

Discussion of

**“Dollarization and the Integration of International
Capital Markets:
A Contribution to the Theory of Optimal Currency
Areas”**

**by Valerie Bencivenga,
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¹ Much of my thinking on dollarization has been shaped by discussions with Fernando Alvarez and Patrick Kehoe. The views expressed herein are those of the author and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System

1. *A Tour de Force*

This paper is a *tour de force* of what I would call the “Bruce Smith” style of applied economic theory. It presents a two-country dynamic general equilibrium model in which each country has borrowing and lending subject to shocks, endogenously arising financial institutions, and potentially independent monetary policy. Bruce, together with his co-authors, Valerie Bencivenga and Elisabeth Huybens (BHS), address Mundell’s (1961) now classic question of when it makes sense for a country to abandon the use of its own currency in favor of that of another. Complementary to Mundell, who stresses the need for integration of labor markets, BHS stress the need for integration of capital markets. The paper is the result of a lot of hard work, and BHS have been able to provide a fairly complete analysis of a complicated dynamic model.

In spite of the complicated nature of the model, the results are simple and intuitive. The consequences of dollarization depend crucially on whether or not the financial markets of the two countries are integrated, which within the context of the model boils down to whether or not borrowing and lending takes place freely across countries:

- (Under weak conditions) Dollarization leads to indeterminacy of equilibrium if financial markets are segmented.
- Dollarization leads to oscillatory paths converging to the steady state with segmented financial markets.
- (Under weak conditions) Dollarization does not lead to indeterminacy if financial markets are integrated.
- Dollarization leads to a unique monotone path converging to the steady state with integrated financial markets.
- Dollarization leads to a fall in worldwide seigniorage revenues if financial markets are segmented.
- When financial markets are segmented, dollarization always leads to a fall in the steady state utility of borrowers and to a fall in the steady state utility of lenders if the nondollarized monetary policies were sufficiently similar.

The approach employed by BHS, which utilizes a two-country overlapping generations model with two-period-lived consumers and very complicated within-period timing, has its advantages and its disadvantages. I provide a critique in the next section. The paper suggests that we need to investigate whether or not a country that is considering dollarization, like Mexico, has financial markets that are well integrated with financial markets in the United States. In the following section, I present some evidence on Mexican and U.S. stock price indices that suggests that Mexican markets are in fact well integrated with U.S. markets. In the final section, I use (abuse?) my position as

discussant of this paper to pose questions about dollarization that I would have liked to see addressed by this paper, or by some other paper in this collection.

2. A Critique of the “Bruce Smith” Style

Like a number of other papers by Bruce and his different co-authors, this paper utilizes an overlapping generations model with two-period-lived consumers and complex within-period timing. The restriction to two-period-lived consumers is necessary to keep the model simple enough so that it can be studied analytically. The complex within-period timing permits BHS to incorporate different theoretical approaches to analyzing financial issues. In the case of the model in this paper, BHS simultaneously incorporate Townsend’s (1987) theory of demand for money as insurance against spatial relocation and Diamond and Dybvig’s (1983) theory of banks as providers of insurance against random liquidity shocks. Moreover, BHS follow Betts and Smith (1997) in generalizing Townsend’s theory of demand for money to an international context: Consumers face the possibility of being randomly relocated not just to another location in the same country, but to another country. This leads these consumers to demand not just domestic currency, which they can spend after relocation within the same country, but also foreign currency, which they can spend after relocation abroad.

A major advantage of the “Bruce Smith” modeling approach is that it brings important concepts in economic theory into contact with policy issues. The theory in this paper provides interesting and nontrivial roles for monetary policies and financial institutions. The restriction of attention to a model simple enough to study analytically allows BHS to derive theorems of the sort enumerated in the previous section. For both the case where financial markets are segmented and the case where they are integrated, BHS are able to provide a complete analysis of the steady state of the economy and to reduce the analysis of the dynamic equilibrium to the study of a second-order nonlinear difference equation. Linearizing this difference equation allows them to make qualitative statements about determinacy of equilibrium near a steady state and about the sort of convergence to the steady state, for example, whether convergence is monotonic or oscillatory.

The sort of analysis in this paper requires a lot of hard mathematical work and a deep understanding of the model being studied. Even so, there is a basic intuition for most of the results. If financial markets are segregated, for example, then equilibrium is indeterminate because there is nothing to pin down the real exchange rate between countries. If consumers in one country think that goods in the foreign country are expensive relative to domestic goods, then they will demand a lot of foreign currency to insure themselves against the possibility of being relocated to the foreign country. This high demand for foreign currency then justifies the belief that goods in the foreign country are relatively expensive. If, however, financial markets are integrated, then arbitrage rules out this sort of self-fulfilling prophecy. (I must admit that the intuition for oscillatory, rather than monotonic, paths under dollarization when financial markets are segregated eludes me.)

