between domestic currency--if it exists--and foreign currency. Official dollarization need not mean that just one or two foreign currencies are the only full legal tenders; freedom of choice can provide some protection from being stuck using a foreign currency that becomes unstable. Most officially dollarized countries give only one foreign currency status as full legal tender, but Andorra gives it to both the French franc and the Spanish peseta. In most dollarized countries, private parties are permitted to make contracts in any mutually agreeable currency.

Some dollarized countries do not issue domestic currency at all, while others, such as Panama, issue it in a secondary role. Panama has a unit of account called the balboa equal to the dollar and issues coins but not notes. In practice, there is no difference between the balboa and the dollar; the balboa is simply the Panamanian name for the dollar.

Where official dollarization exists. Many countries have used foreign currency at some point in their history: in the United States, foreign coins were legal tender until 1857.⁽³⁾ As Table 2 shows, 29 countries today officially use the U.S. dollar or some other foreign currency as their predominant currency. Of those, 15 are territories that are not independent, such as the U.S. Virgin Islands. With minor exceptions they use the currency of their "mother" country. The table includes only dependencies that have a high degree of self-government, but there are some borderline cases that other observers might count as being part of the mother country.

Of the 14 officially dollarized countries that are independent, Panama is several times larger in population and economy than all the rest combined. As of 1997, Panama had 2.7 million people and a gross domestic product (GDP) of \$8.7 billion. Independent officially dollarized countries use either the currency of a large neighbor or, in the case of Pacific Ocean islands, the currency of their former colonial power. Official dollarization is rare today except among very small countries because of the political symbolism of a national currency and economic factors such as the perceived costs of dollarization. Argentina, which brought official dollarization to its current prominence, has 33 million people and a GDP of about \$300 billion, so official dollarization there would be a giant leap in scale compared to the countries where it now exists. Yet compared to the United States, the economy of Argentina or any other developing country is small. Argentina's economy is nearly the same size as Michigan's--3.4 percent of the U.S. economy.

Performance of dollarized countries. The economic performance of unofficially and semiofficially dollarized countries has been highly variable, but generally unimpressive. One reason is that their domestic currencies have often been of low quality, and have hampered economic growth by causing high inflation and other problems. Laws that compel people to use the domestic currency, especially for payment of wages and taxes, create some artificial demand even for a low-quality domestic currency.

There seem to be no studies that systematically compare the performance of officially dollarized countries with the performance of countries having other monetary systems. Part of the explanation is that data are hard to find except for Panama. Panama has had respectable though not spectacular economic growth, an average rate of inflation even lower than that of the United States, and no major bank failures. Interest rates for retail borrowers and lenders have been roughly two percentage points higher than rates in the United States, while interbank rates have been even closer to U.S. levels. Other than the U.S. commonwealth of Puerto Rico, Panama is the only Latin American country where private lenders are willing to make 30-year fixed-rate mortgages. A previous report (JEC 1999, p. 33) summarized Panama's performance, and detailed information is available elsewhere (Moreno-Villalaz 1999).

Although systematic studies focusing on officially dollarized countries are lacking, more general studies exist. They compare the performance of developing countries with central banks to developing countries with more rule-bound monetary systems, including official dollarization and currency boards. These studies find that the more rule-bound monetary systems have generally outperformed central banking in developing countries (Ghosh and others 1998, Hanke 1999, Hausmann and others 1999, Schuler 1996). Another important but frequently neglected body of evidence comes from internal rather than cross-country experience. Official dollarization works much like the monetary system among regions of a single country: Panama has much the same relationship to New York that Pennsylvania and Puerto Rico do. Among regions of a single country, monetary systems typically operate without many of the problems that arise at the international level because countries have separate currencies (Ingram 1962).

Table 1. Unofficially and Semiofficially Dollarized Countries as of January 2000

Unofficially dollarized--U.S. dollar: Most of Latin America and the Caribbean, especially Argentina, Bolivia, Mexico, Peru, and Central America; most of the former Soviet Union, especially Armenia, Azerbaijan, Georgia, Russia, and Ukraine; various other countries, including Mongolia, Mozambique, Romania,

Turkey, and Vietnam.

Semiofficially dollarized--U.S. dollar: Bahamas, Cambodia, Haiti, Laos (also Thai baht), Liberia.

Unofficially dollarized--other currencies: French franc--some former French colonies in Africa; German mark--Balkans; Hong Kong dollar--Macau and southern China; Russian ruble--Belarus.

Semiofficially dollarized--other currencies: Bhutan (Indian rupee); Bosnia (German mark, Croatian kuna, Yugoslav dinar); Brunei (Singapore dollar); Channel Islands, Isle of Man (British pound); Lesotho (South African rand); Luxembourg (Belgian franc); Montenegro (German mark, Yugoslav dinar); Namibia (South African rand); Tajikistan (use of foreign currencies permitted--Russian ruble widespread).

Notes: The list of unofficially dollarized economies is not exhaustive because the extent of unofficial dollarization is difficult to measure. An IMF survey based on data of foreign-currency deposits alone classifies 18 countries as "highly dollarized" as of 1995, meaning that foreign-currency deposits exceeded 30 percent of a broad measure of the money supply. The countries are Argentina, Azerbaijan, Belarus, Bolivia, Cambodia, Costa Rica, Croatia, Georgia, Guinea-Bissau, Laos, Latvia, Mozambique, Nicaragua, Peru, S o Tom  and Pr ncipe, Tajikistan, Turkey, and Uruguay. The survey classifies as "moderately dollarized" another 34 countries, where foreign-currency deposits averaged 16.4 percent of a broad measure of the money supply. Those countries are Albania, Armenia, Bulgaria, Czech Republic, Dominica, Ecuador, Egypt, El Salvador, Estonia, Guinea, Honduras, Hungary, Jamaica, Jordan, Lithuania, Macedonia, Malawi, Mexico, Moldova, Mongolia, Pakistan, Philippines, Poland, Romania, Russia, Sierra Leone, Slovak Republic, Trinidad and Tobago, Uganda, Ukraine, Uzbekistan, Vietnam, Yemen, and Zambia (Balino and others 1999, pp. 2-3).

Semiofficially dollarized countries are those that the IMF (1998) identifies as having foreign currency as "other legal tender," meaning that foreign currency circulates widely but plays a secondary legal role to the domestic currency. A few other countries, notably Argentina and Bolivia, allow foreign currency a legal role but apparently not so extensive as in semiofficially dollarized countries, so the list omits them.

Table 2. Officially Dollarized Countries as of January 2000

Country	Population	GDP(\$bn)	Political status	Currency	Since
Andorra	73,000	1.2	Independent	French franc, Spanish peseta, own diner coins	1278
Cocos (Keeling) Islands	600	0.0	Australian external territory	Australian dollar	1955
Cook Islands	18,500	0.1	New Zealand self-governing territory	New Zealand dollar	1995
Cyprus, Northern	180,000	1.4	De facto independent	Turkish lira	1974
East Timor	857,000	0.2	Independent	U.S. dollar	2000
Greenland	56,000	0.9	Danish self-governing region	Danish krone	before 1800
Guam	160,000	3.0	U.S. territory	U.S. dollar	1898
Kiribati	82,000	0.1	Independent	Australian dollar, own coins	1943
Liechtenstein	31,000	0.7	Independent	Swiss franc	1921
Marshall Islands	61,000	0.1	Independent	U.S. dollar	1944
Micronesia	120,000	0.2	Independent	U.S. dollar	1944
Monaco	32,000	0.8	Independent	French franc/euro	1865
Nauru	10,000	0.1	Independent	Australian dollar	1914
Niue	1,700	0.0	New Zealand self-governing territory	New Zealand dollar	1901
Norfolk Island	1,900	0.0	Australian external territory	Australian dollar	before 1900?
N. Mariana Is.	48,000	0.5	U.S. commonwealth	U.S. dollar	1944
Palau	17,000	0.2	Independent	U.S. dollar	1944
Panama	2.7 mn	8.7	Independent	U.S. dollar, own balboa coins	1904
Pitcairn Island	42	0.0	British dependency	New Zealand, U.S. dollars	1800s
Puerto Rico	3.8 mn	33.0	U.S. commonwealth	U.S. dollar	1899
Saint Helena	5,600	0.0	British colony	British pound	1834
Samoa, American	60,000	0.2	U.S. territory	U.S. dollar	1899

San Marino	26,000	0.1	Independent	Italian lira/euro, own coins	1897
Tokelau	1,500	0.0	New Zealand territory	New Zealand dollar	1926
Turks and Caicos Is.	14,000	0.1	British colony	U.S. dollar	1973
Tuvalu	11,000	0.0	Independent	Australian dollar, own coins	1892
Vatican City	1,000	0.0	Independent	Italian lira/euro, own coins	1929
Virgin Islands, U.K.	18,000	0.1	British dependency	U.S. dollar	1973
Virgin Islands, U.S.	97,000	1.2	U.S. territory	U.S. dollar	1934
United States	268 mn	8,100	Independent	U.S. dollar	1700s

Sources: CIA 1998; The Statesman's Year-Book; IMF 1998; World Bank 1999.

Notes: Italics indicate countries using the U.S. dollar. Population and gross domestic product (GDP) are 1997 or most recent prior year available. The United States is included for comparison. As of mid January 2000, Ecuador is debating official dollarization. Kosovo, which uses the German mark as its official currency, is not on the list because it is still officially part of Serbia.

