Currency Unions and Capital Flows

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December 3, 2002

1. Introduction

Joining a currency union result in both costs and benefits for those countries involved. The costs include the loss of an independent monetary policy that may be adjusted in response to economic shocks. The benefits are thought to result in part from reduced transaction costs when engaging in trade across national or regional boundaries.[1]

One way to assess the size of the benefits is to look directly at the impact of joining a currency union on trade.[2] Recent research by Rose (2000), Glick and Rose (2002), Rose and van Wincoop (2001), and Melitz (2001) has suggested that participation in a currency union has a large effect on bilateral trade between the

[1] See Feldstein (1997) for a discussion.

[2] Parsley and Wei (2001) provide an alternative approach, using the level of price dispersion across disaggregated goods. They obtain results that are consistent with those cited here.

members of that currency union. Their results, using a combination of both time series and cross section data, suggest that trade between members of a currency union is between 2 and 3.5 times as great as it would otherwise be, absent the currency union. This strong result survives a plethora of sensitivity analyses. [3]

So, should a country that joins a currency union expect bilateral trade with other countries in the union to more than double? The cited empirical results are based on the gravity model, which is a reduced-form model of trade. They show that there is a high correlation between currency union membership and trade, but do not indicate the causality. There are three possibilities: (1) joining a currency union causes trade to increase; (2) currency unions are more likely between countries with high trade (endogeneity bias); or (3) both currency unions and high levels of trade are jointly caused by some third, un-modeled factor (missing variables).

In the next section, we summarise the existing evidence for (2) and (3), and argue that the balance of evidence points to a large and statistically significant causal relationship from currency unions to trade. We then consider two possible mechanisms for this: (1) being a member of a currency union reduces trade resistance (Rose and van Wincoop 2001), and (2) being a member of a currency union reduces capital resistance. We present new evidence based on the datasets of Rose (2000) and Glick and Rose (2002), as well as a new dataset of capital flows, that both of these mechanisms are important in explaining the relationship between currency unions and trade. Conclusions then follow.

[3] Nitsch (2002b) provides some corrections to the data in Rose (2000) and adds some additional regressors, resulting in small decreases in the estimated effect of currency unions on trade; see also Rose (2002a) for a reply.

2. Do Currency Unions Cause Trade?

Previous studies have identified a strong positive correlation between currency union membership and trade flows. In this section, we examine alternative explanations to a causal relationship from currency unions to trade.

Endogeneity Bias

A number of authors have argued that the decision to enter a currency union is endogenous and influenced by the level of trade, so that the estimated effect of currency union membership on trade is biased. Several authors have used estimation techniques that are designed to correct for this bias. For example, Persson (2001) uses a two-stage procedure where the first stage identifies pairs of countries that share the same probability of being in a currency union, based on observable characteristics. This probability is then used to match 'similar' countries, one in a currency union and one out, and trade between these and third countries is then used to identify the impact of currency union membership on trade. He finds only a small impact of currency union membership on trade, in the order of 13-66%. However, as Rose (2001) points out, the first stage of the procedure has very low explanatory power when it comes to explaining membership of currency unions membership (since 99% of country-pairs are not in currency unions), and therefore the results from the second stage should be interpreted with caution.

Similarly, Tenreyro (2001) jointly estimates the participation decision along with the gravity equation using Maximum Likelihood. Then the effect of joining a currency union on bilateral trade drops to 60%, or 25% if quadratic terms are included

in the gravity equation, neither of which are statistically significantly different from zero.[4]

In contrast, Alesina, Barro, and Tenreyro (2002) find a large and significant causal relationship from currency unions to trade even after allowing for reverse causality. They argue that a currency union is more likely if countries (1) are closer; (2) share the same language; (3) include a colony/colonizer; (4) have lower per capita GDP; and (5) have small population. They use an estimated 'propensity to form a currency union' variable as an instrumental variable for the currency union dummy, and actually obtain larger estimates of the effect of currency union membership on trade than Rose (2000).[5]

Missing Variables

An alternative explanation is that trade and currency unions are jointly caused by some un-modeled third variable. This is likely if, for example, countries that have entered currency unions are systematically different from those that have not, and may lead to an overstatement of the impact of entering a currency union on trade.

