

Charles Engel
Andrew K. Rose

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Recently economists have developed considerable evidence that regions that are politically integrated also tend to be highly economically integrated. There is much more economic intercourse within political unions than between political unions. The volume of trade, the degree of business-cycle correlation, the linkage of prices of goods and services, the opportunities to insure economic risks—all are greatly enhanced within the member states of a political union compared to groups of independent political entities.

Although the facts about economic integration have been firmly established, the underlying causes for this “home bias” in integration are in dispute. Many hypotheses have been advanced. Formal and informal barriers to international trade, for example, might help explain why there is more economic interaction within countries than between countries. However, available evidence suggests that visible barriers to trade—such as tariffs or quotas—are inadequate to explain the greater level of linkages intranationally. Proposed explanations include the common laws and political environment;

the shared culture and language; and the shared history and so forth of units within political borders.

Here we investigate one possible explanation for the “border effect”: households and firms within a country usually make transactions with a common currency. The British all use pounds, and the Japanese all use yen. But international transactions involve a swap of currencies. So the greater convenience from using the same currency might explain the high levels of integration of economies within a political union.

Currencies owe their existence to their ability to solve a problem of coordination among economic agents. The butcher might wish to buy a loaf of bread; the baker might want a candle; and, the candlestick maker would like a nice steak. How can the sellers and buyers be organized so that each can purchase the goods she wants? If there were no currencies, the three would need to meet and discuss how to arrange trade among them. Economists use the term *transactions costs* to label those costs associated with buying and selling products. But currencies coordinate demands and supplies without any need for formal organization. Each can sell her product and purchase her desired goods using money. The transactions costs are much lower.

So transactions that occur between economic agents within a country benefit from the use of a common currency. But international economic interaction does not usually take place with a common currency. An exchange of one currency for another is required; thus transactions costs are higher for international transactions. We observe, however, that in several instances international transactions do not require currency exchange. That is because there are several currency unions in existence around the world. A *currency union* is a group of countries that use the same currency. Examples are the CFA Franc zone and the East Caribbean Currency Area. To the extent that economic transactions are facilitated by the use of a common currency, we expect to find greater economic linkages

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among countries of a currency union than among countries that do not share a common currency.

So our objective is to examine the economic linkages among currency union countries. Are they greater than the linkages for non-currency union members? Are the linkages as great as economists have found within political unions? The answers, in short, are yes and no, respectively.

We use several data sets for our study. The first data set consists of annual observations from 1960 to 1996 for 210 countries, territories, colonies, and other entities for many macroeconomic variables. The data are taken from the 1998 World Bank *World Development Indicators* and are extremely comprehensive. There are, however, many missing observations for variables of interest. The second data set consists of bilateral trade volumes for 166 countries, measured annually from 1970 through 1995. The data are extracted from the "World Trade Data Base," a recompilation of United Nations trade data. It contains observations for goods measured at the four-digit Standard International Trade Classification (SITC) level.

First, some descriptive statistics help to characterize currency union countries relative to the whole sample of countries. Member countries of currency unions are smaller (in population) than most countries, and are poorer. Their average gross domestic product (GDP) per person is about one-third below the world average. They have on average had much lower inflation than non-currency unions. This is primarily because no currency union country in our sample ever experienced very high inflation (for example, over 50 percent per year), while such inflation rates are quite common in our overall sample. Real growth rates in currency union countries have not been appreciably higher than in non-currency union countries. Countries that are members of currency unions appear to be more open to international trade and capital flows. Their exports and imports (as a percentage of GDP) are about one-third greater than for our entire sample of countries; gross foreign direct invest-

ment (as a percentage of GDP) is about one-third greater; and private capital flows (again as a percentage of GDP) are about 80 percent greater. Although the growth rate of currency union countries has been no greater than for other countries, Frankel and Rose find that the openness of the currency union members is a significant channel for growth.¹

Another characteristic of currency unions is that the members are more specialized in production and exports. By *specialization*, we mean the degree to which exports are concentrated in a narrow range of products. We use a standard measure of specialization, the Herfindahl index. Indeed, the members of currency unions are significantly more specialized than countries that have their own currencies. It might be objected that currency union members are smaller and poorer than other countries, so that more specialization is to be expected. But we control for factors such as GDP per capita and country size, and currency union members consistently have a higher degree of specialization. Succinctly, members of currency unions are more open than countries with their own currencies, and they are also more specialized.