3. HOW DOLLARIZATION WORKS

Unofficial dollarization. Most studies economists have written about dollarization have concerned unofficial dollarization, especially its "currency substitution" phase. (That is the phase at which people use foreign currency to pay for expensive items even though legally they are supposed to use the domestic currency.) The findings of the studies have varied widely because unofficial dollarization has mixed effects. On the one hand, it can make demand for the domestic currency unstable. If people switch into foreign currency suddenly, that can cause the domestic currency to depreciate, starting an inflationary spiral. Where people hold extensive foreign-currency deposits, a change in domestic or foreign interest rates can trigger large shifts from one currency to the other, as a means of speculating about the exchange rate. Such shifts complicate the job of a central bank that is trying to target the domestic money supply.

On the other hand, unofficial dollarization provides a hedge against inflation in the domestic currency and can increase the stability of the banking system. Allowing domestic banks to accept deposits in foreign currency means that depositors do not have to send their money out of the country when they want to switch it into foreign currency. The risk of a currency devaluation causing a bank run therefore becomes smaller. In some cases the "instability effect" on the demand for money is more important, while in other cases the "stability effect" on the banking system is more important. Accordingly, economists are divided about whether unofficial and semiofficial dollarization are desirable or undesirable (see Revista 1992).

Official dollarization. Official dollarization is easier to analyze than unofficial dollarization because by eliminating the domestic currency it eliminates problems from shifts between domestic currency and foreign currency. And since high inflation and other monetary problems in developing countries more often originate from the domestic currency rather than from the most widely used foreign currencies, official dollarization eliminates those problems.

An officially dollarized country is part of a unified currency zone with the country whose currency it uses, hereafter called the issuing country. To repeat, Panama has much the same relationship to New York that Pennsylvania and Puerto Rico do. An officially dollarized country relinquishes an independent monetary policy and "imports" the monetary policy of the country whose currency it uses. Within the unified currency zone, arbitrage--buying and selling to take advantages of differences in prices--tends to keep prices of similar goods within a narrow range. If a computer costs \$500 in the United States, in Panama it cannot cost more than \$500 plus extra taxes and shipping costs, otherwise it becomes profitable to ship computers from the United States to Panama until the difference in price vanishes. The same is also true of trade in computers between the United States and Mexico, but because Mexico has a separate currency, currency risk imposes extra costs to arbitrage that do not exist for trade between the United States and Panama.

Because arbitrage tends to keep prices of similar goods within a narrow range throughout the unified currency zone, inflation rates tend to be broadly similar throughout the zone. Inflation need not be exactly the same all over the zone, however: prices for goods that are not mobile, particularly real estate and labor, can rise faster than average in fast-growing areas, reflecting that economic growth is making the goods more valuable. There is nothing unusual about that; the same happens to different regions of a single country.

Interest rates also tend to be broadly similar throughout the zone: if 30-year mortgages have an interest rate of 8 percent in the United States, the rate cannot be too much higher in Panama, otherwise it becomes profitable for banks to lend for mortgages in Panama until the difference vanishes. Some difference in interest rates can persist, however, because of country risk (political factors that affect the security of property rights). Interest rates will be most closely synchronized if there is financial integration, which is discussed below.

Just as for a region within a country, in an officially dollarized country the supply of money is determined "automatically" by the balance of payments, which itself reflects people's preferences for holding versus spending money. The issuing country determines the amount of the monetary base in existence (notes and coins in circulation, plus bank reserves). The monetary base then comes to be held by people in various regions or countries according to the intensity of their demand for it. If people want to acquire more foreign-currency notes, they have to spend less, other things being equal; if they have more foreign-currency notes than they want, they can get rid of them by spending more.

As for a region, though, the current-account balance (trade in goods and services) does not rigidly determine the supply of money, because people can also acquire or dispose of spending power through capital-account transactions (trade in financial assets--in other words, obtaining or making loans). Suppose that in one year Panama has sold \$6 billion of goods and services to the rest of the world but has bought \$7 billion; then its current-account deficit for the year is \$1 billion. That does not mean its money supply must contract by \$1 billion. If during the same year Panamanians invest nothing abroad and foreigners invest \$2 billion in Panama, the capital-account surplus is \$2 billion, making the combined surplus \$1 billion and meaning that the money supply can expand rather than contract.

An officially dollarized country cannot respond to economic shocks, such as an increase in the price of oil, by altering the exchange rate of its currency. However, it still has other methods of adjustment at its disposal: flows of capital into or out of the country to offset the shock, changes in the government budget, and changes in prices and (less often) wages. A country experiencing a "real" economic shock ultimately has to adjust by experiencing "real" pain or gain. Altering the exchange rate can perhaps soften but not avoid the need for real adjustment.

Financial integration. If official dollarization goes no further than using a foreign currency, it does not achieve its full potential benefits. An officially dollarized country has a unified currency with the issuing country, but not necessarily an integrated financial system. To achieve financial integration, a country must allow foreign financial institutions to compete with domestic financial institutions. Full financial integration occurs when the law allows financial institutions extensive freedom of action to compete and does not discriminate against foreign institutions. In particular, it means that foreign financial institutions can establish branches, accept deposits and make loans, buy up to 100 percent of domestic institutions, and move funds freely into and out of the country.

Financial integration plus official dollarization using a leading international currency (the dollar, euro, or yen) makes a country part of a large and liquid international pool of funds. Consequently, the location of loans need not be closely linked to the location of deposits. Citibank, for example, does not need to balance its loans and deposits in Panama any more than it needs to balance its loans and deposits in Pennsylvania. It can borrow where the cost of funds is lowest and lend where the risk-adjusted potential for profit is highest anywhere in the dollar zone. The ability of the financial system to switch funds without exchange risk between an officially dollarized country and the issuing country reduces the booms and busts of foreign capital that often arise in countries having independent monetary policies and financial systems not well integrated into the world system. It also helps stabilize the real exchange rate (a measure of the effect of the exchange rate and inflation on the competitiveness of exports [Moreno-Villalaz 1999, pp. 422-4]).

Besides helping to stabilize the economy, financial integration improves the quality of the financial system by allowing consumers access to financial institutions that have proved their competence internationally. That forces domestic financial institutions to be high quality to compete with foreign institutions. Moreover, foreign financial institutions can lend funds to domestic institutions when domestic institutions lack liquidity. Ready access to foreign funds offers a dollarized country a substitute for the central bank function of a lender of last resort.

4. COSTS AND BENEFITS FOR THE UNITED STATES

Let us now consider the consequences for the United States of more countries using the U.S. dollar as their official currency.

Seigniorage. The revenue from issuing currency is called seigniorage. Net seigniorage is the difference between the cost of putting money into circulation and the value of the goods the money will buy. (Gross seigniorage, a related concept, ignores the cost of putting the money into circulation.)

One way to measure seigniorage is as a stock--a one-time gain. A \$1 bill costs about 3 cents to print, but the U.S. government can use it to buy \$1 worth of goods. If the bill circulated forever, the net seigniorage would be 97 cents. In reality it is less because after about 18 months the average \$1 bill wears out and needs to be replaced; like other governments, the U.S. government replaces worn-out notes and coins free of charge.(4) More generally, the concept of seigniorage applies not just to the \$1 bill, but to the entire monetary base--notes and coins in circulation, plus bank reserves. Under this approach, gross seigniorage is the change in the monetary base over a given period, divided by the average level of prices during the period if one wants to correct for inflation.

Another way to think of seigniorage is as a flow of revenue over time. Notes and coins pay no interest. Somebody who holds notes could instead buy a bond and earn interest on it. By holding notes it is as if he is giving the issuing government an interest-free loan. Under this approach, gross seigniorage is the average monetary base times some measure of inflation or the interest rate over a given period. The stock measurement is like a landlord thinking about a house in terms of the price he could sell it for in cash, while the flow measurement is like thinking about the house in terms of what it can earn from monthly rental income. Using an appropriate interest rate to take into account that a dollar in the future is less valuable than a dollar today, the two measurements should be equal.

For the U.S. government, net seigniorage from issuing dollars, as measured by the flow of payments the Federal Reserve System makes to the Treasury, is roughly \$25 billion a year. That is a large amount in dollar terms, but it is less than 1.5 percent of total federal government revenue and only about 0.3 percent of the GDP of the United States. When foreigners hold dollar notes, they create seigniorage for the U.S. government. As was mentioned, foreigners are estimated to hold 55 to 70 percent of the total value dollar notes in circulation, which implies that they account for perhaps \$15 billion a year of the seigniorage from issuing dollars.

Like the United States, other countries earn seigniorage from issuing domestic currency. Under current arrangements, those that become officially dollarized give up the seigniorage. If Argentina were to replace the peso with the dollar, the U.S. government would receive the seigniorage that the Argentine government now receives. That may be as much as \$750 million this year, or around 1.2 percent of Argentina's federal government budget. To reduce the loss of seigniorage as an obstacle to official dollarization, Senator Connie Mack and Representative Paul Ryan introduced the International Monetary Stability Act (S. 1879 and H.R. 3493) in November 1999. A later section discusses the act in more detail.(5)

Possible risks. A possible risk of encouraging official dollarization in other countries is unlikely to make it harder for the Federal Reserve to conduct monetary policy. However, the greatest growth in foreign holdings of dollar notes has apparently occurring in recent years (Judson and Porter 1996, p. 896), and it has been precisely during that period that the Federal Reserve has successfully reduced inflation first to 3 percent and now to less than 2 percent a year.

Another possible risk is that the officially dollarized countries will pressure the United States to assume responsibility for solving their economic problems. But by explicitly disclaiming responsibility to lend to troubled banks in officially dollarized countries or to supervise foreign banking systems, the Federal Reserve System and the Treasury Department can notify countries considering official dollarization that responsibility rests with the domestic government. Officials of the Federal Reserve and the Treasury have already emphasized this point repeatedly in public statements.

