Trade Areas versus Currency Agreements: Which Causes What to Economies?*

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Any error remains our own.

Abstract:

The economics literature on the effects of currency agreements has recently documented extremely large effects of currency unions on bilateral trade intensity. On the other hand, the effect of currency agreements on the co-movement of price and output shocks is far from conclusive. This literature has taken into account the endogeneity of the currency union criteria while controlling for the presence of regional trade agreements. This paper argues that it is important to control for the endogeneity of currency *and* trade agreements simultaneously for two reasons: first, trade agreements can impact trade flows as well as price and output co-movements; second, the determinants of country participation in the trade and currency agreements may be related. This paper estimates the impact of currency and trade agreements in a new cross-country dataset, while fully taking into account the endogeneity of each indicator. In addition to the endogeneity issue, our paper differs from the literature in two other important ways: we use information only on relatively large economies, constituting the overwhelming fraction of world trade and output; we take a long-term view by computing all variables of interest as decade averages, from the 1970s to the 1990s. Our results show that instrumenting for currency or trade agreement indicators in isolation shows that either leads to larger bilateral trade flows, less export dissimilarity, and closer co-movement of output and real exchange rates. However, in specifications where *both* currency and trade agreements are instrumented for, currency agreements have an effect only on real exchange rate variability while trade agreements increase bilateral trade and the co-movement of output while decreasing export dissimilarity.

1. Introduction

The effect of currency and trade agreements on the participating economies is a key issue in economics. Both types of agreement have multiplied in recent years: many countries have fundamentally changed the way their currencies relate to the currencies of other countries – by adopting a common currency (in the case of the European Union and the Euro), by fully dollarizing their economies (such as Ecuador and El Salvador in Latin America) or by pegging their currencies to a major world currency (such as Argentina and the US Dollar); in addition, several countries consider joining regional trade agreements, in the wake of the European Common Market and the North American Free Trade Agreement.

Estimating the impact of currency and trade agreements on the economies involved is complicated by several factors. First and foremost, while trade agreements and currency unions are often justified on the basis of their presumed effect on trade volumes, the reverse is also true: groups of countries that trade heavily among themselves are also "better candidates" for trade and currency agreements. This is the issue of endogeneity – trade leads to (currency or trade) agreements, that in turn lead to trade – and it cannot be avoided.[1] The same issue is present when estimating the effect of trade and currency agreements on other economic outcomes, such as the cross-country co-movement of prices or output fluctuations. A high co-movement in prices and output makes bilateral agreements more feasible, and may even result from the agreements themselves.

However, a second issue may confound the estimates. Given that, as argued in Alesina and Barro (2002), a high volume of trade increases the gains from a common currency and that a common currency facilitates trade, a positive correlation between entering a trade agreement and sharing a common currency is likely to be observed. This is the correlation issue, suggesting that if countries that trade more also tend to enter into currency agreements, then the latter´s effect on bilateral trade may be overestimated. In sum, taking care of reverse causality of trade or currency

[1] Several papers highlight the importance of this issue, most notably Frankel and Rose (1998) and Alesina et al. (2002).

agreements without taking into account a possible common cause at the origin of both agreements may lead to biased estimates.

In this paper we take both issues above into account and undertake, for the first time, an empirical study of the effects of currency and trade agreements that corrects for reverse causality in both the trade and currency indicator. In other words, we obtain instrumental variable estimates of the effect of *both* currency and trade agreements. We are thus able to determine the specific causal effect of trade and currency agreements on the economy´s characteristics - bilateral trade intensity, output co-movement, real exchange rate shocks and export dissimilarity. Our results show that the significance of the coefficients varies dramatically when both of the agreement indicators are included and instrumented for. These results are robust to different specifications and estimation methods and differ from those obtained in the literature where only one of the factors was instrumented for.

Our paper differs from previous studies in two other ways. First, it uses a sample of 37 large countries that are responsible for over 85 percent of the world Gross Domestic Product and over 80 percent of trade. We ignore a large number of small countries that are present in most previous studies. Second, our variables of interest are constructed for three decades – from the 1970s to the 1990s – and are thus farther from the influence of sharp short-term fluctuations.

The paper is organized into four sections. The second section briefly reviews the evidence on the effect of currency and trade agreements on the economies involved and the third section presents the new empirical estimates. The last section concludes.

2. Trade Agreements, Currency Agreements and the Economy

The seminal work by Mundell (1961) on optimal currency areas emphasized how a high level of trade intensity, a high correlation of output fluctuations and price changes facilitated the adoption of a common currency in a given economic area. These and similar criteria were then used as a litmus test of whether certain regions

should embark on a currency union.[2] The assumption of exogeneity – that the decision to join a currency union is exogenous – is key to identifying the effects of membership in a currency agreement on the economy. However, as first evidenced in Frankel and Rose (1998), entry into a currency agreement may lead to the *ex-post* validation of these same criteria. In other words, the decrease in exchange rate volatility associated with joining a currency agreement can lead to an increase in bilateral trade and a higher correlation of output and price changes.

