Does a Currency Union Boost International Trade?

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Preliminary: Comments Welcome.

Abstract

Yes. A lot.

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The effect of a common currency on trade is an important issue. The increase in trade stemming from a common currency is one of the few undisputed gains from European Monetary Union (EMU). Even EMU-skeptics such as Feldstein (1997) agree that substituting a single currency for several national currencies reduces the transactions costs of trade within that group of countries. Indeed, this was one of the official motivations behind the EMU project (European Commission, 1990).

Clearly it is cheaper to trade between two countries that use the same currency than between countries with their own monies. The question is: How much? Skeptics believe that (intra-EU) trade may only rise a little because of the Euro. For instance, the 1993 *Economic Report of the President* (pp 294-295) states "… There is uncertainty as to how much additional benefit will be yielded by the permanent fixing of exchange rates implied by a single currency." This seems reasonable: exchange rate volatility was low before EMU, and whatever volatility remained could be inexpensively hedged through the use of forward contracts and other derivatives. Europhiles, in contrast, thought that sharing a common currency would lead to an increase in the depth of trading relations, while precluding the "beggar thy neighbor" competitive devaluations that can destroy a common market. Indeed, a common currency could have a larger effect on trade than even a radical reduction in exchange rate volatility. The primary objective of this article is to resolve the argument by estimating the separate effects of exchange rate volatility and common currencies on trade. Currency unions *do* in fact have an effect on trade. And it is large; as big, or bigger than the effect of joining a free trade area like NAFTA or the European single market.

If a common currency *does* substantially increase trade, there will be important repercussions. At least six come to mind quickly. First, there will be an increase in trade

disputes and frictions simply because the volume of international trade rises. Second, if greater international competition leads to layoffs and associated labor market pressures, there could be an increase in pleas for continuation or enlargement of the social safety net. Third, closer economic integration is likely to lead to greater economic and political integration. Fourth, other countries – like the UK, Sweden and Denmark in Europe, but also Argentina, Mexico, Canada and others – may find it more worthwhile to join existing currency unions, leading to a further increase in global integration. Fifth, reduced barriers to trade will lead to an enormous surge in competition across international borders, affecting firms both within and outside the currency union. Sixth, and most importantly, a big increase in trade will lead to substantial extra gains from trade for consumers inside currency unions.

Methods for Determining the Relationship between Currency Unions and Trade

With such important and interesting issues at hand, it is no surprise that economists have worked hard to quantify the effects of reduced exchange rate volatility on trade. Sadly, there is almost no consensus in the area, save that the effect (if any) is difficult to estimate, even with high-tech time-series econometrics.

Much ink has been spilled on the issue of international trade and the international monetary regime; there is a long and inglorious tradition of ambiguous, weak and negative results. For instance, the Calmfors Commission (1997, p. 50) stated "Many empirical studies have been done on the effects of exchange-rate fluctuations on the volume of foreign trade. The somewhat surprising, but fairly unanimous, conclusion is that these fluctuations seem to influence foreign trade very little, if at all. This conclusion must be regarded as fairly robust, because the various studies have been done with different methods."

Essentially, researchers have looked at periods of high and low exchange rate volatility and attempted to map them into trade during the same periods. Unfortunately, time-varying exchange rate volatility simply does not seem to have a strong effect on international trade or investment patterns. Basically, exchange rate volatility for most of the OECD was low in the 1960s, much higher in the 1970s and 1980s, and moderate in the 1990s. The problem, for this literature, is that trade has risen continuously. Unsurprisingly, it has been difficult to establish a consensual view about this effect, or even its sign.

Not only is this literature weak; it is not even clear that it is asking the right question. Having even a very stable exchange rate may not be the same as being a member of a currency union. Sharing a common currency is a much more serious and durable commitment than a fixed rate. This is manifest empirically in much more intense trade *inside* countries than *between* countries, a phenomenon known as "home bias" in international trade. McCallum (1995) quantifies the size of the intra-national bias at more than twenty to one. In particular, he finds that trade between two Canadian provinces is more than 20 times larger than trade between a comparable Canadian province/American state pair. Part of this home bias effect may stem from the fact that a single currency is used inside a country.