Rose (2000) and Klein (2002) have noted that the bilateral trading relationships within currency unions in the above studies largely consist of a small, poor, underdeveloped region combined with a large, rich, developed country. While

[4] Tenreyro also argues the earlier results are biased because periods where countries do not trade are dropped from the analysis due to the need to take logs when estimating the gravity equation. She finds that taking 5-yearly trade averages halves the effect of currency union on trade. However, a question remains as to whether her reported results are correct or not: see http://faculty.haas.berkeley.edu/arose/strep.htm

[5] See also Kenen (2002) for similar results.

the European Monetary Union is a clear exception to this rule, it is still too early to expect clear evidence here.[6]

Note, however, that others have obtained similar results for earlier periods between countries that do not share this characteristic. For example, Lopez-Cordova and Meissner (2001) find that trade between members of currency unions is twice as high, and between gold-standard countries is 60% higher, than would otherwise be expected. Similarly Flandreau and Maurel (2001) argue that arrangements similar to currency unions in 19th century Europe resulted in 3-fold increases in trade between members. Also Estevadeordal, Frantz, and Taylor (2002) find that the gold standard played an important role in the increase in world trade over the 1870-1913 period.[7]

Thom and Walsh (2002) argue that the time-series results in Rose (2000) stem in part from the circumstances surrounding the break-down of currency unions, particularly in Africa, which often times coincided with economic chaos. Note, however, that the original studies incorporate a plethora of sensitivity analyses, such as excluding poor countries and countries in Africa.[8]

Nitsch (2002a) focuses on two currency unions (the CFA franc zone and the Eastern Caribbean Currency Union), which he argues have more in common with the

[6] One empirical study does exist: Micco, Stein, and Ordonez (2002), using a gravity model, find a statistically significant impact of EMU membership on trade. Even before monetary union, they estimate that trade between EMU members was approximately 60% higher than between other equivalent countries, and their results suggest additional increases since the advent of the union of the order of 15%.

[7] See also Thom and Walsh (2002) and Nitsch (2002c) for counter-examples, where currency union membership does not appear to have resulted in increased trade between Ireland and the United Kingdom, and Belgium and Luxembourg respectively.

[8] See, for example, Rose (2000) Table 2A and 2B. Excluding African observations or very poor countries actually increases the estimate of the effect of currency union membership on trade.

European Currency Union in that they incorporate countries of similar size, structure, and geographical area to each other. He finds that membership of the CFA franc zone contributes to a 90% increase in trade, although allowing for country fixed-effects or multiplicative regressors reduces this effect. He finds no significant impact of currency union membership on trade in the Caribbean union.

Taking a different approach, Klein (2002) shows that the above results do not hold for bilateral trade with countries that have adopted the U.S. dollar. He considers only data for the post-Bretton Woods era, where the United States is one of the trading partners. His empirical results suggest that dollarization results in only a small increase in bilateral trade, and insignificantly different from a relatively stable pegged exchange rate.[9] By comparison, he finds that the effect on trade for economies adopting the Australian dollar is much stronger.

So?

The results outlined in this section so far all focus on the fundamental question: does entering a currency union lead to an increase in trade? While not all authors agree, the preponderance of evidence appears to favor an economically significant causal relationship.[10]

3. The Mechanism

Why do currency unions cause trade to increase? Two arguments are found in the existing literature. Yeyati (2001) hypothesizes that increased trade flows may result from the development of common institutions. If that is the case, then countries

[9] This result remains a puzzle that is difficult to reconcile with the rest of the literature.

[10] See also Rose (2002b), for a summary of the results to date.

that unilaterally dollarize (such as those studied by Klein above, who have adopted the U.S. dollar as their domestic currency) may be fundamentally different from those that form multilateral monetary unions, with the latter being more likely to develop common institutions. This hypothesis is rejected by the data, however. Yeyati finds that multilateral currency unions are associated with an increase in trade only half as large as countries that unilaterally-dollarize.

