Exchange Rate Regimes and Trade in Central and Eastern Europe

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Abstract:

This paper discusses the effect of exchange rate regimes on trade in Central and Eastern European countries. I will test to see if countries with pegged exchange rate regimes (i.e. more predictable exchange rates) experience more trade than countries with free floating exchange rate regimes (i.e. less predictable exchange rates). I will be using a standard gravity model with exchange rate regime country pairings as my variable of interest. I procured my data from the World Bank's World Development Indicators, the International Monetary Fund's Direction of Trade Statistics, the Organization of Economic Co-operation and Development database, and the World Atlas Online. My conclusion is that managed exchange rate regimes have a positive effect on bilateral trade flows when compared to free floating exchange rate regimes.

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I. Introduction

One of the oldest and most important policy decisions a country must make regards their exchange rate. Should they choose a fixed or flexible exchange rate regime, or something in between? Many countries have encountered crises that have interrupted their growth because they made a bad choice. Others have never experienced strong growth because of misguided decisions. Obviously exchange rate policies are not the only things that matter, but flawed exchange rate policies can derail even the strongest economy.

Past literature has analyzed the effects of exchange rate policy on many macroeconomic variables include GDP, exports, and trade (Balazs and Morales 2008, Rose 2000, and Adam and Cobham 2007). I will be focusing on which exchange rate regime encourages trade the most. I look at the effects on trade for three reasons. First trade is a measure of openness, which has a strong, positive effect on foreign direct investment (FDI) that can lead to future economic growth (Borensztein et al 1998). Openness is merely a metric for trade, and since the two are interchangeable and most of the previous literature refers to trade instead of openness, I will use trade in this study. Secondly, Central and Eastern European (CEE) countries, which I focus on in this paper, have already started making great leaps towards growing their bilateral trade. The ratio of trade to GDP in 2007 for most CEE countries was greater than one hundred percent compared to between thirty and sixty percent for most Western European countries (World Trade Organization).

The third reason for focusing on trade is that trade allows countries to reap the

benefits of comparative advantage. The benefits are lower prices which translate directly to a higher standard of living. Much of the previous literature has only focused on exports, excluding imports. Imports are very important to countries in CEE. For the countries in my data set, the ratio of imports to GDP was 0.31 in the year 2000 as well as 2005 (World Trade Organization). From this figure we can see how influential imports are in CEE countries. Import prices from Germany rose 77% between 2000 and 2008, which had a very strong adverse affect on CEE countries which import greatly from Germany (World Trade Organization). Countries in this region are geographically and economically smaller than their Western European neighbors, and because of their size, they rely more heavily upon imported goods. Therefore, an exchange rate regime that provides for a smooth transaction of goods from abroad could help ease prices in CEE countries.

CEE countries import many of their consumer goods and materials for the product market. Certain exchange rate regimes may provide for a more predictable exchange rate which would allow for easier movement of imports. Determining which exchange rate regime makes prices most stable and therefore supports ample movement of imports is very important to developing countries. If the exchange rate was very unpredictable due to a certain exchange rate regime, it would negatively affect the amount of imports a country would take in, adversely affecting their standard of living.

I will be using a gravity model to analyze data from the International Monetary Fund's *Direction of Trade Statistics* and The World Bank's *World Development Indicators* for the years 1994-2005 for a group of ten CEE countries. These countries are: Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Russia, Slovak Republic,

Slovenia, and Ukraine. Previous literature has stated the economic differences between advanced, emerging, and developing countries can prove essential to the actual effect of volatility or exchange rate regime on international trade (Husain et al 2004 and Klein and Shambaugh 2004). Because of this groups' special relationship with the European Union (EU), their experience with trade and exchange rate regimes may be different from other developing countries. Previous literature has failed to analyze the impact exchange rates have on this group of countries.

Because I am estimating the effect of exchange rate regimes on bilateral trade (where other researchers only estimated the effect on exports), I will be using a gravity model. This model puts more emphasis on the size and distance of the countries involved. Since all of these countries are relatively close geographically and of near equal size economically and population wise, this model seemed most appropriate.