One might imagine that trying to measure the effects of a common currency on trade is a purely academic (i.e., trivial) exercise. The only countries that have adopted a common currency of late are the EU-11, for whom there are necessarily few data. True enough. But there is no reason to rely on before and after differences to estimate the effect of currency unions on trade, just as one need not use *time-series* variation to discern the effects of exchange rate volatility on trade. This article exploits *cross-sectional* variation – using evidence across countries – to trace the effects of currency unions and exchange rate volatility on trade.

Is a cross-country approach to investigating currency unions doomed to failure since there are so few of them? Not at all. Above and beyond the eleven current members of "euroland" ninety "countries" are currently in some sort of official common currency scheme (thirty-one of these areas are official dependencies or territories), as shown in the table.[1] The empirical work in this article hinges on exploiting these linkages. In particular, the question is" "Do countries inside currency unions tend to trade more, holding other factors constant?" The other factors held constant are dictated by the "gravity" model of international trade, a framework with a long track record of success.

----- Insert the Currency Union Table around here ------

Estimating the Relationship

This section applies the "gravity model" of international trade to analyze the impact of common currencies and exchange rate volatility on trade. The technical details – discussions of the model, methodology and data set – are presented briefly in the appendix.

The appendix presents estimates of the model. There are six different sets: one for each of the five years of the sample (1970, 1975, 1980, 1985, and 1990), and finally a pooled regression that uses all the data simultaneously.

Unsurprisingly, the standard features of the gravity model of international trade work well. For instance, both higher GDP and higher GDP per capita (for the country pairing) increase trade. The coefficients are statistically significant and economically reasonable; both higher income per capita and larger country size increase trade less than proportionately. 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 very statistically significant. Sharing a land border, a language, or a regional trade agreement also increase trade by economically and statistically significant amounts. Ex-colonies and their colonizers, countries with the same colonizer, and geographically disparate areas of the same state (for instance France and its overseas departments) all have disproportionately intense trade, consistent with intuition and received wisdom. The equations fit the data relatively well, explaining over half of the variation in bilateral trade linkages. Few of the effects vary much over time, so pooling the data simply improves the precision of the coefficient estimates.

Above and beyond all of these real – and conventional – factors, there is compelling evidence that the international monetary regime matters. Countries that use the same currency tend to trade disproportionately, even holding the nine real factors constant. The effect is economically large. The best estimate is that *countries with the same currency trade over three times as much with each other as countries with different currencies*!

Without taking the precise estimates 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. These positive results stand in contrast to received wisdom. For instance, the European Commission (1990, p 73) wrote: "Since the empirical research has not found any robust relationship between exchange rate variability and trade it is not possible to estimate the increase in intra-EC trade that might derive from the irrevocable fixing of exchange rates."

Most of the extant literature presumes that a common currency is equivalent to reducing exchange rate volatility to zero (as manifest in the preceding quotation). Is this assumption reasonable? No. The effects of currency unions and exchange rate volatility are not only

precisely estimated, but also economically distinguishable. The results from the table show that *entering a currency union delivers an effect that is over an order of magnitude larger – thirty times the size – as the impact of eliminating typical exchange rate volatility.*

Extensive sensitivity analysis has been performed to check the robustness of these results; skeptical readers can check it out in the working paper. In particular, the results do not depend sensitively on the exact way that the equation is specified or estimated, or the exact way that the variables are measured. 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. 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.

To summarize, the model of international trade works well in a variety of different dimensions. This bolsters confidence in the three main findings. First, there is an intuitive but heretofore hidden (in time-series analysis) strong 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.

Summary

In this article, the gravity model of international trade was used to show that two countries with a common currency trade more. The effect is statistically significant and economically large. Two countries which use the same currency trade much more than comparable countries with their own currencies; the best estimate is over three times 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.

Understanding the Relationship

It is 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 an enormous effect on trade? There are many possible explanations. A common currency represents a serious government commitment to long-term integration. This commitment could, in turn, induce the private sector to engage in much more 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. More generally, money facilitates trade in its roles as both unit of account and as medium of exchange. Fewer, more widely accepted moneys facilitate more trade, as has been recognized since at least Mundell (1961). Still, it is wisest to conclude that we simply don't know why a common currency seems to facilitate trade so much. The most obvious benefit – foregoing the cost of hedging exchange rate risk – appears to be low.