Another influential paper, Rose (2000), has uncovered a substantial effect on bilateral trade when two countries decide to use the same currency. After controlling for several other determinants of bilateral trade, Rose (2000) shows that bilateral trade approximately triples for countries that use the same rather than different currencies. The magnitude of the estimate has prompted several other authors, notably Persson (2001), to examine the effect of common currencies on trade after correcting for endogeneity bias. However, Frankel and Rose (2002), Rose and van Wincoop (2001), and Glick and Rose (2002) reexamined the evidence and confirm the main result - a large effect of currency unions on trade – only slightly denting the quantitative estimate. Recently, Micco et al. (2003) have used the experience of economic and monetary union in Europe (EMU) to revise the estimate of the effect of currency agreements on trade quite dramatically.

An important recent addition to the literature is that of Tenreyro and Barro (2003), who address the problem of endogeneity by developing a new instrumental variable (IV) estimate of the effects of currency unions on three economic variables: bilateral trade flows, co-movement of price shocks and the co-movement of output shocks. Their methodology exploits the determinants of the (independent) decisions of two given countries to peg to the same third country, for instance due to the latter being the former colonizer of both countries, due to proximity or contiguity.[3] The estimated propensity of two countries to adopt the same third-country currency is then used as the exogenous indicator of low bilateral exchange rate variability. The authors

[2] See, for instance Bayoumi and Mauro (1999) and Larraín and Tavares (2003).
[3] The authors estimate a "client-anchor" relationship, such as modelled in Alesina and Barro (2002). This estimate illustrates some of the reasons for adopting or pegging to a foreign currency or joining a currency union. The authors find that the probability of a currency agreement increases if the client speaks the same language or is geographically close to the anchor, or if it was a former colony of the anchor. Lower GDP per capita and smaller population size also increase the propensity to enter a currency agreement.

find that a currency agreement increases bilateral trade flows, though by less than estimated in Rose (2000). In addition, entering a currency agreement increases the co-movement of price shocks and, less strongly, decreases the co-movement of output shocks. Tenreyro and Barro (2003) control for whether the two countries at stake are also part of the same regional trade agreement but do not take the endogeneity of trade agreements explicitly into consideration. However, as these authors acknowledge, since the decisions to enter currency and trade agreements may be related and determined by the same type of factors, this may be an important omission.

The issues of endogeneity and correlation of currency and trade agreements mentioned above also hold when considering the other effects of bilateral agreements. Take, as an example, the issue of co-movement of output: low values for this variable are likely to encourage trade and currency agreements, but the co-movement of output shocks can in turn be affected by trade and currency agreements. Trade can increase the correlation of demand shocks, and induce either productivity spillovers – increasing co-movement - or enough sectoral specialization – decreasing co-movement. The abandonment of independent currency management may either enhance co-movement (monetary policy choices become more closely connected) or actually decrease it (if monetary policy choices were used and are able to "correct" for different economic behavior). Frankel and Rose (1998) show evidence that trade causes higher synchronization of business cycles, using IV estimation methods to control for endogeneity, and Gruben et al. (2002) generally confirm these results. On the currency front, Tenreyro and Barro (2003) find some evidence that currency agreements decrease synchronization. While all these studies take the issue of endogeneity of the currency agreements seriously, they do not consider that participation in either trade or in currency agreements are endogenous variables that are correlated.

So how are trade and currency related? On the one hand countries that develop the common institutions to share a common currency, or the institutional affinity to sign a currency agreement, are also more likely to enter a common trade agreement. In part this may be the result of the possible impact of the currency agreement on the bilateral trade volume, encouraging the formalization of a trade agreement. On the

other hand, if trade agreements actually further trade, they are increasing the benefits of currency agreements, as the latter lower the transaction costs on a larger set of transactions.[4] When estimating the effect of currency agreements on the economy, one must thus correct for the presence of trade agreements. However, in view of the problem of endogeneity highlighted above, considering participation in a trade agreement as an exogenous variable may not be sufficient.

3. Estimating the Impact of Trade and Currency Agreements

In this section we estimate the impact of participation in both currency and regional trade agreements using data on 40 countries for the period from 1970 to 1997. We instrument for both currency agreements and for regional trade agreements and show that results crucially depend on the presence of both indicators and consideration of their endogenous nature.