Still another possible risk is that when the Federal Reserve increases interest rates, officially dollarized countries will pressure it to keep rates inappropriately low. However, as Federal Reserve chairman Alan Greenspan has testified in an April 22 hearing before a Senate Banking subcommittee, the Federal Reserve already receives criticism and withstands it. The policies of the Federal Reserve already affect even countries that have separate domestic currencies and floating exchange rates. Furthermore, the quarter- and half-percentage point increases in interest rates that the Federal Reserve makes are small compared to the 10- and 20-percentage point increases that central banks have made in such countries as Brazil, Ecuador, Indonesia, and Russia in the last two years.

A way to ensure that the Federal Reserve is resistant to political pressure, whether foreign or domestic, is to give the Federal Reserve a clearer mandate, explicitly making price stability its primary long-term goal. To do just that, Senator Connie Mack (R-Florida) has introduced the Economic Growth and Price Stability Act (S. 1492). The act is similar to bills that Senator Mack and Representative Jim Saxton introduced in the previous Congress.

Another risk is the possibility that a large number of foreign users of dollars will suddenly switch to the euro or another currency, causing mass dumping of dollars and forcing the Federal Reserve to increase interest rates to prevent inflation from flaring up. But as long as the dollar continues to be trustworthy, mass dumping is unlikely. The best way to prevent it is for the dollar to continue the good performance of the last 17 or so years.

Benefits. Currency risk (the risk of a currency devaluation or revaluation) would nearly disappear for Americans dealing with officially dollarized countries.

With it would disappear the currency conversion fees familiar to tourists and businesses. The direct savings from eliminating those fees would be small, but would open the way to larger indirect savings in the form of higher economic growth in officially dollarized countries because of a better currency and tighter financial links with the United States. That in turn would create higher demand for American goods and higher economic growth in the United States.

By increasing the number of countries that use the dollar, official dollarization would help the dollar remain the premier international currency, a status that the euro is now challenging. Dollarization by one or more large Latin American countries would significantly expand the number of people officially using the dollar, moving the population of the dollar zone ahead of the population of the euro zone for the time being.

In addition, official dollarization should reduce complaints by American producers about foreign dumping of goods by ending the possibility that dollarized countries could devalue against the dollar. Much of the controversy surrounding dumping arises because large unexpected devaluations suddenly make the goods much cheaper than they were before, not because of any technological advantage, but because of capricious exchange rate policies. It is notable that recent controversy over imports of steel concerned Russia and Brazil, whose currencies have depreciated greatly.

5. COSTS AND BENEFITS FOR OFFICIALLY DOLLARIZING COUNTRIES

In proportion to the size of their economies, many countries that become officially dollarized stand to gain even more than the issuing country does. Because this section does not specifically concern the United States, "official dollarization" is used in the sense that includes any foreign currency, not just the dollar.

Cost of lost seigniorage. In discussing the costs of dollarization, economists have focused on the loss of seigniorage from replacing a domestic currency with a foreign currency. Harkening back to the discussion of seigniorage a few pages ago, one can think of the cost as a one-time stock or, equivalently, as a continuing flow.

The stock cost is the cost of obtaining enough foreign reserves necessary to replace domestic currency in circulation. (As is explained later, currency in circulation is more accurate than the monetary base as an indicator of the need for foreign reserves.) In an influential study, Stanley Fischer, who today is the First Deputy Managing Director of the IMF, used data from the 1970s to estimate that the stock cost of official dollarization for an average country would have been 8 percent of gross national product (GNP, a concept closely related to the GDP more commonly used now [Fischer 1982, p. 305]). That is a large amount: for the United States today, it would exceed \$700 billion. However, since the 1970s advances in technology have enabled deposit transfers to replace notes and coins for many types of payments. Because people use notes and coins less than formerly in most countries, the cost of replacing them, expressed as a percentage of GDP, is also less--generally 4 to 5 percent instead of 8 percent.

An alternative way to think about the cost of lost seigniorage is as a flow cost--a continuing amount lost year after year. Central banks or other monetary authorities that hold foreign assets hold few or no foreign notes and coins; rather, they hold bonds and other interest-earning assets. Official dollarization deprives them of the interest. One method of calculating the flow cost is to multiply currency in circulation by the interest rate on foreign assets. Another method is to multiply the monetary base (which, recall, is larger than currency in circulation) by the domestic inflation rate or by some domestic-currency interest rate, which will generally be higher than the interest rate on foreign assets. The first method, which we will call it the "low-end estimate," is appropriate for a country that wishes to have low inflation and low interest rates; the second method, which we will call the "high-end estimate," is more appropriate for a country that intends to use high inflation as a tool for generating seigniorage.

Fischer's calculations, which were a type of low-end estimate, indicated that in the 1970s the average flow cost of officially using the U.S. dollar would have been about 1 percent of GDP per year. In the 1990s, inflation in the United States and many other countries inflation has been significantly lower than it was in the 1970s. Lower inflation translates into lower flow costs, as is apparent from the low-end estimates of Table 3, which are much lower than Fischer's estimates. Table 3 calculates low-end and high-end estimates of the gross flow cost of official dollarization for selected Latin American countries. It assumes, as Fischer did, that officially dollarized countries will not share in the seigniorage earned by the issuing country. To the extent that they do share, the net flow cost of official dollarization falls. If, calculated using the interest rate on foreign assets, Argentina's gross flow cost of using the dollar is 0.2 percent of GDP a year but the United States rebates 85 percent of that amount, as the International Monetary Stability Act proposes, Argentina's net flow cost is just 0.03 percent of GDP a year.

Other costs. The stock and flow costs of official dollarization are relatively easy to estimate. Other costs range from the quantifiable to the vague.

The one-time cost of converting prices, computer programs, cash registers, and vending machines from domestic currency to foreign currency varies considerably across countries. In Argentina, for example, it would be almost zero because the Argentine peso is worth one dollar, so no repricing would be necessary. In Mexico, the cost would be larger because the Mexican peso has a floating exchange rate against the dollar. In countries with high inflation there may even be a net benefit rather than a cost from less frequent need to revise prices and more efficient economic calculation.

Many economists have claimed that there is a cost of losing a domestic central bank as a lender of last resort. The first issue here is whether the government of an officially dollarized country can obtain sufficient funds to save individual banks if it wishes. One solution is to arrange for lines of credit from foreign banks, as the currency board-like system of Argentina has done (BCRA 1998). The branches of foreign banks can also provide credit directly to domestic banks without government involvement, as they have done in Panama. The second issue is whether an officially dollarized system can handle system-wide banking problems. Here it is important to think comparatively. Officially dollarized countries and other countries without central banks as lenders of last resort have on occasion suffered system-wide problems, but less often and at lower cost to taxpayers than countries with central banks (for a summary, see Frydl 1999). This suggests that not having a central bank may actually be a benefit rather than a cost.

It has also been claimed that there is a cost of losing flexibility in monetary policy, such as when the issuing country is tightening monetary policy during a boom while an officially dollarized country really needs looser monetary policy because it is in a recession. In a dollarized monetary system the national government cannot devalue the currency or finance budget deficits by creating inflation, because it does not issue the currency. But in practice, lack of flexibility has been beneficial rather than costly. Contrary to a standard theoretical justification for central banking, in Latin America greater flexibility in monetary policy has made interest rates more rather than less volatile in response to changes in U.S. interest rates (Frankel 1999, Hausmann and others 1999). Again, this suggests that not having a central bank may actually be a benefit rather than a cost.

Benefits. The benefits of official dollarization flow from using a currency that is presumably better than a domestic central bank could provide. Instead of making a laundry list of particular benefits, it is simpler to think in terms of broad classes of benefits.

One class of benefits comes from lower transaction costs--the costs of exchanging one currency for another. These costs take the form of a difference between the buying and selling rates for converting domestic currency into foreign currency. Official dollarization eliminates transaction costs with other countries in the unified currency zone. Hedging for currency risk with those countries becomes unnecessary, tending to increase trade and investment with them. In the particular case of the U.S. dollar, official dollarization even reduces the transaction costs with other currencies. Large transactions between, say, the Mexican peso and the Japanese yen occur in two legs--a peso-dollar trade and a dollar-yen trade--because those markets are so big

and efficient that using them is actually less costly than making a direct peso-yen transaction. Using the dollar would reduce the costs of Mexico's transactions with Japan because it would eliminate one leg of the trade.

Another aspect of lower transaction costs is that without the existence of a separate domestic currency, banks may be able hold lower reserves, thereby reducing their cost of doing business. The existence of a distinct domestic currency implies a need for banks to separate, say, their peso and dollar portfolios. With official dollarization the peso portfolio and the dollar portfolio become one big pool. One study claims that in Panama, official dollarization enables bank reserves to be 5 percent of GDP lower than they would be if Panama had a separate domestic currency (Moreno-Villalaz 1999, p. 437).⁽⁶⁾

A second class of benefits comes from lower inflation now and lower risk of future inflation. By using a foreign currency, an officially dollarized country assures itself of a rate of inflation close to that of the issuing country. Using the dollar, euro, or yen would reduce inflation to single digits from the double-digit levels that many developing countries now have. Because confidence exists that inflation in the dollar, euro, and yen will continue to be low, they have low and relatively steady interest rates.

Low inflation increases the security of private property. Money is the most widely held form of property. Inflation is a kind of tax on money, and the lower and less variable inflation is, the more secure are property rights in money. Because other financial assets are denominated in money (currency units), low inflation also increases their security, which encourages saving and long-term lending. Panama is the only independent Latin American country where 30-year fixed-rate mortgages are available without government subsidies because it is the only one that has not suffered high inflation and currency devaluations in the last 15 years. Low inflation also helps retirees, people on fixed incomes, and people too poor to have bank accounts by assuring that their savings retain value.