Nevertheless, even if we don't know *why* a common currency makes a difference, it is plausible *that* it does. The evidence in this article has separated the common currency component from the other characteristics that differentiate within-country *intra*national trade from cross-country *inter*national 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 a common currency, common cultural norms, common legal system, common history, common norms, and so forth. A common currency is a piece of this package; and it seems to be an important piece. One need not take the precise estimates too literally to agree with this reasoning.

Implications

The findings presented in this paper imply that EMU will lead to an expansion of trade inside Europe. The rise in trade will be both enormous; my estimate is that intra-European trade may eventually triple. It will also be unexpected. This will have serious implications for all managers doing business inside euroland. German managers can expect unprecedented competition from firms as far-flung as Portugal and Finland. Of course the elimination of the monetary barrier is also an opportunity. Unencumbered by exchange rate worries, French producers can look to expand their sales to Ireland and Austria dramatically at much lower cost than before. The increase in competitive pressures may start slowly but could eventually be as or more important than the 1992 elimination of all tariffs and non-tariff barriers inside the European Community. No manager doing business inside the vast market that is euroland can afford to ignore EMU.

As a result, there will be great benefits for consumers. The most important consequence of increased trade is increased gains from trade. As the deadweight loss of using different currencies vanishes, competitive pressures increase, prices fall and consumers gain. The size of these gains may be large; Frankel and Romer (1999) estimate that increasing the ratio of trade to GDP by one percentage point raises income per person by between one-half and two percent.

Given potential gains of this magnitude, trade need not triple for a common currency to induce large welfare gains! There may also be dynamic gains if growth rates increase.

Even more visible consequences of an increase in trade caused by EMU may take place outside euroland. If EMU causes radically increased intra-European trade and its benefits, other countries may well take the plunge, spreading currency unions even further. Many countries both inside Europe and elsewhere are toeing the water at present. Sweden, Denmark, the UK, Greece and future EU-entrants are contemplating joining EMU; Argentina, Mexico and Canada are considering adopting the American dollar. If the benefits of a common currency have been underestimated, more will consider relinquishing monetary sovereignty.

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

An increase in trade also affects the very sustainability of the currency union. As trade increases, business cycles can in principle move either more asynchronously (as countries specialize to take advantage of comparative advantage) or more closely together (if most shocks are monetary or most trade is intra-industry trade). The relationship between trade and business cycle synchronization depends on the nature of business cycle shocks and the evolving economic

structure of the countries. Historically, closer international trade between countries has been associated with more synchronized business cycles. Thus, an increase in intra-European trade precipitated by EMU, could make EMU itself more sustainable by increasing the synchronization of European business cycles.

Conclusion

Currency union-skeptics are skeptical in part because they perceive few advantages from a common currency. One of the few undisputed benefits of joining a currency union is the encouragement of trade. That effect has not been quantified until now. Instead, economists have used the much smaller effect on trade of eliminating exchange rate volatility. As a result, the current consensus is that currency unions have hardly any effect on trade. The case for a common currency is weaker accordingly.

This article contends that such skepticism is unwarranted, so that a potent argument in favor of currency unions has been under-stated in the literature. Data for the many countries that share currencies in the real world point to an unambiguous conclusion. Even after taking a host of other considerations into account, countries that share a common currency engage in substantially higher international trade.

Sovereign monies are important (though perhaps inadvertent) national barriers to trade. The monetary barriers are now falling across Europe. Managers throughout EMU would be well advised to prepare for an unprecedented and unexpected onslaught of competition.