Rose and van Wincoop (2001) argue that entering a currency union represents a reduction in trade resistance. If this is the case, then a small country that joins a currency union may experience a larger increase in trade flows than a large country. They use this as a basis for estimating the likely increase in trade for various pairs of countries.

Here, a third mechanism is considered: that entering a currency union represents a reduction in capital resistance. We first present empirical evidence that a reduction in trade resistance (as argued in Rose and van Wincoop 2001) cannot explain all of the increase in trade flows. We argue that a reduction in resistance to capital is consistent with the data, and go on to present evidence that capital flows are disproportionately large into currency union members.

Resistance to Trade

Suppose that a reduction in the resistance to trade is responsible for the increase in trade flows within currency unions. That is, being a member of a currency union reduces exchange rate uncertainty faced by importers and exporters, as there is now reduced uncertainty as to the returns on shipping goods between regions. In this case, joining a currency union provides complete insurance for firms involved in trade. However, even without being a member of a currency union, the presence of

thick, efficient futures markets may be a close substitute, since the horizon of concern to exporters and importers is typically short. If this were the mechanism at work, we would expect to see a smaller impact of currency unions on trade for larger economies for which thick, relatively efficient futures markets already exist, since this uncertainty can already be insured against at little cost. In contrast, for a small country, entering any currency union with a major currency would open up de facto thick, efficient futures markets with every other major currency. We can identify the extent to which this is the mechanism at work in the earlier results since it implies that a small, poor country that utilises a major currency should see trade increase by a large amount with respect to all countries that use major currencies. Under these circumstances, there is little consequence for trade for an economy already using a major currency entering a currency union, and the choice of which currency to utilise is also of little importance for trade. We may isolate this effect by introducing a dummy variable for bilateral trade that is between two users of major currencies, defined here as the currencies of the G7- economies. If currency union membership increases trade by reducing short-run exchange rate uncertainty, the coefficient on this new dummy variable should be similar to that on currency union membership.

Resistance to Capital

A second explanation is that being a member of a currency union reduces exchange rate uncertainty faced by firms choosing a location for production. Firms face less uncertainty as to the returns on their investment, so that if different regions have different comparative advantages in production, a currency union will result in production and consumption being less closely linked to national boundaries in equilibrium. Because investment decisions are typically decided based on long-run

expected returns, even the presence of thick, efficient futures markets cannot reduce this risk substantially, since futures markets typically exist only at short horizons. If this is the mechanism by which entering a currency union increases trade in the cited studies, this would be expected to apply to all economies, and as equally to large, rich economies as the small regions typically included in the previous studies. Among other things, this would imply that being a member of a currency union increases trade flows with all trading partners (not just those in the currency union), and capital flows are larger into members of currency unions.

The Cross-section Evidence

The data used are the same as in Rose (2000) and Glick and Rose (2002).[11] We first use cross section data, and estimate the gravity equation in Rose (2000) of

$$\begin{aligned}\ln(X_{ijt}) = {} & \gamma \mathrm{CU}_{ijt} + \delta \mathrm{Volatility}_{ijt} + \beta_1 \ln(Y_{it}Y_{jt}) + \beta_2 \ln(Y_{it}Y_{jt} / \mathrm{Pop}_{it}\mathrm{Pop}_{jt}) \\ & + \beta_3 \ln(\mathrm{Distance}_{ij}) + \beta_4 \mathrm{Border}_{ij} + \beta_5 \mathrm{Language}_{ij} + \beta_6 \mathrm{FTA}_{ijt} \\ & + \beta_7 \mathrm{Country}_{ij} + \beta_8 \mathrm{Colonised}_{ij} + \beta_9 \mathrm{Colony}_{ij} + \varepsilon_{ijt}\end{aligned}$$

where i and j denote countries, t denotes time, and

- X_{ijt} is the value of bilateral trade
- CU_{ijt} is a dummy variable that takes on a value of 1 if i and j are in the same currency union at time t,
- $\mathrm{Volatility}_{ijt}$ is the volatility of the nominal exchange rate between i and j in the period before t,
- Y_{it} is real GDP,
- Pop_{it} is population,
- $\mathrm{Distance}_{ij}$ is the distance between i and j,
- Border_{ij} is unity if i and j share a land border,
- $\mathrm{Language}_{ij}$ is unity if i and j share a common language,
- FTA_{ij} is unity if i and j belong to the same trade agreement,
- $\mathrm{Country}_{ij}$ is unity if i and j are part of the same nation,

[11] These data are generously made available on Andrew Rose's web page at http://faculty.haas.berkeley.edu/arose/RecRes.htm.