Figure 1 illustrates the potential of dollarization to reduce interest rates. The figure compares daily data for three countries with different monetary systems: Brazil, which has a central bank; Argentina, which has a currency board-like system linked to the dollar; and Panama, which has official dollarization. Interest rates in the figure are expressed in terms of the spread (premium) that each government has to pay for its dollar bonds compared to U.S. Treasury bonds. Since Treasury bonds have virtually zero risk, the spreads reflect "country risk," the possibility that its government will default. Typically, the government pays lower interest rates than any borrower in the country because it has the greatest resources, so the degree of country risk gives a rough idea of the security of private property in a country. Because Panama is not noticeably more politically stable than Argentina or Brazil, it is hard to attribute the lower rates on Panamanian bonds to anything other than the benefits of official dollarization.

Figure 2 compares monthly data of domestic-currency interest rates for bank deposits in Brazil, Argentina, and Panama. Again, interest rates in Panama are lowest, though rates in Argentina are close.

A final class of benefits comes from greater economic openness and transparency, especially on the part of the government. Because there is no domestic currency that needs to be propped up, official dollarization eliminates balance-of-payments crises and the rationale for exchange controls (restrictions on buying foreign currency), such as many developing countries have. By eliminating the government's power to create inflation, official dollarization fosters budgetary discipline. That need not mean that the government budget must be balanced every year --Panama has run large deficits at times--but it means that deficits must be financed through the fairly transparent methods of higher taxes or more debt rather than through the murky method of printing money.

How do we measure costs and benefits? So far, we have just a list of the costs of official dollarization versus the benefits. The analysis would be better if we could measure them in terms of GDP gained or lost. If official dollarization really is beneficial, it should result in higher economic growth than would otherwise exist. The government of Argentina has estimated that official dollarization there would increase economic growth as much as 2 percentage points of GDP a year. Even if the United States shared no seigniorage, the cost in lost seigniorage would be only about 0.2 percent of GDP a year (BCRA 1999). And as has been mentioned, developing countries without central banks have generally had better monetary and economic performance than those with central banks, which suggests that the benefits of official dollarization would far exceed the costs for most or all countries that are likely candidates.

A different and more satisfactory approach to measuring costs and benefits is to realize that ultimately, it is the evaluations of consumers that determine costs and benefits. Economists' estimates of costs and benefits are just indirect ways of trying to gauge the evaluations of consumers. A "market test" provides direct insight. The way to conduct a market test of currencies is to remove all legal privileges that domestic currency has over foreign currency and see which currency or currencies people prefer to use. Where that is not possible because a government is unwilling to remove the legal privileges of the domestic currency, a high degree of unofficial dollarization strongly suggests that the "consumers" of money--the people who use it--prefer foreign currency and would not use the domestic currency at all if not for its legal privileges.

Table 3. Estimated Gross Flow Costs of Official Dollarization for Selected Countries

Country	Years	Low-end estimate (% of GDP per year)	High-end estimate (% of GDP per year)
Argentina	1991-6	0.2	0.5
Brazil	1994-6	0.1	1.3
Ecuador	1991-7	0.2	7.4
El Salvador	1991-6	0.2	2.3
Mexico	1991-7	0.2	0.8

Sources: For the low-end estimate, own calculations; for the high-end estimate, Bogeti (1999). Both estimates use data from IMF International Financial Statistics.

Notes: The low-end estimate is currency in circulation at the end of the year (line 14a of International Financial Statistics) as a percentage of GDP (line 99b) times the average annual interest rate on U.S. commercial paper (line 60bc for the United States). Commercial paper--short-term corporate bonds--is one of the highest-yielding short-term investments that is quite liquid. The high-end estimate is the average annual change in the monetary base (calculated from line 14 of International Financial Statistics) times the average annual rate of inflation (calculated from line 64).

Brazil is calculated on the basis of 1994-6 because its hyperinflation of the early 1990s makes costs appear misleadingly large.

Observe that these are estimates of gross flow costs, that is, they assume that the issuing country will not share seigniorage with the countries in the

table if they became officially dollarized. If the issuing country shares seigniorage, net flow costs are less than gross flow costs.

6. WHICH COUNTRIES ARE CANDIDATES FOR OFFICIAL DOLLARIZATION?

Considering the costs and benefits of official dollarization raises the question of which countries are likely candidates for official dollarization. The answer involves both economics and politics. Note that official dollarization would be a voluntary decision on the part of dollarizing countries. It would be inappropriate for the United States or any other country to pressure a country into official dollarization.

Economic considerations. The main economic consideration that makes a particular country a likely candidate is a history of poor monetary performance that impairs the credibility of its currency. As previously mentioned, most developing countries have such a history. Lack of credibility forces borrowers in that currency to pay high interest rates and reduces economic growth.

The other important economic consideration that makes a country a likely candidate is that it collects little seigniorage from issuing a domestic currency because unofficial dollarization is already extensive. Official dollarization would involve a comparatively small loss of seigniorage, and the loss would be even smaller if the issuing country shared seigniorage.

Many economists propose using the "theory of optimum currency areas" to judge whether official dollarization is desirable. According to the theory, an economy is part of an optimum currency area when a high degree of economic integration makes a fixed exchange rate more beneficial than a floating rate. Unfortunately, economists disagree about how to define optimum currency areas in practice, though they generally agree that an optimum currency area exists where there is a large country that has a dominant currency and where considerable trade, labor, and investment flow between it and its smaller neighbors. The flaw with the theory of optimum currency areas, as economists usually apply it, is that economists presume to determine costs and benefits for consumers, rather than acknowledging that it is the evaluations of consumers that determine the costs and benefits economists must consider. If Argentines prefer to hold dollars, it indicates that for them Argentina is part of an optimum currency area with the United States, no matter what economists may think (see White 1989).

Nevertheless, the theory is useful insofar as it highlights the problems that can arise when neighboring countries have radically different exchange rate policies. Official dollarization would work better in Argentina if Brazil, its largest trading partner, were also dollarized, because then Argentine businesses would not have to worry about exchange rate risk when trading with Brazil. Since Brazil seems unlikely to become officially dollarized, Argentina is left with options that all involve difficulties. Adopting Brazil's currency would subject Argentina to the many monetary problems Brazil has experienced. Adopting a floating exchange rate for the Argentine peso would risk repeating the hyperinflation Argentina suffered before establishing its currency board-like system in 1991. Sticking with the currency board-like system or establishing official dollarization seem the best choices despite possible problems from further depreciation of Brazil's currency.

Political considerations. The most important political consideration that makes a country a likely candidate for official dollarization is that people do not consider the domestic currency an indispensable element of national identity. (Where there is residual desire to maintain the domestic currency as an element of national identity, domestically issued coins are a potential solution.) Official dollarization promotes globalization, increasing the influence of international economic forces relative to domestic political forces. Debate in various countries about whether that is desirable has centered on the concept of national sovereignty. So far, however, participants in the debate have rarely defined precisely what they mean by national sovereignty, nor have they explained why it should be more important than the principle of "consumers' sovereignty"--the freedom of choice that undergirds a market economy.

Furthermore, national sovereignty is losing its formerly unquestioned status as a basis for designing monetary policy. As globalization proceeds, the politics of monetary policy are changing from a stress on national sovereignty to a stress on regional integration. The most noteworthy example is the advent of the euro to replace national currencies in 11 Western European countries earlier this year. Interest in official dollarization is another manifestation of the change.

There has recently been serious consideration of official dollarization in a number of countries, and more preliminary consideration in others. Moreover, official dollarization has been established or is in the midst of being established in some new countries.

Dollarization in Yugoslavia and East Timor. Montenegro and Serbia comprise the Federal Republic of Yugoslavia, which the United States has not formally recognized. Montenegro is moving towards a separation from Serbia. On November 2, 1999 it declared that the German mark to be legal tender alongside the Serbian-issued Yugoslav dinar. Montenegro is therefore semiofficially dollarized. Montenegro intends to establish a currency board to issue a national currency linked to the mark. However, the mark and perhaps the dinar will continue to be accepted as legal tender after the new currency enters circulation.

Most of the Serbian province of Kosovo has been under administration by the United Nations since an international force of peacekeepers entered in June 1999. The administration introduced the German mark as Kosovo's official currency on September 3, 1999. It remains permissible to use other currencies, including the Yugoslav dinar (AFP 1999). The mark had been in widespread unofficial use. The United Nations considers Kosovo still part of Serbia, so Table 2 above does not list it as an officially dollarized country.

East Timor, a longtime Portuguese colony, became independent when Portugal dissolved its empire in 1975, but Indonesian military forces invaded later that year. Indonesia granted independence after a referendum of August 30, 1999 indicated very strong support for independence among the East Timorese people. The United Nations has assumed temporary administration of the new nation. On January 24, 2000, the administration, in consultation with the main pro-independence coalition, announced that the U.S. dollar would be East Timor's official currency, although the Indonesian rupiah may be accepted during a transition period and it is legal for private parties to use any mutually acceptable currency (Agnote 2000). It is envisioned that in two or three years East Timor will establish its own currency. A consideration favoring adoption of the U.S. dollar over the Indonesian rupiah, Australian dollar, or Portuguese escudo was that the U.S. dollar is the main currency of international aid, which East Timor will depend heavily upon in the near future.