Since I have a panel data set, I have to use random and fixed effects analysis in order to empirically estimate my model. This technique will take into account endogeneity issues in the data set. These issues include country-pair differences that are consistent throughout time periods as well as time trend issues. Without taking these issues into consideration, my estimations would be biased.

II. Literature Review

A large portion of literature focuses on the relationship between exchange rate regimes and the volatility that ensues from that specific regime. Many authors tie this volatility to other macroeconomic topics such as trade and exports. Rose (2000) initially broke the mold by analyzing the effect of currency unions on trade. Previously, the effect

of currency unions was synonymous with eliminating exchange rate volatility. He demonstrated empirically that joining a currency union increased international trade by three fold. He concluded that the reason for this huge increase was because currency unions last much longer than pegged exchange rate regimes. For this reason, long term investment takes place.

One of the faults of his study, however, is that many of the countries in his data set were small and underdeveloped. Between 1973 and 1976 (the span of his data set), very few countries had currency unions. Only small and poorer countries (like those located in the Caribbean) had them. He attempted to alleviate this problem by running multiple tests to find causes for the huge increases in trade. His results suggested that currency unions were the reason for this increase in trade.

Following in Rose's footsteps, Balazs and Morales (2008) focus on the effect of exchange rate volatility and regime on exports. They looked strictly at exports because they believed this was a general public policy goal of most emerging economies. They characterized the specific exchange rate regime of each of the ten CEE countries in my data set from 1990 through 2005. These regimes include but are not limited to: peg to a currency, managed float, or free float (five other classifications between these three are also used). I will consolidate these five other classifications into peg to a currency, managed float, and free float using the same method as Adam and Cobham (2007) in order to analyze the effect of exchange rate regime pairings on trade. Balazs and Morales (2008) used statistical methods to establish the de facto regime each country used opposed to the de jure regime the country said it was using. They also created a dummy variable for periods of high volatility regimes based on their de facto regime estimates.

They used breaks in volatility as dummy variables in their export model to see the effect of above average increases in volatility on exports. They then used time-series analysis to estimate the effect of exchange rate volatility on different export sectors for each country.

They concluded that CEE countries' exports are negatively impacted by exchange rate volatility. The manufacturing and chemicals export sectors were affected the most. Therefore, any country which had a greater share of their exports as manufacturing or chemicals was more adversely affected by exchange rate volatility. They believed this to be the case, because both of those sectors relied more heavily upon long term investment. Exchange rate volatility was perceived as an extra risk premium which made longer term investment less profitable than short term.

Dell'Ariccia (1998) uses a typical gravity model to estimate the effect of exchange rate volatility on trade. Incorporated in his model are dummy variables for membership in the European Union, sharing a language, and sharing a border. Dell'Ariccia (1998) uses fixed and random effects to take into account cross-country differences that may affect the coefficients of the estimators. He found evidence of a small but significant negative effect of exchange rate uncertainty on trade.

Bergin and Lin (2008) show that as you slowly progress from one regime to the next, there is this increase in trade. They compared the effects of currency unions on trade to the effects pegged regimes had. Their findings show that currency unions, due to being longer term than pegged regimes, promote greater amounts of trade at the extensive margin[1]. Pegged regimes increase trade at the intensive margin[2]. From peg to float the gain is at the intensive margin. From peg to currency union the gain is at the extensive

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[1] The extensive margin is when new firms are developed to export goods.

[2] The intensive margin is when already established firms decide to export to foreign countries.

margin.

Adam and Cobham (2007) compared the effect of different pairings of exchange rate regimes on trade. For example, whether trade is greater between two countries that both have floating exchange rate regimes or between countries that both have pegged regimes. In order to perform this research, they had to consolidate many different exchange rate regime systems into more specific classifications. I used their same specification in order to consolidate Balazs and Morales (2008) exchange rate regime classifications. Adam and Cobham (2007) also defined which country was the importer and which was the exporter, and then the possible combinations of regimes they could have. Lastly, they introduced a third country to see what effect trade between the previous two had on it. They tested for a trade diversion effect by two trading countries having similar regimes. In general, their results suggested that more fixed exchange rate regimes and lower transaction costs (sharing a currency) were influential on trade. In their conclusion section, they call for more specificity in future research because their data set included 175 countries for over fifty years. I intend to fill this gap in the literature by performing analysis on developing countries in CEE. Klein and Shambaugh (2004) and Husain et al. (2004) note that economic differences between advanced, emerging, and developing countries can prove essential to the actual effect of volatility or exchange rate regime on international trade. They state that in developing countries, pegs are associated with lower inflation and more durable regimes without increased risk of crises. However, in emerging economies, pegged regimes tend to be less durable and therefore encounter crises more frequently.