- Colonised_{ij} is unity if i and j were colonized by the same nation,
- Colony_{ij} is unity if i colonised j or vice versa, and
- ε_{ijt} is an error term.

Table 1 outlines the cross-section evidence. In the first column, the results of Rose (2000) are replicated. Members of currency unions trade more than three times as much as other countries (exp(1.21)-1=235% increase).

Is trade resistance consistent with this result? That should imply that users of major currencies also experience relatively large trade with other users of major currencies, due to access to thick, efficient futures markets at horizons of up to one year. To examine this possibility, we add an additional regressor that is equal to one when both trading partners are users of one of the largest 7 currencies (Canada, France, (West) Germany, Italy, Japan, UK, USA, plus those in currency unions with those countries), and zero otherwise. Using a G7 currency is associated by an increase in trade of 72%, while being a member of a currency union increases trade by 203% (Column 2).

Next, we split the sample a slightly different way (Column 3), and exclude currency union members from the G7 variable, trade between G7-currency users who are not in a currency union is 85% higher, while that within currency unions is 236% higher. Note, however, that the estimated increase in trade associated with use of a major currency is mostly in addition to the increase associated with being a member of a currency union, since the coefficient estimate on the latter variable is virtually unchanged. Thus entering a currency union with a major currency is estimated to increase trade with all users of major currencies by an additional 1/3.

Next, consider that if a reduction in trade resistance explains all the increased trade, then joining a currency union should have a large impact on trade within the currency union, but little outside.[12] Therefore we consider whether countries in currency unions simply trade more with everyone, whether they are in the same currency union or not. The fourth column shows that countries that are members of a currency union trade, on average, 68% more with all their trading partners than other countries. However, this is dwarfed by the estimated additional 161% increase in trade within the currency union (for a total of 229%).

Taking this one step further, if both trading partners are members of (not necessarily the same) currency union, do they trade more? The fifth column reveals that if one trading partner is a member of a currency union, trade is 61% higher. If both countries are members of (potentially different) currency unions, trade is an additional 43% higher (104% combined). And if both countries are members of the same currency union, trade is further increased by 98% (for an estimated combined total of 202%). Thus while trade within currency unions is greater than outside, approximately half of this can be explained simply as the result of currency unions members trading more with all trading partners.

The Time-series Evidence

Moving now to the time-series data, we estimate the gravity equation in Glick and Rose (2002) of

[12] Strictly, the trade resistance story would imply that trade with non-currency unions countries should decline, since relative trade resistance determines trade levels.

$$\ln(X_{ijt}) = \gamma \mathrm{CU}_{ijt} + \beta_1 \ln(\mathrm{Distance}_{ij}) + \beta_2 \ln(Y_{it}Y_{jt}) + \beta_3 \ln(Y_{it}Y_{jt} / \mathrm{Pop}_{it}\mathrm{Pop}_{jt}) + \beta_4 \mathrm{Language}_{ij}$$
$$+ \beta_5 \mathrm{Border}_{ij} + \beta_6 \mathrm{FTA}_{ijt} + \beta_7 \mathrm{Landlocked}_{ij} + \beta_8 \mathrm{Islands}_{ij} + \beta_9 \ln(\mathrm{Area}_i \mathrm{Area}_j)$$
$$+ \beta_{10} \mathrm{Colonised}_{ij} + \beta_{11} \mathrm{Current}_{ijt} + \beta_{12} \mathrm{Colony}_{ij} + \beta_{13} \mathrm{Country}_{ij} + \varepsilon_{ijt}$$

where i and j denote countries, t denotes time, and the variables are as defined before, with the addition of

- $\mathrm{Landlocked}_{ij}$ is the number of landlocked countries,
- $\mathrm{Islands}_{it}$ is the number of island countries,
- Area_i is land mass, and
- $\mathrm{Current}_{ijt}$ is unity if i and j are colonies at time t.