3.1. Data and Specification

We rely on three main data sources: Rose (2000), a dataset on bilateral trade and bilateral indicators that includes an indicator for currency unions and regional trade agreements and which has become the main source in the field; the Reinhart and Rogoff (2002) historical data on exchange rate agreements, including exchange rate pegs and exchange rate bands of variation; the Larraín and Tavares (2003) dataset on bilateral indicators for 40 large and medium-sized countries. In addition, we computed two indicators of institutional proximity between any two countries in the sample in the rule of law and civil liberties dimension. These indicators of institutional proximity are used as instrumental variables for the likelihood of entering

[4] Trade and currency agreements may also be inversely related. In a monopolistic setup where firms set their output prices, as developed in Alesina and Barro (2002), lower levels of competition entail higher markups that tend to deter trade. At the same time, lower levels of competition can lead to higher inflation rates under discretion as there is a temptation by the central banker to "correct" for the higher markups. Since that temptation is anticipated by economic agents, the economy may end up with higher inflation and the same output, increasing the benefits from entering a currency agreement that undercuts monetary discretion, and thus reducing inflation. In this case lower trade flows – and lower likelihood of agreements in the trade area - can be associated with higher likelihood of currency agreements.

an agreement in the currency and in the trade area. The description, units and sources for all variables used in the paper are presented in Appendix I – Data and Sources.

All variables are computed as averages for the three periods of interest, 1970-79, 1980-89 and 1990-97. This implies that, as an example, the indicator for bilateral currency agreement takes the value 1 for the period 1970-1979 only if the two currencies were linked for each and every one of the 10 years. Working with decade averages has two advantages over indicators such as those previously used in the literature: it transforms the currency and trade agreement variables into continuous variables, in contrast with previous studies; it attenuates the influence of discrete jumps in the time series on the results. The dataset uses bilateral information for 40 countries spanning the period 1970-1997.[5] Unlike previous studies the countries under scrutiny are for the most part either large or medium-sized economies. This is important since criticisms of previous estimates of the impact of currency unions on trade are associated with the weight of small countries in the sample. The 40 countries in our sample are responsible for more than 80 percent of world trade flows and over 85 percent of Gross Domestic Product.[6] In sum, we are covering the lion´s share of world GDP and world trade.

We use a simple specification to test the effect of currency and trade agreements on bilateral trade intensity and the other variables. It relies on the standard "gravity equation" approach, which suggests that bilateral trade between a pair of countries increases with the size of the countries and decreases with their distance. The basic gravity equation is then augmented to include additional variables, such as dummies indicating whether the countries are linked by a currency or trade agreement. The significance of the coefficient on these additional variables is used as a test for their effect on bilateral trade. In addition to the variables being tested, we have used a set of additional controls in the spirit of Rose (2000) and Tenreyro and Barro (2003), such as per capita GDP, indicators for common language, common

[5] The countries included are Belgium-Luxembourg, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, the United Kingdom, China, India, Indonesia, Japan, Korea , Malaysia, Philippines, Singapore, Taiwan, Thailand, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Paraguay, Uruguay, Venezuela, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Canada, Mexico and the United States.

[6] We computed weights for the 1973-79, 1980-89 and 1990-97 periods using annual data from World Bank (2001) in constant 1995 US Dollars and then averaging through a geometric mean. The decade averages were 81, 82 and 80 for the sample share of world trade and 87, 86 and 86 for the share of world GDP.

border, common colonizer and whether the countries are islands.[7] However, the spirit of the paper and of the estimates presented below is to rely on a gravity-equation-based specification that is as straightforward as possible. Our preferred specification is then given by

$$\text{Bilateral Trade Intensity} = \alpha + \theta 1 * \text{Currency Agreement} + \theta 2 * \text{Trade Area} + \beta 1 * \text{Distance} + \beta 2 * \text{Population} + \beta 3 * \text{Per Capita GDP} + \beta 4 * \text{Size} + \beta 5 * \text{Common Language} + \beta 6 * \text{Common Border} + \beta 7 * \text{Common Colonizer} + \beta 8 * \text{Island} + \varepsilon$$

where we test for θ1 and for θ2 by entering currency agreements and trade agreements as independent variables, first one at a time and then simultaneously.[8] For each specification we conduct an ordinary least squares estimation with the variable(s) of interest only, then instrument the variable(s) of interest and then add the extra controls. Thus, for each bilateral indicator to be explained, we report nine different estimates in Tables 2 through 5. For reasons of parsimony we use the same specification above in the equations estimating the impact of the variables of interest on real exchange rate volatility, asymmetry of output shocks and dissimilarity of export structure (in Tables 2 through 5).