We then turn to the question of whether currency unions really trade more than other countries, taking into account the size, income, and geographic remoteness of the currency union members. The gravity model of international trade has been a very successful predictor of the volume of trade between two countries. It points to distance between the two countries, income levels, and country size as being the most critical determinants of bilateral trade flows. Our data confirm that result. Using data for 1995 trade volumes for 150 countries and other political units, we estimate the gravity model of international trade. Greater distance between two countries lowers

1. Jeffrey Frankel and Andrew K. Rose, 2000, "An Estimate of the Effect of Currency Unions on Trade and Growth," paper delivered at Hoover Institution conference on Currency Unions, May.

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trade, while greater economic *mass* (proxied by real GDP and real GDP per capita) increases trade.

But even after taking out the effects of output, size, and distance, there is a large effect of a common currency on trade. According to our estimates, two countries that share a common currency trade together by a factor of 6.5 more than two countries with separate currencies! This strong result is surprising, but it stands up to a number of tests for specification. We take into account the effects of being partners in a regional trade agreement, sharing a common language, having the same (post-1945) colonizer, being part of the same nation (as, for example, France and an overseas department like French Guiana), and having had a colonizer-colony relationship. All these factors increase trade by economically and statistically significant amounts. Also, landlocked and large countries tend to trade less, and islands trade more. But, even controlling for all of these other explanations for the volume of trade between nations, we find that sharing a common currency has a large and statistically significant effect on the volume of bilateral trade. Our lowest estimate indicates that trade is 285 percent higher for members of a currency union than for countries with sovereign currencies. This result is only strengthened when we pool the 1995 data together with data from 1970, 1975, 1980, 1985, and 1990.

Although our estimate of the intensity of trade within currency unions is provocatively high, it is actually quite low compared with the well-documented size of home bias in international trade. For example McCallum² and Helliwell³ find the volume of trade between two regions within a country (controlling for distance, size, income, etc.) to be twelve to twenty times larger than the volume of trade between two regions that are located in different countries.

2. John McCallum, 1995, "National Borders Matter: Canada-U.S. Regional Trade Patterns," *American Economic Review* 85, no. 3: 615–23.

3. John Helliwell, 1998, *How Much Do National Borders Matter?* (Washington, D.C.: Brookings).

Although membership in a common currency area does intensify trade, it does not intensify it nearly enough for common currency areas to resemble countries.

Areal exchange rate is a measure of relative price levels between two countries. The price of a basket of goods in one country is divided by the price in another country, after first converting the prices into a common currency using the exchange value of one country's currency in terms of the other's. The latter is referred to as the *nominal exchange rate*. When nominal exchange rates are volatile, as they are for many countries with no controls on foreign exchange markets, the real exchange rate consequently tends to be volatile. Since currency union members use the same currency, their nominal exchange rate is fixed at one for one. With no nominal exchange-rate volatility, we might expect to find greater real exchange-rate stability within currency unions.

Obstfeld and Rogoff⁴ discuss two of the benefits from currency unions, relating to real exchange-rate stability. First, accounting costs are reduced and the greater predictability of relative prices reduces uncertainty for firms doing business in the countries of a currency union. Second, the currency union countries are not subject to the fluctuations in nominal exchange rates caused by monetary disturbances and speculative bubbles that lead to temporary unnecessary fluctuations in real exchange rates.

We measure real exchange-rate stability in two ways. The first is a measure of how quickly real exchange rates adjust to sudden disturbances. The second is simply a measure of the overall volatility—the standard deviation of annual percentage changes in the real exchange rate. We use annual data on real exchange rates from 1960 to 1996.

