National Money as a Barrier to International Trade: The Real Case for Currency Union

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Abstract

National money is a barrier to international trade. Accordingly, currency unions have lower trade barriers, more trade, and higher welfare. This paper uses empirical gravity models to quantify these effects using a large panel data set. We estimate that trade barriers associated with national borders are halved when countries join a currency union, significantly raising trade and welfare. EMU may lead to an increase in euroland's trade of over 50%, with comparable numbers for Mexican dollarization.

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Europeans are proceeding with Economic and Monetary Union (EMU); a number of countries in the Americas are pursuing dollarization. Why? Conventional wisdom is that the costs are high, since members of currency unions cannot employ domestic monetary policy to smooth business cycles. More intriguingly, most economists think that the economic benefits from currency union are low. We argue below that conventional wisdom may be wrong, since national money seems to be a significant barrier to international trade *in the data.* Currency unions lower these monetary barriers to trade and are thus associated with higher trade and welfare; we estimate EMU will cause European trade to rise by over 50%. The benefits of trade created by currency union may swamp any costs of foregoing independent monetary policy.

1. Just Do It

What is the effect of currency unions on international trade? One way to answer this question would be to examine trade patterns before and after countries join or leave currency unions. Unfortunately such time-series experiments are rare; currency unions are typically long-lived and stable. Nevertheless, many countries are actually *in* currency unions. Andrew Rose (2000) provides a long list of currency unions and exploits this cross-sectional variation to estimate the effect of currency unions on trade.

International trade is affected by a host of considerations, above and beyond any effect of a common currency. We account for these influences by estimating an empirical "gravity" equation. In a standard gravity equation, trade between a pair of countries is a negative function

of the distance between the countries and a positive function of their combined GDPs. We add a number of additional effects to this standard specification, including: the combined GDPs per capita of the countries; whether the countries are landlocked, share a common language, land border, or colonizer, belong to a common regional free trade agreement (FTA); and so forth. There is a special control for geographically disparate areas of the same nation (such as France and its overseas departments). Further details and the data set itself are available online.

To all this, we add a dummy variable that is one if the two countries use the same currency, and zero otherwise. Currency unions occur where: a) one of the countries does not issue its own currency and uses that of another (e.g., Panama), and b) in multilateral currency unions (e.g., the African CFA franc zones).

Table 1 reports OLS results using data at five-year intervals between 1970 and 1995 covering almost 200 countries and 98% of all international trade. The first column includes time-effects; the second column removes a few controversial controls and adds country-effects (we discuss the rationalization for this below).

The coefficients are sensible and precisely estimated: more distant countries trade less, as do countries with larger land areas and land-locked countries. Larger and richer countries trade more; so do countries with common languages, land borders, trade agreements, and colonial histories. Further, the equations fit the data well, explaining around two-thirds of the variation in trade. Thus we are searching for the currency union effect in the context of an empirical model that performs admirably (certainly compared with most econometric models).

----- Table 1 around here -----

The point estimates of the currency union effect indicate that two countries that use the same currency trade more. Lots more. Since $\exp(1.38) \approx 3.97$, the estimate without country-

fixed effects indicates that currency union is associated with an increase in trade of almost four hundred percent. The effect is statistically significant; the robust t-statistic is 7.4. This despite the presence of eleven other controls (the least significant of which has a t-statistic of 2.6)! Adding country effects reduces both the economic and statistical impact of the currency union effect, but it remains economically large (a trade effect of over 230%) and statistically significant (the t-statistic is 4.6).

Since most currency union members are small, poor or remote, only about 1% of the observations are members of currency unions. Still, the paucity of observations does not appear to prevent them from having a strong and identifiable effect. *National money seems to be a significant trade barrier*.

Rose (2000) provides extensive sensitivity analysis. The results do not depend on the exact way that the equation is specified or estimated, or the precise way that the variables are measured. Cutting the sample in different ways does not change the thrust of the results. An extensive search for omitted variables – which might lead one to conclude incorrectly that currency unions affect trade when it is really some third factor that matters – turned up nothing. Reverse causality also does not explain away the findings; there is little evidence in the political science literature that countries join currency unions to increase trade, and instrumental variables only increase the impact of currency unions on trade. In all, some fifty different perturbations of the basic model yield no smoking gun. The effect of currency unions on trade remains large and significant throughout.

A currency union should stimulate trade somewhat, since one money is more efficient than two as both unit of account and medium of exchange. The real question is: why is the

impact so large? In a world with derivative markets (at least for developed countries), it is hard to believe that lower transactions costs could lead trade to rise so much.