Rule of law and civil liberties are used as instrumental variables in a first-stage regression correcting for the endogeneity of currency and trade agreements. We posit that both higher and more similar levels of institutional development on the part of the potential currency or trade partners increase their likelihood of actually entering a currency or trade agreement. Fernandez and Portes (1998) highlight the importance of institutional considerations to the decision to enter a trade agreement, and Alesina and Wagner (2003) have suggested an inverse relationship between political development and pegging a currency.[9] We construct the civil liberties and rule of law indicators as the product of the levels of each indicator in each country so that it increases between 0 and 1, with 1 corresponding to the occurrence of highest level of civil liberties for both countries (likewise for rule of law). Rule of Law and Civil Liberties are

[7] The results are not sensitive to the specification, as far as the significance of the coefficients on currency and trade agreements are concerned. These are available from the authors upon request.
[8] In other words, we first force θ2 = 0, then θ1 = 0 and finally allow θ1 and θ2 to take any possible value.
[9] These authors find that countries with poor institutional development, measured as low levels of political rights and the rule of law, tend to float more than explicitly announced. In contrast, countries with high levels of political rights and respect for the rule of law tend to *de facto* peg even when not announced.

constructed from annual data available from International Country Risk Guide (2001) – rule of law indicator - and Freedom House (2001)- civil liberties indicator. We started by normalizing each indicator into a 0 to 1 scale, where 1 indicates better developed institutions. We then computed, for each year and each country pair in the sample, two institutional indicators. The civil liberties indicator is the product of the civil liberty index for each country, so that it attains a maximum of 1 when both countries have a score of 1 (most developed as far as civil liberties) and decreases to 0 as the countries display a lower score regarding civil liberties. The rule of law indicator is constructed in a similar way using the respective country rule of law indicators. In this way a high score in the index rewards good institutions in each country (increasing as each country´s individual score increases) and similarity of institutions when high (increasing as both countries approach 1). Decade averages for each indicator are then computed.

3.2. Results

As highlighted above, previous studies on the effect of currency agreements on trade failed to correct for the endogeneity of the related indicator of membership in a trade agreement. In this section we present estimates that correct for this important shortcoming.

Appendix II presents tests of the appropriateness of Rule of Law and Civil Liberties as instruments for currency and trade agreements. We conducted a Durbin–Wu–Hausman test augmented regression test for endogeneity, as in Davidson and MacKinnon (1993). This is a test of whether it is necessary to use instrumental variables in estimating a specific equation when there are reasons to suspect that the right hand-side variable is not endogenous, i.e., it tests whether the estimates obtained through least squares are consistent or not. We have tested for the endogeneity of the currency agreement and the regional trade agreement indicators. We ran an OLS regression of each of the two possibly endogenous variables – currency agreement and regional trade area indicators - on all right-hand side variables in the equation above. We then used the residuals from this first regression to substitute for the

original variable in the equation above. A significant coefficient in this second regression indicatesa that OLS is not consistent and we need to take account of endogeneity by using IV estimation techniques. We find, as presented in Appendix II, that both the currency agreement and the trade area indicators, that endogeneity is indeed present.[10]

In addition, we find that the instrumental variables chosen are associated with the instrumented variable as predicted: institutional closeness between the two countries, in the civil liberties as well as the rule of law dimensions, is positively associated with the presence of a bilateral currency or trade agreement. The table in Appendix II shows this first stage regression and documents how the impact is substantial: two countries that share developed political or legal institutions are 10 to 15 percent more likely to enter trade or currency agreements. In sum, higher and similar levels of institutional development are associated with the occurrence of bilateral agreements.

Tables 1 through 4 present results for the impact of currency and trade agreements on the economy´s characteristics, for the intensity of bilateral trade, real exchange rate volatility, asymmetry of output shocks and dissimilarity of export structure. The impact of currency and trade agreements on bilateral trade has been widely studied, as discussed above. Results on the other characteristics of pairs of economies are presented for illustrative purposes. In each table we present, successively, results for OLS estimates, IV estimates without controls and IV estimates with controls. The first three columns of Table 1 show that membership in either a currency or a trade agreement tends to increase the volume of bilateral trade. When we instrument for either indicator of bilateral agreement, irrespective of the inclusion of controls (in columns 4 and 5 and then 7 and 8), we uncover a significant and quantitatively important effect of either currency or trade agreements on bilateral trade. The effect of a currency agreement on trade is substantial, estimated at about 10 percent of GDP in column 7, but it is also substantially smaller than previous estimates, with the exception of Micco et al. (2003), who estimate the early effect of EMU membership on trade at a remarkably close 12 to 19 percent.

[10] For reasons of parsimony, these results are not presented in the paper and are available upon request.