Unfortunately, the approach taken by this paper also has its disadvantages. At least one disadvantage is obvious without imagining a more general modeling framework: Although BHS are able to provide a complete comparison of welfare across steady states, they cannot provide welfare comparisons across dynamic equilibria. They cannot, for example, make statements like, “A country whose financial market is not integrated with that of its neighbor will be worse off if it adopts its neighbors currency.” To some extent this criticism seems narrow because it seems obvious that “dollarization” would make a country worse off in this case. But how much worse off? We need to remember that this model has built into it many potential costs of dollarization but few potential gains. There is, for example, no time consistency policy of domestic monetary policy that would be avoided by abandoning an independent monetary policy. The best case that BHS seem to be able to make for dollarization therefore seems to be that, when the financial markets of the two countries are integrated, it will do no harm.

To use this model to say something about the costs of dollarization outside the steady state, we would need to do computer simulation. A computer simulation would require us to impose numerical parameters on the economy. Economic researchers like me would want to calibrate the model so that it matches the economies in which we are interested along a number of crucial dimensions. Rather than having the two countries in the model be symmetric, for example, we would calibrate one to resemble Mexico in terms of features like relative size and level of financial development and the other to resemble the United States. It is in calibrating this sort of model, however, that the analytical framework employed by BHS, although suitable for deriving theorems, runs into troubles. In a model in which consumers live for two periods, we naturally think of a period as being 25 or 30 years, that is, half of the typical consumer’s adult lifetime. I do not think that BHS take seriously such a long time period, or a period of half its length in the case of the within-period timing, in terms of the Townsend or the Diamond and Dybvig theories. My guess is that they would rather stress the usefulness of their model for identifying issues that more general applied models could later address.

3. Is Mexico Financially Integrated with the United States?

The issue identified by BHS as crucial to thinking about costs and benefits of dollarization is that of the degree of integration of the domestic financial markets with U.S. financial markets. I agree with BHS that it is a logical extension of Mundell’s analysis of labor market integration that a country whose financial markets are integrated with those in the United States would have a lot more to gain from dollarization than would a country whose financial markets are poorly integrated, or at least a lot less to lose.

Are in fact Mexico’s financial markets well integrated with those in the United States? The model employed by BHS is too stylized to give us a precise concept of integration that is crucial to determining the costs and benefits of dollarization. A perusal of financial headlines, however, suggests that the Mexican and U.S. stock markets are well integrated: Headlines like “Mexican bourse drops on NASDAQ woes” and “Mexican stocks hold modest gains ahead of Fed meeting” are commonplace.

Let me provide a casual econometric analysis of the question of whether or not the Mexican stock market is well integrated with the U.S. stock market using data that are easily available on the Internet. To be specific, I examine the daily closing values of the following stock market indices

- U.S. Dow Jones Industrial Index (DJI)
- U.S. NASDAQ Composite Index (IXIC)
- Mexican IPC All-Share Index (MXX)

over the period 4 January 1999 to 31 August 2000. These data have been obtained from the Yahoo! Finance site (<http://finance.yahoo.com>). The Mexican stock index has been converted from dollars into pesos using the daily closing values of the peso/dollar exchange rate reported by the Board of Governors of the Federal Reserve System (<http://www.bog.frb.fed.us>). The data are reported only for days on which all three markets are open. There are a total of 409 observations for each variable. Each index had been normalized so that the observation for 4 January 2000 is 100.

The data are depicted in Figure 1. It is striking that the data for the U.S. NASDAQ and the Mexican IPC seem to move together to a much greater extent than either moves with the U.S. Dow Jones. A more systematic examination of the data verifies this impression. Table 1 reports statistics on the data in levels. Table 2 reports the statistics on first differences. (Notice that the first difference is not the daily change in the price index for days on which the market is open but another market is closed.)

Both the depiction of the data in Figure 1 and the statistics in Tables 1 and 2 provide support for the contention that Mexican and U.S. financial markets are highly integrated. At least it seems that the prices of the equities that make up the U.S. NASDAQ index move closely with the prices of the equities of that make up the Mexican IPC index. It is the equities that make up the U.S. Dow Jones Index that seem to be poorly substitutable with the equities in both the NASDAQ and the IPC. Curiously enough, the equities in the Mexican IPC make up a market that seems to be more integrated with the market represented by the U.S. Dow Jones than do the equities that make up the U.S. NASDAQ.

