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FRBSF ECONOMIC LETTER

2000-03 | February 4, 2000

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Do Currency Unions Increase Trade? A "Gravity" Approach

Andrew Rose

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In 1999, eleven European nations created a common currency zone, known as the European Economic and Monetary Union (EMU). These countries have relinquished national monetary control and adopted the euro as their official currency. The EMU is one of several currency unions in the world. Furthermore, in recent weeks, Ecuador—acting unilaterally—has seriously contemplated abandoning its national money and adopted the U.S. dollar, a move that Argentina, Mexico, and Canada also are considering.

Increased trade is one of the few undisputed gains from a currency union. Substituting a single currency for several national currencies eliminates exchange rate volatility and reduces the transactions costs of trade within that group of countries. Thus trade can be expected to rise. The question is: How much?

This question has not been addressed in the literature, which is curious, since the number of currency unions is large. For instance, fifteen African countries use the CFA franc, and eight Caribbean countries belong to the East Caribbean Currency Area (see Rose 1999 for a complete list of countries with common currency arrangements). Most research has focused instead on the effects of exchange rate volatility on international trade. For example, in the case of the euro, most economists believe that trade will increase only slightly, since exchange rate volatility was low before the EMU was formed, and since whatever volatility remained could be inexpensively hedged through the use of forward contracts and other derivatives. Indeed, econometric investigations of the impact of exchange rate volatility on international trade have never found a big negative effect.

This *Economic Letter* presents results based on research that directly explores the effect of currency unions on international trade using a "gravity" model (Rose 1999). This study shows that the effect of currency unions is large. I use a large cross-country data set to show that two countries with the same currency trade much more than comparable countries with their own currencies—over three times as

much. While reducing exchange rate volatility also increases trade, the effect of a common currency is much larger than that of eliminating exchange rate volatility but retaining separate currencies.

The "gravity" model

My objective is to link cross-country variation in currency arrangements to cross-country variation in international trade. Of course, many things affect trade other than international monetary relations. While these other factors are not of direct interest here, I need to model their effects to see if there is any remaining role for exchange rate volatility and/or currency unions. Ordinarily, this would be difficult in economics. But in this context, there is a simple and persuasive model in which I can embed the objects of interest: the "gravity" model of international trade.

The gravity model is a very simple empirical model that explains the size of international trade between countries. It models the flow of international trade between a pair of countries as being proportional to their economic "mass" (read "income") and inversely proportional to the distance between them. The gravity equation acquired its name since a similar function describes the force of gravity in physics.

The gravity model has a remarkably consistent history of success as an empirical tool. The elasticities of trade with respect to both income and distance are consistently signed correctly, economically large, and statistically significant in an equation that explains a reasonable proportion of the cross-country variation in trade. An embarrassing number of theories claim the empirical success of the gravity model as their own, so the gravity model also has theoretical credentials.

The regression model I use to explain trade includes the income of the two countries, the distance between them, and a host of extra variables. These account for the effects of physical contiguity (if two countries share a common land border), common language, membership in a common regional trade agreement like NAFTA, colonial past, and the like.

To this set-up, I add two extra variables. One is a binary dummy variable, which is one if the two countries share a common currency (like Panama and the U.S., or Belgium and Luxembourg) and zero otherwise. The other is exchange rate volatility, measured as the standard deviation of the percentage change in the bilateral nominal exchange rate.

I estimate my equation using a data set with 33,903 bilateral trade observations for five different years (1970, 1975, 1980, 1985, and 1990). All 186 entities ("countries") for which the United Nations Statistical Office collects international trade data are included in the data set (see Rose 1999). In this sample, I have 320 observations where two countries trade and use the same currency.

The trade data are taken from the *World Trade Database*. This data set is estimated to cover 98% of all trade. I pool the data across years, deflating nominal trade values (measured in dollars) by the GDP price index and include year controls. I use the *Penn World Table 5.6* for population and real GDP per capita data.

The gravity model's performance

When I estimate my equation with ordinary least squares, I find that the model works well. Both higher GDP and higher GDP per capita for the country pair increase trade. The greater the distance between two countries, the lower their trade. All three of these traditional gravity effects are intuitively reasonable, similar in magnitude to existing estimates, and statistically significant. Sharing a land border, a language, or a regional trade agreement also increases trade by economically and statistically significant amounts. The equations fit the data well, explaining over half of the variation in bilateral trade linkages.