When we instrument for both currency and trade agreements in columns 6 and 9, we find that only membership in a trade agreement is associated with a significant increase in bilateral trade. This is true irrespective of the inclusion or not of the additional controls. Moreover, the inclusion of the trade agreement indicator (not instrumented for) does not take away the significance of the effect of the currency agreement on trade, suggesting that previous studies suffer from misspecification.[11] In sum, instrumenting for both agreement indicators radically changes previous conclusions on the importance of currency agreements for trade.[12]

[Table 1 about here]

Table 2 presents the results of similar specifications with real exchange rate volatility as the dependent variable. Unlike those reported above for trade intensity, now it is trade agreements that become non-significant when both indicators are instrumented for. Only currency agreements seem to have a significant impact on real exchange rate volatility. Table 3 and 4 conduct the same investigation for the asymmetry of output shocks and the dissimilarity of the export structure. We find that belonging to a regional trade agreement significantly affects both variables, with currency agreements becoming non-important, as in the case of bilateral trade. The negative impact of trade agreements on the dissimilarity of export structure is consistent with its negative impact on the asymmetry of output shocks. In other words, economies integrated through trade agreements seem to become more similar, and thus experience output cycles that move closer together.

[Table 2 about here]

[Table 3 about here]

[Table 4 about here]

[11] We do not report these results for reasons of parsimony but they are available upon request.

In all Tables 1 through 4, in the columns where each indicator of agreement is entered alone, the evidence suggests that all have a significant effect on the characteristic of the economy. Moreover, the direction of that effect is the same, irrespective of which type of agreement – currency or trade – the countries are engaged in. However, when both indicators are entered simultaneously and both are instrumented for, only currency agreements matter for real exchange rate volatility and only trade agreements matter for the other three characteristics – bilateral trade, asymmetry of output shocks and the dissimilarity of export structure. In addition, these results are independent of the inclusion or not of additional controls. In sum, our results suggest that trade agreements matter for trade-related characteristics – bilateral trade, output asymmetry and export dissimilarity - and currency matters for real exchange rate variability.

4. Conclusion

This paper uses a new dataset to estimate the effect of membership in a currency or trade agreement on the characteristics of the pair of economies involved. We use decade data on bilateral characteristics and exclude very small countries to estimate for the effect of membership in currency and trade agreements on bilateral trade intensity, real exchange rate volatility, asymmetry of output shocks and the dissimilarity of the export structure. Most importantly, we instrument for both currency and trade agreement membership and find that the results are in stark contrast with the literature.

When no correction for endogeneity is undertaken or when only one agreement indicator is added and instrumented for, estimates suggest that both trade and currency agreements matter and that they matter in the same way for all four characteristics. However, when both agreement indicators are considered and instrumented for, we find that only trade agreements increase the volume of bilateral trade and decrease both the asymmetry of output shocks and dissimilarity of export structure. In turn, only membership in a currency agreement matters for bilateral real

[12] These results are entirely robust to the definition of currency agreements alternatively as pegs, currency bands or currency unions.

exchange rate volatility, decreasing it.[13] These results are especially important for the effect of currency agreements on bilateral trade, which is robust to instrumental variable estimation and the inclusion of a control for trade agreements but not to the proper consideration of endogeneity of trade agreements.

We believe these results warrant a reconsideration of the effect of membership in a currency agreement on the economy, especially as the determinants of membership in currency and trade agreements and their effect on the economies involved are very similar and extremely hard to distinguish.

[13] An issue that arises is why enter a currency area if its effect on real economic integration is, at best, slim. One possible explanation is given in Corsetti and Pesenti (2002), who show that a currency area can be self-validating as an optimal monetary regime, even if its effect on real variables is not significant. But entering a currency union can also deliver non-traditional gains such as credibility and insurance, as well as benefits at the political level, in line with the argument in Fernandez and Portes (1998) for regional trade agreements.

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Table 1
Dependent Variable: Bilateral Trade Intensity - Ordinary Least Squares and Instrumental Variables Estimation