The degree to which financial markets in countries considering dollarization are integrated with U.S. market is obviously an issue that merits more attention. Perhaps the next generation of models can provide us with more guidance about exactly what concept of financial integration is crucial for assessing the desirability of dollarization.

4. What is Special about Dollarization?

There is one criticism of BHS's analysis that applies to all of the papers in this collection: They do not identify anything that crucially distinguishes dollarization from a completely credible fix of the exchange rate. Given that there is already a large literature on fixed versus flexible exchange rates, I would have thought before the conference that

the papers here would focus on the special features of dollarization. One key question that has not been addressed by any paper in this collection is why dollarization should be more credible than simply announcing a policy of fixing the exchange rate. To answer this question we would need to identify, for example, why it would be more costly for the government of Argentina to abandon dollarization than for it to abandon its current Convertibility Program.

To answer questions about what makes dollarization different from other policies, we need to enter into the institutional details of a specific dollarization program. An obvious place to start is the International Monetary Stability Act proposed by U.S. Senator Connie Mack (see U.S. Congress Joint Economic Committee, 2000). This law would give the U.S. Secretary of the Treasury the discretion to encourage official dollarization by offering to rebate quarterly to any country that dollarizes 85 percent of the resulting increase in U.S. seigniorage revenues. The remaining 15 percent of seigniorage revenues would accrue to the United States, although some of these revenues would be used to rebate seigniorage to countries like Panama that are already officially dollarized. The law makes clear, however, that the United States would have no obligation to serve as a lender of last resort to dollarized countries, to consider their economic conditions when setting monetary policy, or to supervise their banks. Mack's proposal is a relatively modest one, but it identifies a clear cost to abandoning dollarization, even partially: A country in which the government introduces an alternative currency would lose its certification from the U.S. Department of the Treasury and the accompanying quarterly seigniorage rebates.

At the time that I am writing this discussion, Mack's proposal is what is on the table, but there is no reason that we cannot imagine other alternatives. An obvious alternative could partially follow the European Monetary Union currently being enacted inside the European Union. European monetary unification obviously involves more costs and benefits than Mack's dollarization program because it is tied in with the other economic and political unification programs going on in Europe. There are probably subtle benefits within the process itself, however. Some of my European friends have argued to me, for example, that the principal benefit of joining the EMU for a country like Italy was that the convergence criteria in the Maastricht Treaty enforced discipline on the domestic political process: Faced with the possibility that Italy would be left out of the first stage of European monetary unification, as was Greece, rather than included, as were countries like Spain and Portugal, Italian politicians abandoned many of their special interests to put domestic fiscal and monetary policy in order.

Trying to learn from the European example, let me outline a possible plan for a Currency Union of the Americas: Countries would have the option of printing their own dollar notes (fully backed by U.S. notes) that would freely circulate alongside U.S. notes within the country, much the same as Bank of Scotland notes freely circulate alongside Bank of England notes in Scotland. Such notes could bear the portraits of important national historical figures, for example, rather than those of U.S. historical figures. The central bank of a dollarized country would have the status of a regional Federal Reserve Bank in the current Federal Reserve System, giving it a limited voice in monetary policy. Moreover, the domestic central bank would be required to regulate domestic financial intermediaries just as regional Feds regulate their member banks. The Federal Reserve

System, perhaps renamed the Central Bank of the Americas, would provide the lender of last resort facility for member banks in a dollarized country.

My Currency Union of the Americas would have benefits for dollarized countries that Mack's scheme does not have. It could also have additional costs: There could be convergence criteria for domestic fiscal discipline and for healthy domestic financial intermediaries that a country would need to satisfy before being admitted. As the example of Italy in the EMU illustrates, however, the costs of being forced to satisfy such criteria can actually be viewed as a benefit for some countries.

It should be obvious that a country thinking of dollarizing would assess the potential costs and benefits quite differently under my hypothetical Currency Union of the Americas scheme than it would under Mack's scheme. This is probably true of any alternative proposal for dollarization: The costs and benefits of any dollarization program depends on the details. Failing to take institutional details into account, we are left with the old debate about fixed versus flexible exchange rates.

References

Betts, Caroline M., and Bruce D. Smith. "Money, Banking, and the Determination of Real and Nominal Exchange Rates." *International Economic Review* 38 (August 1997), 703-36.

Diamond, Douglas W., and Philip H. Dybvig. "Bank Runs, Liquidity, and Deposit Insurance." *Journal of Political Economy* 91 (June 1983), 401-19.

Mundell, Robert A. "A Theory of Optimum Currency Areas." *American Economic Review* 51 (September 1961), 657-65.

Townsend, Robert M. "Economic Organization with Limited Communication." *American Economic Review* 77 (December 1987), 954-71.