In Table 2, the first column replicates the results of Glick and Rose (2002). Trade within currency unions is estimated to be 266% higher than elsewhere, allowing for year dummies.

Next we include pair-wise fixed effects in the column 2 (as in Glick and Rose (2002, Table 5, first column) to allow for any other un-modeled factors that increase trade between each pair of countries, currency unions are estimated to increase trade by 81%.[13] We now use this as our base model for considering the relative importance of trade resistance and capital resistance in explaining the relationship between currency unions and trade.

Considering the role of using a major currency, column 3 reveals that users of major currencies experience increases in trade of 7%, while currency union membership increases trade by 78%. Considering only non-currency union G7 countries (Column 4), these estimates become 9% and 82% respectively. Note, once again, that the estimated (approximately 10%) increase in trade associated with use of a major currency is in addition to the increase associated with being a member of a

[13] Note that this causes all variables that are constant over the sample to drop out of the regression.

currency union, since the coefficient estimate on the latter variable is virtually unchanged.

Considering whether members of a currency union simply trade more with everyone, column 5 reveals that regions in currency unions trade 31% more with all trading partners, and an additional 76% with currency union partners.

In column 6, the results indicate that if one trading partner is a member of a currency union, trade is 29% greater. If both countries are members of currency unions, trade is an additional 46% greater (75% combined). And being members of the same currency board is associated with a further 30% increase in trade (for an estimated combined trade increase of 105%). Thus approximately two-thirds of the increase in trade may be attributed to the fact that countries that join currency unions trade more with all trading partners, both in and out of currency unions, pointing to the importance of something other than just trade resistance to explain the relationship between currency unions and trade.

The Investment Evidence

We have presented evidence above that trade between users of G7 currencies is only a little greater than trade between users of other currencies, and also that members of currency unions trade substantially more will all trading partners, those both in and out of the currency union. These results suggest that while trade resistance may provide important explanatory power of the link between currency unions and trade, other explanations are also required to fully understand this relationship.

One explanation that is consistent with the results so far is that the increase in trade is due in large part to a reduction in capital resistance within currency unions.

Investors face less uncertainty as to the returns on investing in other countries within the currency union, and are therefore more likely to invest outside of their own country. Considering direct investment, this means that production capacity to meet domestic demand is more likely to be placed in other countries within the currency union, and increased trade flows result directly from this. We look directly for evidence of this, using foreign direct investment, measured in real US dollars, as a measure of capital flows.[14,15] Our estimated equation takes the form

$$\ln(I_{it}) = \gamma \mathrm{CU}_{it} + \delta \ln(\mathrm{Volatility}_{it}) + \beta_1 \ln(Y_{it}) + \beta_2 \ln(Y_{it} / \mathrm{Pop}_{it}) + \beta_3 \Delta \ln(Y_{it}) + \beta_4 \mathrm{FTA}_{it} + \varepsilon_{it}$$

where i denotes countries, t denotes time, and

- I_{it} is capital flow, measured in constant US dollars,
- CU_{it} is a dummy variable that takes on a value of 1 if i is in a currency union,
- $\mathrm{Volatility}_{it}$ is the variance of the exchange rate with the US dollar,[16]
- Y_{it} is GDP (measured in constant US dollars),
- Pop_{it} is population,
- FTA_i is unity if i belongs to a free trade agreement, and
- ε_{it} is an error term.

Also year dummies are included to capture the growth rate in capital flows over time.[17] The results are given in Table 3 for foreign direct investment.

[14] Rose and Engel (2002) showed that capital flows are higher as a proportion of GDP for currency union members than non-currency union members. Here we show that this is robust to conditioning for relevant explanatory variables.