	Ordinary Least Squares			Instrumental Variables			Instrumental Variables		
	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Currency Agreement	4.335 (10.62)**	-	4.182 (9.93)**	9.582 (8.89)**	-	-0.105 (-0.04)	9.366 (9.04)**	-	-0.711 (-0.26)
Trade Agreement	-	1.479 (4.93)**	1.033 (3.37)**	-	14.523 (4.00)**	14.635 (3.31)**	-	13.772 (4.53)**	14.512 (3.39)**
Distance	-	-	-	-	-	-	0.005 -0.35	0.126 (3.49)**	0.132 (2.81)**
Size	-	-	-	-	-	-	0.04 -0.87	0.151 (1.65)*	0.159 -1.59
Per Capita GDP	-	-	-	-	-	-	0.0003 -0.62	-0.0002 (-0.26)	-0.0002 (-0.27)
Population	-	-	-	-	-	-	0.004 -0.84	-0.008 (-1.10)	-0.009 (-1.03)
Common Language	-	-	-	-	-	-	0.176 (2.19)**	0.204 -1.24	0.202 -1.18
Common Border	-	-	-	-	-	-	0.759 (2.20)**	-1.65 (-1.73)*	-1.756 (-1.65)*
Common Colonizer	-	-	-	-	-	-	2.621 (3.53)**	3.066 (3.74)**	3.088 (3.73)**
Island	-	-	-	-	-	-	0.526 (6.33)**	-0.178 (-1.03)	-0.219 (-0.90)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.29	0.04	0.31	-	-	-	-	-	-
F stat	37.91	8.16	30.67	26.6	5.4	4.05	11.87	4.84	4.12
Degrees of Freedom	(3, 2165)	(3, 2124)	(4, 2123)	(3, 2165)	(3, 2124)	(4, 2123)	(11, 2111)	(11, 2111)	(12, 2110)
Decision	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject
Nr. Observations	2169	2128	2128	2169	2128	2128	2123	2123	2123

Note:t-statistics are computed using heteroskedastically consistent standard errors. ** and * denote, respectively, significant at the 5 and 10 percent confidence levels. Variable sources and description are presented in Appendix I.

Table 2
Dependent Variable: Real Exchange Rate Variability - Ordinary Least Squares and Instrumental Variables Estimation

	Ordinary Least Squares			Instrumental Variables			Instrumental Variables		
	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Currency Agreement	-20159.58 (-4.20)**	-	-21556.92 (-3.65)**	-617283.4 (-4.37)**	-	-424525.1 (-2.72)**	-485578.5 (-4.17)**	-	-401444.8 (-2.82)**
Trade Agreement	-	14230.06 -0.65	16526.69 -0.75	-	-691386.7 (-3.14)**	-240226.7 (-1.27)	-	-538646.7 (-3.52)**	-121166.3 (-0.79)
Distance	-	-	-	-	-	-	-0.001 (-0.78)	-0.006 (-2.55)**	-0.002 (-1.11)
Size	-	-	-	-	-	-	-0.009 (-1.29)	-0.015 (-1.82)*	-0.01 (-1.43)
Per Capita GDP	-	-	-	-	-	-	-0.0004 (-0.59)	-0.0002 (-0.26)	-0.0004 (-0.53)
Population	-	-	-	-	-	-	-0.001 (-1.56)	-0.0005 (-0.74)	-0.0009 (-1.41)
Common Language	-	-	-	-	-	-	8163.697 -0.69	9024.167 -0.74	7950.128 -0.69
Common Border	-	-	-	-	-	-	24386.74 -1.33	105707.8 (2.55)**	45385.99 -1.48
Common Colonizer	-	-	-	-	-	-	-40873.38 (-2.88)**	-57345.41 (-3.04)**	-44770.98 (-2.91)**
Island	-	-	-	-	-	-	-22373.78 (-3.27)**	6958.405 -0.86	-16153.86 (-1.59)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.03	0.03	0.03	-	-	-	-	-	-
F stat	10.56	9.83	7.38	9.49	7.7	6.65	2.46	2.33	2.27
Degrees of Freedom	(3, 2165)	(3, 2124)	(4, 2123)	(3, 2165)	(3, 2124)	(4, 2123)	(11, 2111)	(11, 2111)	(12, 2110)
Decision	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject
Nr. Observations	2169	2128	2128	2169	2128	2128	2123	2123	2123

Note:t-statistics are computed using heteroskedastically consistent standard errors. ** and * denote, respectively, significant at the 5 and 10 percent confidence levels. Variable sources and description are presented in Appendix I.

Table 3
Dependent Variable: Asymmetry of Output Shocks - Ordinary Least Squares and Instrumental Variables Estimation