Above and beyond all of these real factors, I find compelling evidence that the international monetary

regime matters. Countries that use the same currency tend to trade disproportionately, even holding the real factors constant. The effect is economically large; indeed, it is larger than the effect of being in a common regional trade agreement. My point estimate is that *countries with the same currency trade three times as much with each other as countries with different currencies!* Without taking this estimate too literally, it seems clear that trade is substantially higher for countries that use the same currency, holding other things equal. Countries with volatile exchange rates also trade less. Both effects are significant at conventional statistical levels.

To date, most economists have presumed that a common currency is equivalent to reducing exchange rate volatility to zero. Is this assumption reasonable? No. The effects of currency unions and exchange rate volatility are not only precisely estimated, but economically distinguishable. Hypothetically reducing exchange rate volatility from its average level to zero would increase trade by around 10%. That is, *entering a currency union delivers an effect that is 35 times—over an order of magnitude—larger than the impact of reducing exchange rate volatility from its average level to zero.*

To summarize, the gravity equation works well: it fits the data well and delivers precise reasonable estimates. These bolster my confidence in the three main findings. First, there is an intuitive negative effect of exchange rate volatility on trade. A more novel finding is the large positive effect of a common currency on trade. Third, the effect of a common currency is much larger than the hypothetical effect of reducing exchange rate volatility to zero.

In Rose (1999), I include a large amount of sensitivity analysis. I estimate my equation over 40 different ways, using different samples, different ways of measuring my exchange rate and currency union variables, different estimation methods, and different specifications of the gravity model. All these robustness checks confirm that my key results do not depend delicately on the exact way that my equation is specified or estimated. I also conducted a robustness check that allowed exchange rate volatility to be modeled as an endogenous variable. This is important, since countries may try to reduce exchange rate volatility in order to stimulate trade. I found that, even after allowing for this feedback, the strong effect of currency unions on trade remains.

Implications of increased trade for the EMU

It seems clear that a common currency should encourage trade. The puzzle is that the effect seems to be so enormous. Why does sharing a currency have such a big effect on trade? The short answer is: I don't know. Perhaps it is because a common currency represents a serious government commitment to long-term integration. This commitment could, in turn, induce the private sector to engage in greater international trade. Or perhaps hedging exchange rate risk is much more difficult than commonly believed. Alternatively, a common currency could induce greater financial integration, which then leads to stronger trade in goods and services. Still, it is wisest to conclude that we simply don't know why a common currency seems to facilitate trade so much.

Nevertheless, even if we don't know *why* a common currency makes a difference, it is plausible *that* it does. The evidence in this paper has separated the common currency component from the other characteristics that differentiate within-country *intranational* trade from cross-country *international* trade. The evidence of intranational bias is clear; trade within countries is simply huge compared to trade between countries, even for well-integrated areas like the European Union. Countries have a number of important aspects for commercial trade, including common cultural norms, a common legal system, and so forth. A common currency is a piece of this package; and it seems to be an important piece.

Does this effect matter? Yes. The most important consequence of increased trade is increased gains from trade. As the deadweight loss of using different currencies vanishes, competitive pressures increase and consumers gain. The size of these gains may be large. There may also be dynamic gains if extra trade

causes growth rates to increase. And if the EMU causes radically increased intra-European trade and its benefits, other countries may well take the plunge, spreading these gains even further.


A large increase in trade precipitated for whatever reason (including the introduction of a common currency) brings benefits but also tensions. Certainly there may be an increase in trade disputes. These will certainly occur inside Europe because of the EMU, as competitive pressures lead special interests to cry for protectionism. There may be an increase in trade tensions between Europe and the rest of the world if the European market size increases dramatically. A common currency may create much trade, but it also will divert trade from low-cost non-European producers to less efficient European producers who benefit from being in the EMU. As a result, there will be pressures to retain (or even increase) the social safety net both inside and outside Europe.

Conclusion

In the research summarized here, I have used the gravity model to show that two countries with a common currency trade much more than comparable countries with their own currencies. The effect is statistically significant and economically large; my point estimate is over 300% as much. The impact of a common currency is an order of magnitude larger than the effect of reducing moderate exchange rate volatility to zero but retaining separate currencies. The effect takes into account a variety of other factors and seems robust. Since most economists believe that the effect of a common currency on trade is small, a potent argument in favor of currency unions has been underappreciated.

Andrew K. Rose
*Visiting Scholar, FRBSF, and
Professor of Economic Analysis and Policy, UC Berkeley*

Reference

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