Table: Currency Unions, 1970-1990

Australia
Christmas Island (territory)
Cocos (Keeling) Islands (territory)
Norfolk Island (territory)
Kiribati
Nauru
Tuvalu

Denmark
Faroe Islands (part of Denmark)
Greenland (part of Denmark)

East Caribbean Currency Area
Anguilla (territory of UK)
Antigua and Barbuda
Dominica
Grenada
Montserrat (territory of UK)
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines

France
French Guiana (overseas department)
French Polynesia (overseas territory)
Guadeloupe (OD)
Martinique (OD)
Mayotte (territorial collectivity)
New Caledonia (OT)
Reunion (OD)
Saint Pierre and Miquelon (TC)
Wallis and Futuna Islands (OT)
Monaco

France and Spain
Andorra

Belgium
Luxembourg

CFA Franc Zone
Benin
Burkina Faso
Cameroon
Central African Republic
Chad
Comoros
(Republic of) Congo
Cote d'Ivoire
Equatorial Guinea (post '84)
Gabon
Guinea-Bissau
Mali (post '84)
Niger
Senegal
Togo

Italy
San Marino
Vatican

Morocco
Western Sahara

Norway
Svalbard (territory)

South Africa
Lesotho
Namibia
Swaziland

Switzerland
Liechtenstein

New Zealand
Cook Islands (self-governing, associated with NZ)
Niue (self-governing, associated with NZ)
Pitcairn Islands (territory of UK)
Tokelau (territory of NZ)

Turkey
Northern Cyprus

UK
Falkland Islands (territory)
Gibraltar (territory)
Guernsey (dependency)
Jersey (dependency)
Man, Isle of (dependency)
Saint Helena (territory)
Scotland (?)
Ireland (pre '79)

USA
American Samoa (territory)
Guam (territory)
US Virgin Islands (territory)
Puerto Rico (commonwealth associated with US)
Northern Mariana Islands (commonwealth in political union with US)
British Virgin Islands (territory of UK)
Turks and Caicos islands (territory of UK)
Bahamas
Liberia
Marshall Islands
Micronesia
Palau
Panama
Barbados (? 2:1)
Belize (? 2:1)

Singapore
Brunei

Technical Appendix

This appendix describes the model, methodology and data set used to estimate the effect of common currencies and exchange on trade.

The Model

The strategy of this article is to link cross-country variation in currency arrangements to cross-country variation in international trade. Of course, many things affect trade above and beyond international monetary relations. While these other factor are not of direct interest, their effects need to be taken into account so as to be able to see if there is any remaining role for exchange rate volatility and/or currency unions. Ordinarily, this would be difficult in applied economics. But in this context, there is a simple and persuasive model in which one can embed the objects of interest to me: 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 "national income") and inversely proportional to the distance between them (literally interpreted). The gravity equation acquired its name since a similar function describes the force of gravity in Newtonian physics.

The gravity model of international trade has a remarkably consistent (and thus, for economics, unusual) 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.

The Methodology

An augmented gravity model is used to estimate the effects of currency unions and exchange rate volatility on trade. The model is "augmented" in that the standard gravity model only includes income and distance variables. In order to account for as many other factors as possible, the equation adds a host of extra conditioning variables as well as the all-important monetary variables:

$$\ln(X_{ijt}) = \beta_0 + \beta_1 \ln(Y_i Y_j)_t + \beta_2 \ln(Y_i Y_j / Pop_i Pop_j)_t + \beta_3 \ln D_{ij} + \beta_4 Cont_{ij} + \beta_5 Lang_{ij} + \beta_6 FTA_{ijt}$$
$$+ \beta_7 ComNat_{ij} + \beta_8 ComCol_{ij} + \beta_9 Colony_{ij} + \gamma CU_{ijt} + \delta V(e_{ij})_t + \varepsilon_{ijt}$$

where i and j denotes countries, t denotes time, and the variables are defined as:

- X_{ij} denotes the value of bilateral trade between i and j,
- Y is real GDP,
- Pop is population,
- D_{ij} is the distance between i and j,
- $Cont_{ij}$ is a binary variable which is unity if i and j share a land border,
- $Lang_{ij}$ is a binary variable which is unity if i and j have a common official language,
- FTA_{ij} is a binary variable which is unity if i and j belong to the same regional trade agreement,
- $ComNat_{ij}$ is a binary variable which is unity if i and j are part of the same nation (e.g., France and its overseas departments),
- $ComCol_{ij}$ is a binary variable which is unity if i and j were colonies after 1945 with the same colonizer,
- $Colony_{ij}$ is a binary variable which is unity if i colonized j or *vice versa*,
- CU_{ijt} is a binary variable which is unity if i and j use the same currency at time t,
- $V(e_{ij})_t$ is the volatility of the bilateral (between i and j) nominal exchange rate in the period before t,

- β is a vector of nuisance coefficients, and
- ε_{ij} represents the myriad other influences on bilateral exports, assumed to be well behaved.