Official dollarization in Latin America--Argentina. Because of its currency board-like system, Argentina already has a fixed exchange rate with the dollar (1 Argentine peso = \$1) and it holds sufficient dollar reserves for immediate official dollarization if it wishes. Argentina has permitted widespread unofficial dollarization, to the point that most bank deposits and loans occur in dollars.

In January 1999, President Carlos Menem announced that the government was studying the possibility of official dollarization. He was prompted to do so by lingering doubts about the credibility of the currency board-like system. Despite the system's good performance, Argentina has experienced interest-rate spikes in 1992, during Mexico's currency crisis in 1994-5, and during the Asian and Brazil currency crises since 1997. Argentine officials have since discussed with U.S. officials the possibility of entrenching official dollarization through a treaty of monetary association with the United States.

Argentina seeks up to three objectives: a share of seigniorage from use of the dollar in Argentina; access for Argentine banks to the discount window of

the Federal Reserve System, enabling them to borrow in times of stress; and cooperation on bank supervision. They also think that a formal agreement may help economic integration generally to become more politically entrenched (BCRA 1999, Castro 1999). As discussed above, officials of the U.S. Treasury and the Federal Reserve have stated that the United States will not grant access to the discount window nor will it help supervise banks in dollarized countries, but they seemingly remain open to the possibility of sharing seigniorage.

Menem's successor as president, Fernando de la Rúa, took office in December 1999. Argentina has not become officially dollarized, but the possibility remains under active debate.

Ecuador. Argentina's consideration of official dollarization brought the issue to prominence all over Latin America, including Ecuador. Following Brazil's devaluation in January 1999, the Ecuadorian sucre came under increased speculative pressure. It was devalued on March 2; the same day, eight troubled banks closed. On March 11, the government froze deposits in the entire banking system. Discontent about the financial crisis and the deep recession the economy suffered led some observers to propose official dollarization (Cordeiro 1999, López 1999; see also IEEP 2000). On January 9, 2000, President Jamil Mahuad proposed official dollarization as a way of ending the rapid depreciation of the Ecuadorean sucre, which in one year had gone from about 7,000 per dollar to 25,000 per dollar. Political unrest forced Mahuad out of office on January 21. His successor, former vice-president Gustavo Noboa, has indicated support for dollarization, but as of late January 2000 it is still unclear whether and how fast Ecuador will become officially dollarized. Ecuador is already heavily dollarized unofficially. If it becomes officially dollarized it will be the largest independent country to do so. Its population is 12.6 million and its GDP in 1997, before the severe depreciation of the sucre, was \$18.8 billion.

Ecuadorean officials have indicated that the prospect of a rebate of seigniorage from the United States under the International Monetary Stability Act (described below) has favorably influenced their consideration of dollarization.

Central America. In 1994-5 the government of El Salvador announced first that it intended to establish a currency board and then that it intended to proceed directly to official dollarization. It dropped the plan in the face of opposition to eliminating a symbol of national identity. In early 1999, President Armando Calderón Sol reiterated interest in official dollarization, after debate on the subject in Argentina brought it into the news. Calderón's successor, Francisco Flores, has indicated interest in preventing future currency devaluations, and official dollarization remains a topic of active discussion.

In Costa Rica, the president of the central bank has expressed interest in official dollarization, and a deputy in the Costa Rican Congress has introduced a bill to abolish the central bank. The finance minister of Guatemala has also said that his country is considering adopting dollarization early in the next century (Hernandez 1999).

Mexico. Since its 1994-5 currency crisis, prominent Mexican and foreign figures have debated suggestions that Mexico establish a currency board or dollarize. A number of well-known Mexican businessmen and trade associations have expressed support for dollarization. The presidential candidate of the National Action Party (in Spanish, PAN) has indicated interest in official dollarization and in the somewhat similar currency board system (Tricks 1999).

Other countries. In a number of other countries, including Brazil, Canada, Hong Kong, Indonesia, Jamaica, Peru, Russia, and Venezuela, economists and other observers have discussed official dollarization using the U.S. dollar, although government officials have rejected the idea for now. Debate has occurred at high levels, including the Canadian Parliament (Canada 1999a, b; see also Grubel 1999). In Eastern Europe there has been discussion about official dollarization using the euro. At present, interest in official dollarization is not as widespread in those countries as in the Latin American countries just mentioned, but Ecuador's attempt to introduce official dollarization is sure to heighten interest in the subject all around the world.

7. ISSUES IN IMPLEMENTING OFFICIAL DOLLARIZATION

A country considering official dollarization needs to take a number of issues into account. To make the issues clear, this section and the next concentrate on what may seem the most difficult case: rapidly converting a central banking system into an officially dollarized one. Converting a currency board poses far fewer questions because a currency board system already has important similarities to official dollarization.

Are there any preconditions? Some observers have claimed that countries wishing to replace central banking with some other monetary system must fulfill certain preconditions, such as a high level of dollar reserves, a solvent banking system, sound government finances, and flexible wages.

If a country already had the alleged preconditions for dollarization, however, it would not be especially attractive because monetary policy should already be good. Critics neglect that dollarization eliminates the possibility of financing government budget deficits by inflation, and in doing so attacks that problem that is at the root of so many other economic problems in many developing countries. Nor is it necessary to have already in hand all the dollar reserves for official dollarization, provided that the amount that is lacking can be borrowed from financial markets or from a source such as the IMF. The experience of currency board-like systems in Argentina, Bulgaria, and elsewhere confirms that drastic monetary reform itself helps create the conditions for economic success, rather than economic success being a precondition for reform. Official dollarization does not guarantee that a country will implement good economic policies, but in many developing countries it would raise the chance of success.

Which currency will be used? A country can grant legal tender status to more than one currency. Indeed, it can allow people to use any currency they wish for making loans, invoicing sales, paying wages, and so on.

In most cases, though, the economies of scale are such that people will tend to use only one currency, as long as that currency remains relatively good. One can judge what currency that will likely be by observing which foreign currency is already most widely used unofficially. Generally it is the same currency that the central bank targets in its operations in the foreign-exchange market. For countries with currency boards, the likely choice is the foreign currency that already serves as the exchange-rate anchor.

Dollarize unilaterally? Provided it has or can obtain sufficient foreign reserves, a country can dollarize unilaterally, without a formal agreement or even the informal approval of the issuing country. However, there may be economic and political advantages to a more formal arrangement.

Issue coins? Panama and some other officially dollarized countries issue coins. Because coins are a subsidiary part of the money supply, the existence of domestically issued coins has not endangered the credibility of official dollarization in Panama or elsewhere. The main technical reason a country may want to issue coins under official dollarization is that because of their bulk, shipping coins is much costlier than shipping an equivalent value of notes from the issuing country. Minting coins domestically avoids the shipment costs, and, to repeat, may satisfy political desire for a domestic currency as an element of national identity.

Issues related to foreign reserves. A key issue is how much in foreign reserves a country needs to have. Answering this question involves thinking about several others. Assume that the foreign currency to be used is the U.S. dollar and that the domestic currency is called the peso. Note that these issues do not arise with a currency board because they were resolved when the currency board was established.

--What constitutes reserves? As foreign reserves, a central bank typically holds almost no foreign-currency notes, because they pay no interest; instead, it holds foreign-currency deposits at foreign banks and foreign bonds. The central bank in a dollarizing country need not hold actual dollar notes until the

time comes to replace peso notes in circulation with dollar notes. To the extent that the central bank holds its existing foreign reserves in forms not suitable for dollarization, such as Japanese yen bonds, it is possible to convert them into dollar reserves provided they are of sufficiently high quality. Almost all foreign reserves of the central bank should meet this description. However, peso bonds may be of such a character that selling them on a large scale over a short period might badly hurt the domestic bond market and the balance sheets of some commercial banks.

--What liabilities should be redeemed with reserves? As assets, a typical central bank owns foreign reserves such as foreign-currency bank deposits and U.S. Treasury bonds, and domestic assets such as domestic government bonds. As liabilities, a typical central bank has obligations it has contracted to pay foreign currency; the domestic monetary base; government deposits; and other domestic liabilities, such as its own bonds if it issues them.

At a minimum, official dollarization implies accepting all the peso notes and coins in circulation that the public wants to convert into some form of U.S. dollars. The process may go beyond this to convert not just peso notes and coins, but the other component of the monetary base: the reserves of commercial banks. Where commercial banks are required to hold large reserves that earn no interest, as a way of creating demand for the domestic currency, it is not necessary to convert all peso reserves into dollars. Reserve requirements can be reduced toward zero and most of the required reserves can be converted into government bonds or extinguished.

Typically, peso notes and coins will be converted into dollar notes and coins, but it is also possible to give commercial banks other easily marketable dollar assets, such as U.S. Treasury bonds, if they prefer. Peso bank deposits will become dollar bank deposits; it is not necessary to have sufficient dollar notes and coins on hand to convert every single peso deposit. Commercial banks will hold fractional reserves (reserves of less than 100 percent) against dollar deposits, just as they now do with peso deposits, and just as banks in the United States do with dollar deposits. Provided that the banks start dollarization with adequate peso reserves, converting part or all of the peso monetary base into some form of the dollar monetary base should give them adequate dollar reserves.

--Are existing reserves really usable? Many central banks are not just agents of monetary policy; they are also trustees for dollars owned by other parties. It may seem that the dollar reserves that the central banks have available for official dollarization are correspondingly reduced, but that is not so. All the dollar reserves of the central bank can be available. Because official dollarization eliminates the domestic currency, it also eliminates the need to hold a special pool of foreign reserves. The parties holding dollars at the central bank can instead be given an equivalent amount of government bonds, which will now be payable in dollars and should therefore be more marketable than before.