	Ordinary Least Squares			Instrumental Variables			Instrumental Variables		
	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Currency Agreement	-0.013 (-5.99)**	-	-0.011 (-5.35)**	-0.131 (-6.77)**	-	-0.031 (-0.92)	-0.117 (-6.65)**	-	-0.033 (-1.20)
Trade Agreement	-	-0.012 (-5.51)**	-0.011 (-5.04)**	-	-0.187 (-4.18)**	-0.154 (-3.06)**	-	-0.155 (-5.03)**	-0.12 (-3.15)**
Distance	-	-	-	-	-	-	0.0003 -1.26	-0.001 (-2.74)**	-0.0008 (-1.88)*
Size	-	-	-	-	-	-	-0.0003 (-0.29)	-0.002 (-1.51)	-0.00124 (-1.30)
Per Capita GDP	-	-	-	-	-	-	-0.000001 (-0.12)	0.000005 -0.48	0.000004 -0.37
Population	-	-	-	-	-	-	-0.0002 (-2.24)**	-0.00006 (-0.61)	-0.00009 (-1.03)
Common Language	-	-	-	-	-	-	0.005 (3.18)**	0.005 (2.58)**	0.005 (2.94)**
Common Border	-	-	-	-	-	-	0.01 (2.43)**	0.035 (3.63)**	0.031 (3.45)**
Common Colonizer	-	-	-	-	-	-	-0.016 (-5.56)**	-0.021 (-4.55)**	-0.02 (-4.86)**
Island	-	-	-	-	-	-	-0.004 (-3.95)**	0.004 (2.07)**	0.002 -0.85
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.1	0.1	0.11	-	-	-	-	-	-
F stat	101.2	96.81	84.31	51.26	20.72	20.66	-	-	-
Degrees of Freedom	(3, 2165)	(3, 2124)	(4, 2123)	(3, 2165)	(3, 2124)	(4, 2123)	-	-	-
Decision	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject
Nr. Observations	2169	2128	2128	2169	2128	2128	2123	2123	2123

Note:t-statistics are computed using heteroskedastically consistent standard errors. ** and * denote, respectively, significant at the 5 and 10 percent confidence levels. Variable sources and description are presented in Appendix I.

Table 4
Dependent Variable: Dissimilarity of Export Structure - Ordinary Least Squares and Instrumental Variables Estimation

	Ordinary Least Squares			Instrumental Variables			Instrumental Variables		
	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area	Currency Agreement	Trade Area	Currency Agreements and Trade Area
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Currency Agreement	-1.59 (-3.37)**	-	-.846* (-1.94)	-23.833 (-6.10)**	-	4.255 -0.53	-24.457 (-6.17)**	-	5.499 -0.69
Trade Agreement	-	-5.116 (-15.09)**	-5.026 (-14.62)**	-	-37.55 (-4.37)**	-42.072 (-3.39)**	-	-37.423 (-5.19)**	-43.142 (-3.71)**
Distance	-	-	-	-	-	-	-0.123 (-2.38)**	-0.21 (-2.33)**	-0.257 (-2.04)**
Size	-	-	-	-	-	-	0.103 -0.56	-0.189 (-0.81)	-0.25 (-0.88)
Per Capita GDP	-	-	-	-	-	-	-0.002 (-0.92)	-0.0005 (-0.22)	-0.0002 (-0.09)
Population	-	-	-	-	-	-	-0.017 (-1.00)	0.013 -0.66	0.019 -0.79
Common Language	-	-	-	-	-	-	-0.606 (-1.75)*	-0.696 (-1.65)*	-0.681 (-1.45)
Common Border	-	-	-	-	-	-	0.157 -0.17	6.808 (2.92)**	7.634 (2.66)**
Common Colonizer	-	-	-	-	-	-	1.05 -0.97	-0.166 (-0.12)	-0.339 (-0.22)
Island	-	-	-	-	-	-	-0.723 (-2.97)**	1.175 (2.64)**	1.492 (2.17)**
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.02	0.08	0.08						
F stat	12.78	87.57	67.42	16.14	7.33	4.56	6.8	3.8	2.72
Degrees of Freedom	(3, 2165)	(3, 2124)	(4, 2123)	(3, 2165)	(3, 2124)	(4, 2123)	(11, 2111)	(11, 2111)	(12, 2110)
Decision	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject
Nr. Observations	2169	2128	2128	2169	2128	2128	2123	2123	2123

Note:t-statistics are computed using heteroskedastically consistent standard errors. ** and * denote, respectively, significant at the 5 and 10 percent confidence levels. Variable sources and description are presented in Appendix I.

Appendix I – Data and Sources

The data set uses information for 40 countries spanning the period 1970-1995. The countries included are Belgium-Luxembourg, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain and the United Kingdom in Europe; China, India, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand in Asia; Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Paraguay, Uruguay, Venezuela in South America; Costa Rica, Dominican Republic, El Salvador, Guatemala and Honduras in Central America; Canada, Mexico and the United States in North America. All variables are computed for each of the three periods, 1970-79, 1980-89 and 1990-97. When a variable is not available for the whole period, it is computed where possible.

Currency Agreement - **Description:** The Currency Agreement variable captures whether the two countries in question were linked by a currency union, a pegged currency or a defined band of variation of the exchange rate. It takes the value 1 in the presence of an explicit peg between the currencies of countries i and j or in the presence of a band (fixed, crawling or moving band). Two countries that have a currency agreement with the same third country are not automatically noted as connected by a currency agreement themselves. **Unit:** Dummy 0 or 1. **Source:** Reinhart and Rogoff (2002).