U. S. Congress Joint Economic Committee. "Dollarization: A Guide to the International Monetary Stability Act." Joint Economic Committee Staff Report, March 2000. (<http://www.senate.gov/~jec/dollaract.htm>)

Mexico-US Stock Market Indices

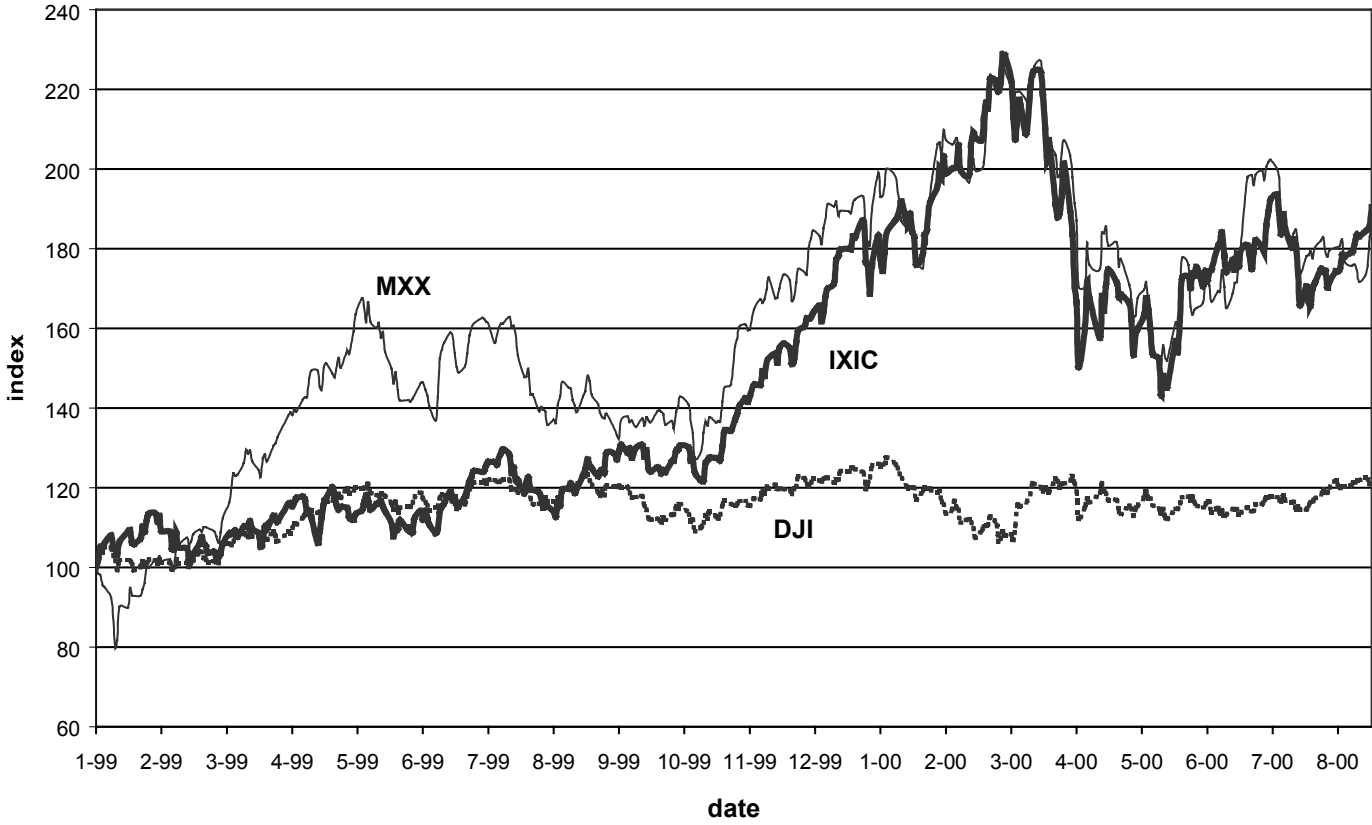


Figure 1

Table 1
Data on Levels

mean(DJI) = 115.3176 std(DJI) = 6.1931
 mean(IXIC) = 147.6366 std(IXIC) = 34.8857
 mean(MXX) = 160.1307 std(MXX) = 31.7026

Cross Correlations	DJI	IXIC	MXX
DJI			
IXIC	0.4087		
MXX	0.6232	0.9078	

Table 2
Data on First Differences

mean(DJI) = 0.0541 std(DJI) = 1.3490
 mean(IXIC) = 0.2218 std(IXIC) = 3.7095
 mean(MXX) = 0.2100 std(MXX) = 3.7471

Cross Correlations	DJI	IXIC	MXX
DJI			
IXIC	0.4734		
MXX	0.4776	0.5695	