[15] While it would be preferable to examine these issues in the context of a dataset containing bilateral capital flows between pairs of countries, no comprehensive dataset of this type is available as far as far as we are aware. Hence the reliance on aggregate capital flows.

[16] Volatility is constructed using the bilateral exchange rate with the United States. The variance of the percent change in the monthly exchange rate is computed for each year. This variance, or a 5 or 10 year moving average, is then included in the regression.

Consider the first three columns of Table 3. First note that exchange rate volatility is barely significant in many cases, and sometimes has the wrong sign. Exchange rate volatility does not appear to explain foreign direct investment. In contrast output, output per capita, and being a member of a free trade agreement all have a positive and significant impact on foreign direct investment. The growth rate of the economy also has a positive effect, although this is typically insignificant. On top of that, being a member of a currency union is associated with a 54-60% increase in foreign direct investment.

In the next three columns, country fixed-effects are included to capture any un-modeled country-specific variables. The estimated effect of currency unions on capital flows remains large and significant (57-82%). One other change that results is that the estimated effect of per capita income is larger, while the estimated effect of output is now negative. Allowing for fixed-effects, investment flows are increasing in output, but declining in population.

In Table 4, a number of sensitivity analyses are included (dropping the insignificant exchange rate volatility variable from the estimated equation) to establish the robustness of this result. One might argue that Foreign Direct Investment is the appropriate measure of what we wish to measure here: investment for the purpose of producing goods and services. However, as Hausmann and Fernandez-Arias (2000) argue, FDI should be viewed as only one component of total capital and is influenced by many factors besides the desire to invest in productive capacity. Therefore we also consider total capital flows. Then quadratic terms in the dependent

[17] Currency union, free trade agreement, and real GDP data are drawn from the Glick and Rose (2002) dataset. All other series are taken from *International Financial Statistics*. The full dataset may be downloaded from http://www.econ.hku.hk/~jyetman/.

variables are included. Next the sample is divided between industrial countries and non-industrial countries. Next, motivated by the results reported in Klein (2002) above, the United States, countries in a currency union with the United States, and others are separated. Countries in currency unions are separated by their geographical location. And finally, the observations are divided into different historical periods. With the exception of the pre-1970 observations, in every case considered, being a member of a currency union is associated with a large, statistically significant increase in capital inflows.

4. Conclusions

Trade within currency unions has been shown to be much larger than outside of currency unions, even after factoring in many variables that are likely to influence trade. An existing explanation for these results is that entering a currency union represents a reduction in trade resistance. Here it has been argued that this does not provide a full accounting for the relationship between currency unions and trade: in addition, entering a currency union represents a reduction in capital resistance.

References

Alesina, Alberto, Robert J. Barro, and Silvana Tenreyro (2002) "Optimal Currency Areas," NBER Working Paper 9072

Estevadeordal, Antoni, Brian Frantz, and Alan M. Taylor (2002) "The Rise and Fall of World Trade, 1870-1939," Quarterly Journal of Economics, Forthcoming and NBER Working Paper 9318

Feldstein, Martin (1997) "The Political Economy of the European Economic and Monetary Union: Political Sources of an Economic Liability," Journal of Economic Perspectives, 11(4): 23-42

Flandreau, Marc and Mathilde Maurel (2001) "Monetary Union, Trade Integration, and Business Cycles in 19th Century Europe: Just do it," CEPR Discussion Paper 3087

Frankel, Jeffrey and Andrew Rose (2002) "An Estimate of the Effect of Common Currencies on Trade and Income," Quarterly Journal of Economics, 117(2): 437-66

Glick, Reuven and Andrew K. Rose (2002) "Does a Currency Union Affect Trade? The Time Series Evidence," European Economic Review, 46(6): 1125-51

Hausmann, Ricardo and Eduardo Fernandez-Arias (2000) "Foreign Direct Investment: Good Cholesterol?" Inter-American Development Bank, Working Paper #417

Kenen, Peter B. (2002) "Currency Unions and Trade: Variations on Themes by Rose and Persson," http://www.princeton.edu/~pbkenen/02MarchRoseTableNotes.pdf