Trade Area - **Description:** Dummy variable which takes value 1 if countries i and j are part of the same regional trade agreement. **Unit:** Dummy 0 or 1. **Source:** Rose (2000).

Bilateral Trade Intensity - **Description:** This variable is calculated as the mean, over each period of time, of the average of the two bilateral-export-to-GDP ratios for each pair of countries *i* and *j*, that is, $\frac{\frac{Xij}{GDPi} + \frac{Xji}{GDPj}}{2}$. **Unit:** Percentage. **Source:** Larraín and Tavares (2003).

Real Exchange Rate Volatility - **Description:** Standard deviation, over each period of time, of the change in the log of the bilateral real exchange rate for countries *i* and *j*. The real exchange rate is constructed using consumer price indices and nominal exchange rate data. **Unit:** Logarithm. **Source:** Larraín and Tavares (2003).

Asymmetry of Output Shocks - **Description:** Standard deviation, over each period of time, of the difference in the shocks to countries *i* and *j*. Output shocks for each country are calculated as annual change in the log of real GDP. The source for real GDP data is the IFS series of GDP. **Unit:** Logarithm. **Source**: Larraín and Tavares (2003).

Dissimilarity of Export Structure - **Description:** This variable is calculated adding up, for the first eight SITC codes at 1-digit level[14], the absolute value of the difference between countries *i* and *j* of the export shares for each category. The mean is then taken over the appropriate period of time. **Unit:** Percentage**. Source:** Larraín and Tavares (2003).

Size - **Description:** This variable is calculated as the mean, over each period of time, of the average of countries *i* and *j*'s GDP (expressed in logs). The GDP data are in constant dollars. **Unit:** Logarithm. **Source:** Larraín and Tavares (2003).

Civil Liberties - **Description:** In the source, it ranges between 1 (best) and 6 (worst). It was recomputed to range between 0 and 1. **Unit:** Index from 0 to 1. **Source:** Freedom House (2003).

Rule of Law - **Description:** it ranges between 0 and 6. It was also recomputed to range between 0 and 1. **Unit:** Index from 0 to 1. **Source:** International Country Risk Guide (2003).

[14] Code 9, "Not elsewhere classified, gold and military equipment" was removed from total exports, as in many cases it may lead to errors given the size of the not elsewhere classified items. This measure is calculated based only on four categories in previous studies.

Distance - **Description:** Computed as the log of the Great Circle distance between the capital cities of countries i and j. **Unit:** Logarithm of miles. **Source:** Andrew Rose's webpage.

Per Capita GDP - **Description:** it is the log of the product of the real per capita GDP's of countries i and j. **Unit:** constant dollars. **Source:** Rose (2000).

Population - **Description:** the log of the product of the populations of country i and j. **Unit: Source:** Rose (2000).

Common Language - **Description:** dummy variable which takes value 1 if two countries share the same official language. **Unit:** Dummy 0 or 1. **Source:** Rose (2000).

Common Border - **Description:** dummy variable which takes value 1 if there is a common border between two countries i and j. **Unit:** Dummy 0 or 1. **Source:** Rose (2000).

Common Colonizer - **Description:** dummy variable if the two countries were colonies and shared the same colonizer after 1945. **Unit:** Dummy 0 or 1. **Source:** Rose (2000).

Island - **Description:** it takes value 1 if one of the countries i or j is an island, 2 if both of them are islands and 0 otherwise. **Unit:** Dummy 0 or 1. **Source:** Rose (2000).

Appendix II – The Instruments

First Stage Regressions
Dependent variables: Currency Agreements and Trade Areas
Rule of Law and Civil Liberties Indices as Instrumental Variables

Dependent variable	**Currency Agreement**	**Trade Area**
	OLS	**OLS**
	(2)	**(4)**
Distance	-0.002 (-1.06)	-0.01 (-5.18)**
Size	0.005 (0.85)	-0.006 (-0.92)
Per Capita GDP	-0.00006 (-1.02)	-0.00001 (-0.25)
Population	-0.001 (-2.01)**	0.00009 (0.20)
Common Language	-0.0004 (-0.03)	0.005 (0.52)
Common Border	0.104 (3.20)**	0.246 (5.71)**
Common Colonizer	-0.013 (-0.95)	-0.0557 (-3.10)**
Island	-0.023 (-3.40)**	0.034 (3.70)**
Rule of Law	***0.134*** ***(4.66)***	***0.164*** ***(5.11)***
Civil Liberties	***0.104*** ***(6.06)***	***0.027*** ***(1.86)****
Time Dummies	Yes	Yes
F (Rule of Law aw = Civil Liberties=0)	29.62	13.34
F stat	F(2, 2110)	F(2, 2110)
Decision	Reject	Reject
R2	0.07	0.14
Nr. Observations	2123	2123