Exchange rate. Besides depending on what liabilities are redeemed with dollar reserves, the amount of dollar reserves necessary depends on the exchange rate of the dollar with the peso. The exchange rate used to convert pesos into dollars should be neither substantially overvalued nor undervalued compared to the market rate. An overvalued rate will hurt export industries, while an undervalued rate will hurt consumers of imported goods; both extremes are harmful to economic growth.

If dollarization occurs at an exchange rate close to the market rate, banks should not experience sudden demands to convert deposits into dollar notes, any more than they already do to convert peso deposits into peso notes. The market exchange rate and the structure of interest rates will work to balance the gains from holding notes versus deposits. Countries in the 1990s that have established currency board-like systems, which have similarities to dollarization, have found that the systems have encouraged people to bring into domestic banks deposits formerly held abroad and foreign notes formerly hoarded in mattresses. It is therefore implausible to envision that under dollarization, people will want to convert a substantial proportion of bank deposits into dollar notes.

Speed of dollarization. Rapid official dollarization is technically feasible. Countries have made similarly sweeping currency reforms, such as introducing new currencies, almost overnight in many instances. The mechanics of introducing new notes and coins can be accomplished within days or weeks. Dollarization need not take two or three years, as some writers have claimed (Hausmann and Powell 1999). A point in favor of rapid dollarization is that a lengthy period of implementation may raise doubts about the government's commitment to dollarization.

Attitude of the issuing country. A final issue that needs consideration is whether the issuing country offers any help to officially dollarized countries. The U.S. Treasury and the Federal Reserve System have made it clear that they will not rescue domestic banks in officially dollarized countries, nor do they wish to have any role in supervising them. Under the International Monetary Stability Act, though, officially dollarized countries could in effect pledge seigniorage rebated to them by the United States as collateral for loans to strengthen their financial systems. The European Central Bank does not appear to have developed a position on issues related to official "euroization," because discussion so far has focused on countries where the U.S. dollar would predominate.

8. STEPS IN OFFICIAL DOLLARIZATION

A central banking system that wishes to become officially dollarized might do so by taking a series of steps like the following. Steps 4 to 7 are simultaneous. A currency board system can skip to the second part of step 4--declaring the dollar legal tender--because the system already has sufficient foreign reserves for immediate official dollarization and an appropriate exchange rate with the dollar.(7) Assume still that the foreign currency to be used is the U.S. dollar and that the domestic currency is called the peso.

1. Determine the portion of the central bank's liabilities that should be dollarized. At a minimum this will be peso notes and coins in circulation, and it may include the entire peso monetary base.

2. Assess the financial position of the central bank and the government. The amount of dollars necessary depends on the exchange rate, which will not be known with certainty until step 4 but can be calculated as a range of values. If the central bank already has sufficient net foreign reserves, it can simply sell its foreign reserves for dollars and give people dollars at the fixed exchange rate for the portion of its liabilities that is to be dollarized. As was mentioned, the peso assets of the central bank may be illiquid and not readily convertible into dollars.

If the central bank needs more dollar reserves than it already has, it may still be possible to dollarize immediately by the government borrowing enough dollars to cover the deficit of reserves. The central bank will then cease to exist in its current form and its assets and liabilities will become assets and liabilities of the government.

3. If there are doubts about the appropriate exchange rate for dollarization, allow the peso to float cleanly for a brief, pre-established period. There are three basic types of exchange rates: at one extreme, fixed rates; at the other extreme, floating rates; and in the middle, mixed arrangements that are neither fixed nor floating, including pegged rates, crawling bands, and target zones. A fixed rate is one in which the exchange rate in terms of a foreign "anchor" currency remains constant because appropriate monetary institutions exist to make the rate last. Officially dollarized systems and currency boards have fixed rates. A floating rate is one in which the exchange rate is not maintained constant in terms of any foreign currency. The mixed types are those in which the central bank limits the range of fluctuation in a more or less well defined way for the time being, but cannot guarantee that fluctuations will remain in that range. Historical experience shows that central banks generally cannot maintain truly fixed exchange rates, and that those maintaining mixed types often allow the exchange rate to become overvalued, which creates the conditions for speculative currency attacks and

devaluations. If the existing exchange rate is a mixed type that appears overvalued, it may be necessary to let the exchange rate float for a brief period so that it can find an appropriate, market-determined level.

To set an appropriate fixed exchange rate at which to convert peso prices to dollar prices, the best indicator is the market rate that will evolve once people know that the value of the peso will soon be fixed and that the dollar will then replace the peso. Demand for pesos may well increase, in which case the exchange rate will appreciate. The government should not try to manipulate the exchange rate to achieve any particular level; it should let market participants determine the level. Manipulating the exchange rate is costly. A highly overvalued exchange rate will price exports out of world markets and may create a recession, while a highly undervalued exchange rate will make imports expensive and prolong inflation.

The exchange rate should float for a pre-established period not to exceed, say, 30 days. The float should be clean, that is, the central bank should not try to influence the exchange rate.⁽⁸⁾ During the float, the central bank should be forbidden to increase its liabilities unless it obtains foreign reserves equal to 100 percent of the increase. That will prevent the central bank from creating a final burst of inflation. The central bank should publish daily the key items of its balance sheet of the previous business day, so that its actions are transparent and cause no destabilizing surprises.

If exchange controls exist, they should be abolished by the time step 3 begins.

4. At the end of the period of floating (if one is necessary), declare a fixed exchange rate with the U.S. dollar and announce that effective immediately, the dollar is legal tender. For example, declare that henceforth the exchange rate is 9.5 pesos per U.S. dollar, or some other rate determined to be suitable. The fixed rate should be somewhere within the range of market rates during the period of floating, particularly toward the end of the period of floating. Setting exchange rates is an art rather than a science, and there is no mechanical formula for making the transition from a floating rate to an appropriate fixed rate. If there is doubt about the appropriate rate, it is better to err on the side of an apparent slight undervaluation rather than an overvaluation compared to recent market rates, so as not to cause a slowdown in economic growth. Experience indicates that an economy will quickly adjust to an exchange rate that is approximately right. Again, a large deliberate overvaluation or undervaluation is undesirable because it will require unnecessarily large economic adjustments.

The central bank will then be required to exchange the peso liabilities determined in step 1 for suitable dollar assets--in the case of peso notes and coins, mainly dollar notes and coins; in the case of its peso deposits, perhaps U.S. Treasury securities. The dollar will be declared to be "domestic" currency, with all the legal tender rights the peso has. All payments in pesos will be permitted to be made in dollars at the fixed exchange rate.

5. Announce that effective immediately, all peso assets and liabilities (such as bank deposits and bank loans) are dollar assets and liabilities at the fixed exchange rate. Announce a transition period of no more than 90 days for replacing quotations of wages and prices in local currency with quotations in dollars. After the period of floating has ended and the exchange rate has been fixed, bank deposits in pesos will become deposits in dollars, while bank loans in pesos will become loans in dollars. Banks will charge no commission fees for the conversion.

During the transition period, wages can continue to be quoted optionally in pesos so that employers and banks have time to modify their bookkeeping and computer systems. Prices can also continue to be quoted optionally in pesos during the transition period, so as to spare merchants the trouble of repricing the goods on their shelves. After the transition period, wages and prices will cease to be quoted in pesos.

6. Freeze the central bank's total liabilities and dollarize the liabilities determined in step 1. Once the central bank starts redeeming the peso monetary base for dollars, commercial banks should not be allowed to charge commission fees for converting pesos into dollars. Commercial banks will probably want to convert their peso reserves into dollar assets immediately, and that can be done, but exchanging the peso notes and coins in circulation for dollars will be slower. The central bank or the government should continue to accept peso notes and coins for a set period, say one year, though the bulk of exchanges will be made in the first 30 days. After 30 to 90 days, peso notes should cease to be legal tender for hand-to-hand payments.

7. Decide what to do about coins. Given sufficient time, arrangements can be made to have a supply of U.S. coins on hand to replace peso coins when dollarization occurs. If dollarization is begun hastily, though, the supply of U.S. coins may be insufficient. Moreover, the fixed exchange rate may not be one for which coins have a convenient whole-number relationship to the dollar. If so, coins, and only coins, can be devalued or revalued to a nearby whole-number equivalent that makes them decimal divisions of the dollar. As in Panama, local coins can circulate alongside dollar notes. Because in most countries coins are only a tiny portion of the monetary base, the overall effects will be small and the importance of this step will be correspondingly low.

8. Reorganize the components of the central bank as necessary. The central bank will cease to be an institution making monetary policy. Its assets and liabilities can be transferred to the government or to a commercial bank operating as a trustee for the government. Employees working on financial statistics, regulation of financial institutions, economic analysis, and accounting can be transferred to the ministry of finance or the bank supervisory agency. Alternatively, the central bank can be converted into a new independent authority in charge of financial statistics and financial regulation, with its organizational structure largely unchanged.

9. FURTHER TECHNICAL ISSUES IN OFFICIAL DOLLARIZATION

Official dollarization may generate some further technical issues that need to be addressed. Again, assume that the foreign currency to be used is the U.S. dollar and the domestic currency is called the peso.

Inflationary momentum? The only difference between the last day of the peso and the first day of official dollarization is that instead of being quoted in pesos, prices will be quoted in their equivalent values in dollars. If the dollarizing country was suffering high inflation under the peso, inflationary momentum may persist for a short time after dollarization, but will be self-reversing since the dollar monetary base is outside local control. In countries that are unofficially dollarized, people do not raise prices in dollars just because high inflation makes prices rise in the domestic currency; rather, prices in dollars are stable and prices in domestic currency fluctuate according to changes in the exchange rate.