Klein, Michael W. (2002) "Dollarization and Trade," NBER Working Paper 8879

Lopez-Cordova, J. Ernesto and Christopher M. Meissner (2001) "Exchange-Rate Regimes and International Trade: Evidence from the Classical Gold Standard Era," American Economic Review, forthcoming, and http://repositories.cdlib.org/iber/cider/C00-118/

Melitz, Jacques (2001) "Geography, Trade and Currency Union," Centre for Economic Policy Research, Discussion Paper #2987

Micco, Alejandro, Ernesto Stein and Guillermo Ordonez (2002) "The Currency Union Effect on Trade: Early Evidence from the European Union," Inter-American Development Bank, http://faculty.haas.berkeley.edu/arose/MSOIADBEMU.pdf

Nitsch, Volker (2002a) "Comparing Apples and Oranges: The Effect of Multilateral Currency Unions on Trade is Small," Manuscript

Nitsch, Volker (2002b) "Honey, I Shrunk the Currency Union Effect on Trade," World Economy, 25(4): 457-74

Nitsch, Volker (2002c) "The Non-Causality of the Common Currency Effect on Trade: Evidence from the Monetary Union between Belgium and Luxembourg," Manuscript

Parsley, David C. and Shang-Jin Wei (2001) "Limiting Currency Volatility to Stimulate Goods Market Integration: A Price Based Approach," NBER Working Paper 8468

Persson, Torsten (2001) "Currency Unions and Trade: How Large is the Treatment Effect?" Economic Policy, 16(33): 435-48

Rose, Andrew K. (2000) "One Money, One Market: Estimating the effect of Common Currencies on Trade," Economic Policy, 15(30): 7-46

Rose, Andrew K. (2001) "Currency Unions and Trade: The Effect is Large," Economic Policy, 16(32): 449-61

Rose, Andrew K. (2002a) "Honey, the Currency Union Effect on Trade hasn't Blown Up," World Economy, 25(4): 475-79

Rose, Andrew K. (2002b) "The Effect of Common Currencies on International Trade: A Meta-Analysis," http://faculty.haas.berkeley.edu/arose/meta.pdf

Rose, Andrew K. and Eric van Wincoop (2001) "National Money as a Barrier to International Trade: The Real Case for Currency Union," American Economic Review, 91(2): 386-90

Rose, Andrew K. and Charles Engel (2002) “Currency Unions and International Integration,” Journal of Money, Credit, and Banking: Forthcoming

Tenreyro, Silvana (2001) “On the Causes and Consequences of Currency Unions,” http://faculty.haas.berkeley.edu/arose/tenreyro.pdf

Thom, Rodney and Brendan Walsh (2002) “The Effect of a Currency Union on Trade: Lessons from the Irish Experience,” European Economic Review, 46: 1111-23

Yeyati, Eduardo Levy (2001) “On the Impact of a Common Currency on Bilateral Trade,” http://www.utdt.edu/~ely/Commoncurrency.pdf

Table 1: The Cross-section Evidence

Variable	(1)	(2)	(3)	(4)	(5)
Currency Union (γ)	1.21 (.14)	1.11 (.14)	1.21 (.14)	.96 (.14)	.68 (.14)
G7 Currency User		.54 (.11)			
G7 Currency User- Non CU Member			.62 (.11)		
One or Both CU Members				.52 (.03)	.47 (.03)
Both CU Members					.36 (.06)
Exchange Rate Volatility (δ)	-.017 (.002	-.017 (.002	-.017 (.002	-.013 (.002	-.013 (.002
Output (β_1)	.80 (.005	.80 (.006	.80 (.006	.82 (.006	.82 (.006
Output/Capita (β_2)	.66 (.01)	.65 (.01)	.65 (.01)	.62 (.01)	.62 (.01)
Distance (β_3)	-1.09 (.02)	-1.09 (.02)	-1.09 (.02)	-1.10 (.02)	-1.10 (.02)
Border (β_4)	.53 (.08)	.52 (.08)	.53 (.08)	.58 (.08)	.59 (.08)
Language (β_5)	.40 (.04)	.40 (.04)	.40 (.04)	.40 (.04)	.39 (.04)
FTA (β_6)	.99 (.08)	.98 (.08)	.96 (.08)	.95 (.07)	.94 (.08)
Same Country (β_7)	1.29 (.26)	1.19 (.27)	1.28 (.27)	1.43 (.26)	1.41 (.26)
Same Coloniser (β_8)	.63 (.06)	.64 (.06)	.63 (.06)	.65 (.06)	.65 (.06)
Colonial Relationship (β_9)	2.20 (.07)	2.20 (.07)	2.20 (.07)	1.96 (.08)	1.91 (.08)