There are two ways to proceed. One can doubt the estimation results. Despite Rose's extensive search, there may still be some omitted factor that drives countries to both participate in currency unions and to trade more. Graduate students take note!

Another tack is to take a harder look at the empirical model. James Anderson and Eric van Wincoop (2000), hereafter "AvW", derive a simple theoretical gravity equation that easily lends itself to interpretation and estimation. There are four advantages to using their structural approach. First, one can use the model to investigate the impact of a currency union among any set of countries, even those that have never been in a currency union. This is critical; without a structural model one may question the relevance of pre-EMU currency unions (which consist of small or poor countries) when considering the impact of EMU. Second, it provides an estimate of the tariff-equivalent of the national monetary barrier. Third, the model provides an explicit welfare metric. Finally, it may lead to a more accurate estimate of the impact of currency unions on trade.

2. We Try Harder

Adopting the assumptions of complete specialization and identical constant elasticity of substitution (CES) preferences that are central to the previous theoretical gravity literature, AvW obtain a simple and intuitive equation:

$$x_{ij} = (y_i y_j / y^W)(t_{ij}/P_i P_j)^{1-\sigma} \quad (1)$$

where: x_{ij} is the nominal value of exports from i to j, y_i is the nominal GDP of country i, y^W is the nominal value of world output, σ is the elasticity of substitution between the countries' goods, t_{ij} is the gross price-markup due to trade costs, and P_i is i's "multilateral trade resistance," a price index that depends positively on trade barriers between i and *all* of its trading partners (not just j). Multilateral resistance can be solved as a function of all bilateral trade barriers, $\{t_{ij}\}$.

In the model, trade between a pair of countries depends on their bilateral trade barrier *relative* to average trade barriers with all trade partners. According to the theory, each region produces a fixed quantity of goods which have to be sold somewhere in the world (analogous to the assumption of fixed factor supplies commonly made in trade theory). More goods will be sold to a region with which the exporter has a relatively low trade barrier.

The theory has an intuitive implication for the impact of currency unions on trade flows. The stronger the level of pre-union trade among the members of a currency union, the smaller the percentage increase in trade among currency union members. If trade barriers are reduced among a set of countries that already trade a lot with each other, multilateral trade resistance will drop a lot and relative trade resistance will fall little. The drop in multilateral resistance of member countries reduces the impact on trade.

Pre-union trade levels can be high either because the countries have relatively low pre-union bilateral barriers (e.g. due to proximity or a regional trade agreement), or because the overall size of the union is large. These considerations imply a smaller effect of EMU on bilateral trade flows than most other currency unions. Existing currency unions, such as the East Caribbean Currency Area, are small and therefore imply a large effect on trade flows. We expect a smaller percentage increase in trade when Mexico or Canada dollarizes than when Argentina dollarizes, as Argentina trades less with the US than Canada or Mexico.

A rise in trade among members of the currency union implies a corresponding drop in trade with other countries and within member countries. That is, the model implies trade diversion as well as trade creation. But there is a positive welfare effect because fewer resources are wasted on trade costs. This is reflected in lower multilateral resistance; the price index P_i falls. Welfare, as measured by the CES consumption index, can be shown to be approximately proportional to $(1/P_i)^2$. The more countries trade with each other before joining the union, the larger is the welfare benefit from joining the currency union, but the smaller the percentage increase in trade among union members. That is, welfare rises the most in currency unions where trade rises the least.

We estimate the AvW model using a linear combination of the controls in Table 1 (other than land area and the GDP controls) for the bilateral trade barrier t_{ij}; details are available online. We estimate the model with country-fixed effects in place of the country-specific multilateral resistance terms. We use 1980 and 1990 data for a set of 143 countries for which we have complete bilateral data, which is necessary to solve for the impact of currency unions on multilateral resistance and trade. The currency union coefficient remains large and significant at .91, with a robust standard error of .18. The theory tells us that this is an estimate of $[(\sigma-1)\ln m]$, where (m-1) is the tariff equivalent of the national monetary barrier. If we use David Hummels' (2000) estimate of s =5, the tariff-equivalent of the monetary barrier to trade is estimated to be 26%! While larger values of σ reduce this estimate, for almost any value of σ the monetary barrier accounts for a little over half of the AvW estimate of the total national border barrier.

The .91 estimate implies that the currency union is estimated to raise bilateral trade by around 250% ($\exp(.91) \approx 2.48$), ignoring the effect on multilateral trade resistance. But this is

warranted only in the unlikely case when there is a negligible amount of pre-union trade inside the currency union. To estimate the effect of currency unions on trade more realistically, we need to incorporate multilateral resistance effects. We do that in the first column of Table 2 for a number of actual and hypothetical unions.