Business cycles. Official dollarization will link the local business cycle more closely to the business cycle in the United States more closely than a floating exchange rate would. Growth in domestic imports and exports will have some synchronization with growth of the imports and exports of the issuing country because changes in the exchange rate of the dollar against, say, the Japanese yen will have similar effects in the United States and in the dollarized country. However, the dollarized country can grow even when the United States is in recession, and may experience recession even when the United States grows.

Legal issues. Interest rates in dollars are lower and concentrated in a narrower range than domestic-currency rates in most developing countries. If borrowers were paying 50 percent interest a year in high-inflation pesos but are now paying 50 percent a year in low-inflation dollars, that is a huge jump in the real (inflation-adjusted) rate of interest. Fortunately, under official dollarization lenders will be willing to offer lower interest rates because their risk of losing money through inflation will be lower, so opportunities will exist to refinance loans.

Contracts in pesos will become contracts in dollars at the fixed exchange rate established at the end of the period of floating. There will be legal questions

involving interest rates, rounding of peso prices to their nearest dollar equivalents, and so on. An efficient way to handle the technical details of dollarization is to do it by decrees, guided by a committee of legal and financial experts. To a large extent, though, businesses should be allowed to make the necessary adjustments as they see fit without having to obey an extensive apparatus of decrees. Though there may be numerous details to be solved, they are minor irritants compared to the relief that official dollarization can bring in many cases.

Soundness of the banking system. Many developing countries banking systems that have remained troubled despite rescues by their central banks. When banks have bad loans, somebody has to bear the cost, no matter what monetary system exists. Often people who hold domestic currency do most of the paying, through inflation that reduces the real value of their assets. Inflation in effect transfers wealth from the general public to bank stockholders and depositors. Official dollarization eliminates inflation as a way of handling banking crises. Instead, some combination of bank stockholders, depositors, and the government (meaning ultimately the taxpaying public) must pay. Because central banking has no magical ability to make losses disappear, a troubled banking system is no argument for delaying official dollarization.

A previous section described some ways that an officially dollarized country could lend to commercial banks even though it lacks a central bank as a lender of last resort.

Foreign debt. In extreme cases, official dollarization may occur where high inflation and other problems under central banking have led the government and corporations to default on their foreign-currency debt. Dollarization may improve their situation, because the domestic currency may appreciate before it is replaced by the dollar, reducing the burden of foreign debt in terms of domestic currency. However, even if the improvement is not enough to allow the government and corporations to resume payment of the debt, official dollarization can proceed. Officially dollarization prevents a government from printing domestic currency to obtain the resources for paying foreign-currency debt. Instead, the government must obtain resources in noninflationary ways or renegotiate the debt with the lenders. Unlike the typical case with central banking, with official dollarization, a country can have a good currency even without good government finances.

10. THE INTERNATIONAL MONETARY STABILITY ACT

As has been mentioned, the loss of seigniorage from giving up a national currency is a political and economic obstacle to dollarization. To reduce this obstacle, Senator Connie Mack (R-Florida) and Representative Paul Ryan (R-Wisconsin) introduced the International Monetary Stability Act in November 1999.⁽⁹⁾

The International Monetary Stability Act allows the Secretary of the Treasury to certify officially dollarized countries as eligible to receive rebates of seigniorage from the United States. Certified countries would receive rebates of 85 percent of the seigniorage calculated by a formula in the act. The remaining 15 percent would finance rebates to countries that are already officially dollarized (such as Panama), help pay the costs of operating the Federal Reserve System, and still leave a net increase of revenue for the United States. The amount of seigniorage rebated to certified countries would depend on the level of interest rates in the United States and on the amount of dollar notes and coins in circulation worldwide; the higher either was, the more seigniorage the United States would earn and the more it would rebate.

The act would not pressure any country into official dollarization. Countries would retain complete discretion over the decision to become officially dollarized, and could choose to "de-dollarize" at any time (though if they did, the United States would no longer rebate seigniorage to them). The act does not take a position about whether any country should dollarize. Nor does the act require the Secretary of the Treasury to automatically rebate seigniorage to every country that dollarizes. The Secretary would merely have the discretion to do so, thereby guaranteeing that countries considering official dollarization cooperate with the United States if they desire a rebate of seigniorage.

The act explicitly states that the United States would not be obligated to act as a lender of last resort to countries that officially dollarize, consider their economic or financial conditions when setting monetary policy, or supervise their financial institutions. These provisions ensure that the United States would not become excessively entangled in the economic affairs of certified countries.

The Senate Banking Committee's Subcommittee on Economic Policy and Subcommittee on International Trade and Finance are expected to hold hearings on the International Monetary Stability Act in February.

11. CONCLUSION

In less than a year, official dollarization has changed from an obscure idea to one debated daily in a growing number of countries. Because interest in official dollarization is so recent, basic information about it has been lacking. Although many details remain to be investigated, this report has described the basics of official dollarization in a way that should promote more informed discussion both in the United States and in countries considering official dollarization.

The twentieth century has been a time of increasing currency fragmentation. At the beginning of the century there were far fewer independent countries than exist today, and the great majority of their currencies were linked to silver or gold, in effect dividing the world into two large currency blocs. Currency crises occurred, but were less frequent and severe than they later became. Since the First World War, the number of currencies with independent monetary policies has risen almost continuously, in tandem with the number of independent countries. The world now appears to have begun a period of currency consolidation that will again divide the world into two or three large currency blocs. The replacement of national currencies with the euro in 11 Western European countries at the start of 1999 has created the first true rival to the dollar in half a century, and has created a sense of urgency in developing countries to try to create their own regional arrangements or to join the dollar or euro blocs.

Official dollarization can be an important option in making the international monetary system more solid and less prone to crises. It has benefits that make it worthy of consideration in developing countries. It also has benefits for the United States, whose realization the United States can promote through the International Monetary Stability Act.

Prepared by Kurt Schuler, Senior Economist to the Chairman, Joint Economic Committee Staff Report Office of the Chairman, Connie Mack. This report originated from research with eljko Bogeti of the IMF, whom I thank for many facts and ideas, but it expresses my own views alone. This staff report expresses the views of the author only. These views do not necessarily reflect those of the Joint Economic Committee, its Chairman, Vice Chairman, or any of its Members.

REFERENCES AFP. 1999. Agence France Presse. "UN Administrator in Kosovo Makes German Mark Official Currency." News wire through Lexis-Nexis, September 3.