Note: Pooled panel OLS gravity estimates. Year controls not recorded. Robust standard errors are in parentheses.

Table 2: The Time-Series Evidence

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Currency Union (γ)	1.30 (.04)	.59 (.05)	.57 (.05)	.60 (.05)	.56 (.05)	.26 (.05)
G7 Currency User			.07 (.03)			
G7 Currency User- Non CU Member				.08 (.03)		
One or Both CU Members					.27 (.01)	.26 (.01)
Both CU members						.38 (.02)
Distance (β_1)	-1.11 (.006)					
Output (β_2)	.93 (.003)	.46 (.02)	.46 (.02)	.46 (.02)	.44 (.02)	.44 (.02)
Output/Capita (β_3)	.46 (.004)	.53 (.02)	.53 (.02)	.53 (.02)	.54 (.02)	.54 (.02)
Language (β_4)	.32 (.01)					
Border (β_5)	.43 (.03)					
FTA (β_6)	.99 (.03)	.84 (.05)	.85 (.05)	.84 (.05)	.83 (.05)	.84 (.05)
Landlocked (β_7)	-.14 (.01)					
Islands (β_8)	.05 (.01)					
Land Area (β_9)	-.09 (.002)					
Same Coloniser (β_{10})	.45 (.02)					
Current Colony (β_{11})	.82 (.07)	.23 (.09)	.23 (.09)	.23 (.09)	.27 (.09)	.25 (.09)
Colonial Relationship (β_{12})	1.31 (.02)					
Same Country (β_{13})	-.23 (.20)					

Note: Pooled panel OLS gravity estimates. Year and country-pair controls not recorded. Robust standard errors are in parentheses.

Table 3: The Investment Evidence: Foreign Direct Investment

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Currency Union (γ)	.43 (.09)	.46 (.08)	.47 (.08)	.45 (.20)	.60 (.19)	.60 (.19)
Volatility- current year	-.04 (.02)			-.05 (.01)		
Volatility- 5 year MA		-.004 (.02)			-.03 (.01)	
Volatility- 10 year MA			.03 (.02)			.005 (.02)
Output (β_1)	.63 (.02)	.65 (.02)	.66 (.02)	-1.0 (.34)	-1.2 (.32)	-1.1 (.31)
Output/Capita (β_2)	.76 (.04)	.76 (.04)	.77 (.04)	2.1 (.33)	2.2 (.31)	2.2 (.29)
Growth Rate (β_3)	.07 (.37)	1.01 (.78)	1.04 (.70)	.08 (.20)	.57 (.38)	.33 (.36)
FTA (β_4)	.51 (.07)	.45 (.07)	.51 (.07)	.30 (.13)	.29 (.12)	.30 (.12)

Note: Year controls (all columns) and country controls (columns 4-6) not recorded.

Robust standard errors are in parentheses.

Table 4: The Investment Evidence: Sensitivity Analysis

Total Capital Flows	.37 (.07)
Quadratic Terms	.45 (.02)
No Industrial Countries	.44 (.08)
Only Industrial Countries	.54 (.09)
US	.48 (.16)
In Currency Union with US	.39 (.19)
Neither	.47 (.07)
Africa	.30 (.12)
America's / Caribbean	.41 (.10)
Asia / Pacific	.79 (.20)
Europe	.50 (.12)
Before 1970	.14 (.24)
1970-1980	.64 (.12)
1980-1990	.46 (.11)
After 1990	.37 (.10)