The theory allows us to estimate the effects of currency union for any set of countries, even if they have never been in one. The only assumption made is that the reduction in *bilateral* trade barriers for union members is the same as that for *existing* currency unions. We tabulate the average percentage change of trade among countries in the union, along with its standard error.[1]

----- Table 2 around here -----

The trade-creating effects of currency union were large in Table 1; the effects are smaller in Table 2. Instead of EMU causing trade to rise inside euroland by 400% or 250%, it is estimated to rise by 58% for current euroland members. Evidently taking multilateral resistance into account makes the effects appreciably smaller.

The trade-creating effects of currency unions are smaller in Table 2; but the effects are large. (They are large even after dividing by two.) They vary somewhat depending on the exact perturbation of the currency union, but none are small, consistent with Jeffrey Frankel and Rose, 2000. These large effects also characterize the dollarization scenarios.

The last column of Table 2 reports the effect of currency unions on the welfare of their members, measured by the average percentage increase in the consumption index, (assuming σ=5). The welfare increases are large. This is particularly the case for EMU and a North-American currency union, where the welfare gains are in excess of 10%.

3. The Real Thing

The case for currency unions is stronger than commonly considered. The cost of foregoing independent monetary policy may be low. Even perfectly effective monetary policy has a small effect if the welfare costs of business cycles are small. Frankel and Rose (1998) argue that business cycles may become more synchronized across countries because of currency union, further lowering the opportunity cost of national monetary policy. Further, currency union may be an efficient institutional arrangement to handle credibility problems, Alberto Alesina and Robert Barro (2000).

But the thrust of this paper has been to estimate the real benefits of currency union. Currency union reduces trade barriers associated with national borders, leading to substantial increases in both trade and welfare. That is, a national currency seems to be a significant barrier to trade. Reducing these barriers through currency unions like EMU or dollarization in the Americas will thus result in increased international trade. Our empirical work indicates that this effect may be large, in excess of 50% for EMU. It will be unexpected. And it will be beneficial. Eliminating the monetary barrier to trade brings benefits for consumers … possibly in the form of more currency unions.

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Table 1: Impact of Currency Union on International Trade, 1970-1995

Currency Union Dummy	1.38 (.19)	.86 (.19)
Log Distance	-1.06 (.03)	-1.31 (.03)
Log Product Real GDP	.94 (.01)	1.06 (.04)
Common Language Dummy	.56 (.06)	.48 (.06)
Common Land Border Dummy	.63 (.12)	.30 (.13)
Free Trade Agreement Dummy	1.09 (.10)	.46 (.12)
Common Colonizer Dummy	.41 (.08)	.68 (.08)
Ex-Colony/ Colonizer Dummy	1.97 (.13)	1.74 (.13)
Political Union Dummy	.95 (.37)	.81 (.32)
Log Product Real GDP/capita	.48 (.02)	
Number landlocked	-.32 (.04)	
Log of Land Area Product	-.15 (.01)	
RMSE	1.97	1.74
R^2	.64	.72
Observations	31,101	31,101
	Time Effects	Time, Country Effects

Regressand is log of bilateral trade in real American dollars at 5-year intervals.

OLS estimates; robust standard errors in parentheses.

Table 2: Impact of Currency Unions on Trade and Welfare using Anderson-van Wincoop

	% Trade Increase	% Welfare Increase
EMU for current (11) members	58 (12)	11.1 (3.9)
EMU + Greece	59 (12)	11.1 (3.0)
EMU + UK	44 (9)	13.8 (3.6)
EMU for all (15) EU members	40 (8)	14.4 (3.8)
Argentina dollarizes	132 (37)	1.7 (0.5)
Ecuador dollarizes	106 (26)	4.5 (1.4)
Mexico dollarizes	53 (13)	12.4 (3.8)
Canada dollarizes	38 (9)	15.3 (4.3)
Mexico and Canada dollarize	27 (8)	18.4 (5.3)
New Zealand + Australia	125 (35)	2.0 (0.6)
Israel + Palestine	62 (12)	10.1 (2.9)
Existing currency unions	91 (22)	5.0 (1.2)
World monetary union	10 (2)	21.3 (5.1)

Standard errors recorded in parentheses.

Notes

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[1] More precisely, the exponential of the change in the average natural logarithm of trade among all country-pairs in the currency union. Trade and welfare numbers for Palestine refer to the GDP weighted average for Gaza and the West Bank.