As to the first measure, we simply find no evidence of faster

4. Maurice Obstfeld and Kenneth Rogoff, 1996, *Foundations of International Macroeconomics* (Cambridge, Mass.: MIT Press).

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adjustment within currency unions compared to countries with their own currencies. But perhaps this is not too surprising if the disturbances to currency union real exchange rates are much smaller than those that hit countries with sovereign currencies. Perhaps there is a great deal of transitory real exchange-rate volatility associated with volatile nominal exchange rates. When disturbances to nominal exchange rates are large and lead to large misalignments of real exchange rates, there may be rapid adjustment.

Indeed, we do find using our second measure that the standard deviation of real exchange rates is lower for currency union members. Every 10 percentage-point drop in the standard deviation of nominal exchange rates leads to approximately a 4 percentage-point drop in the standard deviation of real exchange rates. So the elimination of nominal exchange rate volatility can contribute significantly to the reduction in instability in real exchange rates. Moreover, even controlling for nominal exchange-rate volatility, real exchange rates appear to be more stable within currency unions. Being a member of a currency union reduces the standard deviation of annual real exchange rates by 6 percentage points relative to countries with sovereign currencies.

It appears that much of the success in reducing real exchange-rate volatility in currency unions is attributable to the elimination of high inflation. When inflation is high, it also tends to induce a lot of relative price-level fluctuations between countries. Low-inflation countries with sovereign currencies have real exchange-rate volatility that is only modestly higher than that of currency union members. Moreover, relative price volatility between countries within currency unions appears to be significantly greater than relative price volatility between cities within political unions. We can again conclude that common currency areas are not as integrated as political unions.

Another dimension of integration of economies is the comovement of GDP. Do countries with a common currency have more

highly synchronized business cycles? We compute the correlation of output movements in countries, both for currency union countries and for countries with their own currencies, using annual data on GDP for 1960–1996. We find that the correlation coefficients tend to be perhaps .1 higher on average for currency union members than for nonmembers. This finding is robust when we include controls for country size, regional trade agreements, common language, sharing a common border, and so on. Although economically and statistically significant, the size of this effect is small in an absolute sense.

Most recently, Clark and van Wincoop⁵ have compared the coherence of business cycles within countries and across countries, using annual data for both employment and real GDP. They show that intranational business-cycle correlations are approximately .7 for regions within countries but in the range of .2 to .4 for comparable regions across countries. That is, the effect of international borders on business-cycle synchronization ranges between .3 and .5. Thus, only a small part of the border effect is explained by membership in a common currency area.

We have seen that international capital flows tend to be greater among currency union members than among nonmembers (as a percentage of GDP). One of the benefits of international trade in assets is that it allows for diversification to protect against risks to income. The most comprehensive measure of how well individuals can diversify risk is to measure how protected consumption levels in a country are from income shocks. When households can fully diversify risk internationally, consumption should be independent of idiosyncratic income shocks within a country.

However, we find that there is no increase in consumption “insurance” among currency union members relative to countries with

5. Todd E. Clark and Eric van Wincoop, 2000, “Borders and Business Cycles,” Federal Reserve Bank of New York working paper.

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their own currencies. We use annual data on consumption and GDP from 1960 to 1992. We find that consumption in currency union countries is no more insulated from domestic income shocks than in other countries. This stands in contrast to evidence that there is a great deal of risk sharing among regions within countries. But much of the risk sharing that occurs within political unions occurs through fiscal transfers (taxes and redistribution), rather than through diversification by private agents. Moreover, financial markets remain underdeveloped in most currency union countries, so the opportunities for risk sharing are limited.

Although members of international currency unions are more integrated than countries with their own monies, they remain far from integrated compared with the intranational benchmark of regions within a country. Home bias is pervasive. Goods, labor, and capital markets are all much more integrated within national borders than across national borders. Some economists believe that this border effect is largely the result of national monies. In this paper we have found that a national money is a significant but small part of the national economic institutions that create this home bias.