The coefficients of interest are γ and δ. γ is the effect of a currency union on trade flows, a coefficient that has not yet been estimated. Of lesser interest is δ, which measures the response of bilateral trade to bilateral nominal exchange rate volatility. Hopefully using cross-sectional variation allows one to estimate it with greater success than a time-series approach permits.

This equation is estimated with ordinary least squares, though the exact estimation technique turns out not to matter very much. Separate regressions are estimated for each of the five years of the sample, as well as a pooled regression with year controls. To test the significance of individual coefficients, White's heteroskedasticity-consistent standard errors are reported.

The Data Set

The model is estimated using a data set with 33,903 bilateral trade observations spanning five different years (1970, 1975, 1980, 1985, and 1990). (Observations are missing for some of the regressors so the usable sample is smaller for most purposes.) All 186 countries, dependencies, territories, overseas departments, colonies, and so forth for which the United Nations Statistical Office collects international trade data are included in the data set. For convenience, all of these geographical units are referred to as "countries." In this sample, there are 320 observations where two countries trade and use the same currency.

The trade data are taken from the *World Trade Database*, a consistent recompilation of the UN trade data presented in Feenstra, Lipsey and Bowen (1997). This data set is estimated to

cover 98% of all trade. Further description of the data set can be found in the working paper version.

Results

	1970	1975	1980	1985	1990	Pooled
Currency Union γ	.87	1.28	1.09	1.40	1.51	1.21
	(.43)	(.41)	(.26)	(.27)	(.27)	(.14)
Exchange Rate Volatility δ	-.062	.001	-.060	-.028	-.009	-.017
	(.012)	(.008)	(.010)	(.005)	(.002)	(.002)
Output β_1	.77	.81	.81	.80	.83	.80
	(.02)	(.01)	(.01)	(.01)	(.01)	(.01)
Output/Capita β_2	.65	.66	.61	.66	.73	.66
	(.03)	(.03)	(.02)	(.02)	(.02)	(.01)
Distance β_3	-1.09	-1.15	-1.03	-1.05	-1.12	-1.09
	(.05)	(.04)	(.04)	(.04)	(.04)	(.02)
Contiguity β_4	.48	.36	.73	.52	.63	.53
	(.21)	(.19)	(.18)	(.18)	(.18)	(.08)
Language β_5	.56	.36	.28	.36	.50	.40
	(.10)	(.10)	(.09)	(.08)	(.08)	(.04)
FTA β_6	.87	1.02	1.26	1.21	.67	.99
	(.16)	(.21)	(.16)	(.17)	(.14)	(.08)
Same Nation β_7	1.02	1.37	1.12	1.36	.88	1.29
	(.74)	(.59)	(.38)	(.64)	(.52)	(.26)
Same Coloniser β_8	.91	.73	.52	.48	.59	.63
	(.15)	(.14)	(.12)	(.12)	(.12)	(.06)
Colonial Relationship β_9	2.52	2.40	2.28	2.05	1.75	2.20
	(.23)	(.19)	(.14)	(.14)	(.15)	(.07)
Number of Observations	4052	4474	5092	5091	4239	22,948
$\mathbf{R^2}$	.57	.59	.62	.65	.72	.63
RMSE	2.18	2.18	2.03	1.94	1.75	2.02

Note: OLS estimation; robust standard errors in parentheses.

Constant term (and year controls for pooled regression) not reported.

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Endnotes

[1] Most currency unions occur where one of the geographic units does not issue its own currency, and uses that of another. A few occur where there is massive currency substitution (also known as "dollarization") and two currencies exist with a long-term peg at 1:1. I do not include currency boards (such as Hong Kong or Argentina), countries that are informally or unofficially dollarized (such as Brazil or Russia), or events like German Unification in 1990, or the re-integration of Okinawa with Japan in 1972.