- Agnote, Dario. 2000. "U.S. Dollar Becomes E. Timor's Legal Tender." Kyodo News Service wire through NewsEDGE, January 24.
- Baliño, Tomás J., Adam Bennett, and Eduardo Borensztein. 1999. Monetary Policy in Dollarized Economies. Occasional Paper 171. Washington: International Monetary Fund.
- BCRA. 1998. Banco Central de la República Argentina. Argentina and the Contingent Repo Facility. Buenos Aires: Banco Central de la República Argentina, October.
- BCRA. 1999. Banco Central de la República Argentina. "Tratado de asociación monetaria. Profundizar la convertibilidad: un camino hacia la Unión Monetaria Americana." Mimeo, January 21.
- Bogeti, eljko. 1999. "Official or 'Full' Dollarization: Recent Issues and Experiences." Unpublished paper, International Monetary Fund, June 9. Available online at <http://users.erols.com/kurrency/bogdllr.htm>.
- Bogetic, Zeljko. 2000. "Full Dollarization: Fad or Future?" Challenge, January-February.
- Calvo, Guillermo A., and Carlos Végh. 1996. "From Currency Substitution to Dollarization and Beyond: Analytical and Policy Issues." In Guillermo A. Calvo, Money, Exchange Rates, and Output. Cambridge, Massachusetts: MIT Press.
- Canada. 1999a. Parliament. House of Commons. Debates, March 15, edited Hansard no. 196. Available online at http://www.parl.gc.ca/36/1/parlbus/chambus/house/debates/196_1999-03-15/han196-e.htm.
- Canada. 1999b. Parliament. Senate. Standing Committee on Banking, Trade, and Commerce. Proceedings, Issue 48, Evidence, March 25. Available online at <http://www.parl.gc.ca/36/1/parlbus/commbus/senate/com-e/bank-e/48evb-e.htm>.
- Castro, Jorge. 1999. "Global Currencies as a Central Contemporary Trend: Basis of the Dollarization Strategy and a Treaty of Monetary Association." Working paper submitted by the Secretary of State for Strategic Planning, Dr. Jorge Castro, to the Presidential Cabinet of the Argentine Republic on April 15, 1999. Unofficial translation. Argentina, Presidencia de la Nación, Secretaria de Planeamiento Estratégico, Buenos Aires.
- CIA. 1998. U.S. Central Intelligence Agency. CIA World Factbook. Online version, <http://www.odci.gov/cia/publications/factbook/index.html>.
- Collings, Frances d'A., and others. 1978. "The Rand and the Monetary Systems of Botswana, Lesotho, and Swaziland." Journal of Modern African Studies, v. 16, no. 1, March, pp. 97-121.
- Cordeiro, José. 1999. La segunda muerte de Sucre...y el renacer del Ecuador. Guayaquil, Ecuador: Instituto Ecuatoriano de Economía Política. Partly available online at <http://www.his.com/~ieep/sucre.html>.
- De Grauwe, Paul. 1997. The Economics of Monetary Integration, 3rd edition. Oxford: Oxford University Press.
- Fischer, Stanley. 1982. "Seigniorage and the Case for a National Money." Journal of Political Economy, v. 90, no. 2, April, pp. 295-313.
- Frankel, Jeffrey. 1999. "The International Financial Architecture." Brookings Institution Policy Brief 51, June. Available online at <http://www.brookings.org/comm/PolicyBriefs/Pb051/pb51.htm>.
- Frydl, Edward. 1999. "The Length and Cost of Banking Crises." International Monetary Fund Working Paper 99/30, March. Available online at <http://www.imf.org/external/pubs/ft/wp/1999/wp9930.pdf>.
- Ghosh, Atish R., Anne-Marie Gulde, and Holger C. Wolf. 1998. "Currency Boards: The Ultimate Fix?" International Monetary Fund Working Paper 98/8. Available online at <http://www.imf.org/external/pubs/ft/wp/wp9808.pdf>.
- Grubel, Herbert. 1999. "The Case for the Amero: The Economics and Politics of a North American Monetary Union." Critical Issues Bulletin, Fraser Institute, Vancouver.
- Hanke, Steve H. 1999. "Some Thoughts on Currency Boards." In Mario I. Blejer and Marko Skreb, editors, Balance of Payments, Exchange Rates and Competitiveness in Transition Economies, pp. 341-66. Boston: Kluwer Academic Publishers.
- Hanke, Steve H., and Kurt Schuler. 1999. "A Monetary Constitution for Argentina: Rules for Dollarization." Cato Journal, v. 18, no. 3, Winter, pp. 405-19. Available online at <http://www.senate.gov/~jec/bankingdollar.htm>.
- Hausmann, Ricardo, Michael Gavin, Carmen Pages-Serra, and Ernesto Stein. 1999. "Financial Turmoil and the Choice of Exchange Rate Regime." Working paper, Inter-American Development Bank. Available online at http://www.iadb.org/oce/PDF/Financial_Turmoil.pdf.
- Hausmann, Ricardo, and Powell, Andrew. 1999. "Dollarization: Issues of Implementation." Working paper, Inter-American Development Bank. Available online at http://www.iadb.org/oce/exchange_rate/implement.pdf.
- Hernandez, Edin. 1999. "Guatemala Considers Adopting US Dollar as Currency." Agence France-Presse newswire, February 21.
- IEEP. 2000. Instituto Ecuatoriano de Economía Política, Guayaquil, Ecuador. "Dolarización Oficial en Ecuador." Available online at <http://www.his.com/~ieep/dolrznec.htm>.
- Ingram, James C. 1962. Regional Payments Mechanisms: The Case of Puerto Rico. Chapel Hill, North Carolina: University of North Carolina Press.
- IMF. International Monetary Fund. International Financial Statistics. Monthly, annual, and CD-ROM.
- IMF. 1998. International Monetary Fund. Exchange Arrangements and Exchange Restrictions (annual). Washington: International Monetary Fund.
- IMF. 1999. International Monetary Fund. "IMF Economic Forum. Dollarization: Fad or Future for Latin America?" Transcript, available online at <http://www.imf.org/external/np/tr/1999/TR000624.HTM>.
- International Monetary Stability Act. 1999. (106th Congress, S. 1879 and H.R. 3493.) Available online at <http://thomas.loc.gov/>.
- JEC. 1999. U.S. Congress. Joint Economic Committee. Office of the Chairman. "Encouraging Official Dollarization in Emerging Markets." Staff report, April. Available online at <http://www.senate.gov/~jec/dollarization.htm>.

- Liviatan, Nissan, editor. 1993 Proceedings of a Conference on Currency Substitution and Currency Boards. World Bank Discussion Paper 207.
- López Buenaño, Franklin. 1999. Por Qué y Cómo Dolizar. Guayaquil, Ecuador: Escuela Superior Politécnica del Litoral.
- Melloan, George. 1998. "Another Russian Crisis? Define 'Crisis' Please." Wall Street Journal, June 2.
- Mizen, Paul, and Eric J. Pentecost, editors. 1996. The Macroeconomics of International Currencies: Theory, Policy, and Evidence, Gloucestershire, England: Edward Elgar.
- Moreno-Villalaz, Juan Luis. 1998. "Cost of Using the Dollar as Currency." Unpublished paper, Ministry of Planning, Panama. Available online at <http://www.sinfo.net/juanluismoreno>
- Moreno-Villalaz, Juan Luis. 1999. "Lessons from the Monetary Experience of Panama: A Dollar Economy with Financial Integration." Cato Journal, v. 18, no. 3, Winter, pp. 421-39. Available online at <http://www.cato.org/pubs/journal/cj18n3/cj18n3-12.pdf>. A longer version was published in Spanish as La experiencia monetaria de Panamá: lecciones de una economía dolarizada, con una banca internacional. Panama City: Banco Nacional de Panamá, 1997.
- Porter, Richard, and Ruth Judson. 1996. "The Location of U.S. Currency: How Much Is Abroad?" Federal Reserve Bulletin, v. 82, no. 10, October, pp. 883-903.
- Revista. 1992. Revista de Análisis Económico. Special issue on convertibility and currency substitution, v. 7, no. 1, June.
- Schuldt, Jürgen. 1999. Dolarización oficial de la economía: un debate en once actos. Lima: Universidad del Pacífico, Centro de Investigación.
- Schuler, Kurt, 1996. Should Developing Countries Have Central Banks? Currency Quality and Monetary Systems in 155 Countries. London: Institute of Economic Affairs.
- Schuler, Kurt. 1999. "Dollarising Indonesia." Bulletin of Indonesian Economic Studies, v. 35, no. 2, December, pp. 97-113.
- Seitz, F. 1995. "The Circulation of the Deutsche Mark Abroad." Discussion paper, Deutsche Bundesbank.
- Stein, Robert. 1999a. "Issues Regarding Dollarization." Staff report, U.S. Congress, Senate Committee on Banking, Housing and Urban Affairs, Subcommittee on Economic Policy, Office of the Chairman, July. Available online at <http://www.senate.gov/~jec/bankingdollar.htm>.
- Stein, Robert. 1999b. "Citizen's Guide to Dollarization." Staff report, U.S. Congress, Senate Committee on Banking, Housing and Urban Affairs, Subcommittee on Economic Policy, Office of the Chairman, September. Available online at <http://www.senate.gov/~jec/basicssp.htm>
- Tricks, Henry. 1999. "Mexico May Face Dollar Peg Pressure." Financial Times, February 1, p. 3.
- U.S. Congress. 1999a. Senate Committee on Banking, Housing and Urban Affairs. Subcommittee on Economic Policy and Subcommittee on International Trade and Finance. "Hearing on Official Dollarization in Emerging-Market Countries," April 22. Available online at http://www.senate.gov/~banking/99_04hrg/042299/index.htm.
- U.S. Congress. 1999b. Senate Committee on Banking, Housing and Urban Affairs. Subcommittee on Economic Policy and Subcommittee on International Trade and Finance. "Hearing on Official Dollarization in Latin America," July 15. Available online at http://www.senate.gov/~banking/99_07hrg/071599/index.htm.
- World Bank. 1999. World Development Indicators on CD-ROM. Washington: World Bank.

Web sites

- Guillermo Calvo, original papers, <http://bsos.umd.edu/econ/ciecpn.htm>.
- Instituto Tecnológico Autónomo de México, conference on "Optimal Monetary Institutions for Mexico," December 3-4, 1999, <http://master.ster.itam.mx/~delnegro/dollar.htm>.
- Inter-American Development Bank, conference on "Alternative Exchange Rates for the Region," July 23-4, 1999, <http://www.iadb.org/oce/exchange.htm>
- Juan Luis Moreno-Villalaz, original papers, <http://www.sinfo.net/juanluismoreno>

Notes

1. See in particular the conference papers from the Instituto Tecnológico Autónomo de México and the Inter-American Development Bank, available online and listed at the end of the references. The Federal Reserve Bank of Dallas will hold a conference March 5-6, 2000. Because of interest in official dollarization in Latin America, almost as much has been written on the subject in Spanish as in English; the most comprehensive work so far in either language is Schuldt (1999).
2. Extensive foreign-currency deposits are not confined to developing countries: in Britain they exceeded 15 percent of the total in 1995. However, foreign-currency deposits in developed countries typically result from involvement in international finance rather than from people seeking to hedge against high inflation in the domestic currency.
3. At the time, Americans predominantly used coins rather than notes in retail trade.
4. The new \$20, \$50, and \$100 bills cost about twice as much to print because they have more elaborate features to protect against counterfeiting, but they also have longer average lives than the \$1 bill.
5. Several multinational central banks share seigniorage among their member countries, but the only countries today that earn seigniorage from foreign currency circulating within their borders are Lesotho and Namibia. Before they started issuing their own currencies, they used the South African rand, and the exchange rates of their currencies are 1-to-1 with the rand. As part of a formal arrangement called the Common Monetary Area, South Africa shares with them the seigniorage from their estimated use of rand notes. Swaziland and Botswana, which once had similar arrangements with South Africa, no longer do (Collings and others 1978).
6. The savings involved is not 5 percent of GDP, but 5 percent times the difference between the lower interest rate the funds would earn as reserves and the higher rate they can earn in other types of investment.

7. For an explanation of the steps necessary for official dollarization in Argentina, which has a currency board-like system, see Hanke and Schuler 1999. On Ecuador, which has central banking, see IEEP 2000.

8. A clean float implies that the central bank does not engage in sterilized intervention (changing the domestic money supply to offset changes in the foreign-exchange market).

9. The Senate bill is S. 1879; the House of Representatives bill is H.R. 3493. The text of the International Monetary Stability Act is available online at <http://thomas.loc.gov/>. A forthcoming staff report by the Joint Economic Committee will explain the provisions of the act in some detail.