III. Methods and Data

The primary methodology I will be using comes from Dell'Ariccia (1999) and uses a simple gravity model to estimate trade. Using the gravity model I will estimate trade by examining both fixed and random effects. I will be using two-ways fixed effects analysis because it takes into account cross-country differences along with time trends that may affect the coefficients of the estimators. This will take into account differences between such countries as Russia and Croatia which trade in drastically different amounts. Also, the timing of my data set closely mirrors the transition of these CEE countries into a free market economy. This slow transitional process has no doubt acted to increase trade, and therefore time trends must be controlled for in the estimation process. One issue with the fixed effects technique is that it cannot include time invariant country-pair variables such as distance, which are important to my gravity model. For this reason I use the random effects technique which allow for the inclusion of these variables.

The standard gravity model with the addition of exchange rate regime pairings as my variable of interest is as follows.

$$\log(TRADE_{ijt})=\gamma_t+\alpha_{ij}+\beta_1\log(GDP_{it}GDP_{jt})+\beta_2\log(DIST_{ij})+\beta_3(pop_{it}pop_{jt})+$$
$$\beta_4BORD_{ij}+\beta_5EU_{ijt}+\beta_6LANG_{ij}+\beta_7Peg\_Peg_{ijt}+\beta_8Peg\_Man_{ijt}+\beta_9Peg\_Float_{ijt}+$$
$$\beta_9Man\_Man_{ijt}+\beta_{10}Man\_Float_{ijt}+\varepsilon_{ijt}$$

where the dependent variable in the gravity model is the log of bilateral trade between countries i and j at time t. The independent variables are the log of the GDP of both countries i and j multiplied at time t, the log of the distance between capital cities, log of the populations of countries i and j multiplied at time t, and finally dummy variables for sharing a border, language, or both countries being in the EU. My variables of interest are

Peg_Peg, Peg_Man, Peg_Float, Man_Man, and Man_Float which deal with exchange rate regime pairings for countries i and j at time t. These variables are binary in nature, meaning they are given a value of one if countries i and j have that pairing at time t, and value of zero otherwise. My control group is if both countries have a free floating exchange rate regime. The specification for which regime a country had during a given year was taken from Balazs and Morales (2008), and consolidated using Adam and Cobham's (2007) technique. Adam and Cobham's (2007) technique is to generalize narrower classifications into broader ones in order to have less pairings.

Intuitively, the volume of trade between two countries increases with the product of their GDPs and decreases with their geographical distance. Countries with relatively larger populations should also trade more, and I expect to see population have a positive effect on trade. If countries share a language, they are able to more easily communicate and conduct business with each other. This should allow for lower transaction costs and greater trade. Also, if the countries share a border, their distance is obviously very small and they likely share cultural similarities being so geographically close. Both of these characteristics should decrease transaction costs. Lastly, if both countries are members of the European Union, they should trade more because the EU is a trade union free of tariffs and quotas. All three of these dummy variables are expected to have a positive effect on bilateral trade flows. The individual country-pairing characteristics that are constant over time and the time trend effect is represented by a set of dummy variables $\alpha_{ij.}$

My variables of interest, Peg_Peg, Peg_Man, Peg_Float, Man_Man, and Man_Float, are expected to have a positive effect on trade flow when compared to their

control group. Obstfeld and Rogoff (1995) noted that the unpredictable volatility of a floating exchange rate can inflict both short and long term damage on a countries level of international trade. This being the case, I would expect that the more fixed (pegged) the currency, and the more predictable exchange rate volatility is and therefore the more trade is encouraged. It would seem that pairings where both countries have a pegged exchange rate regime will have the most predictable exchange rate volatility, and will have the greatest positive effect on trade. As country's regimes float more, the more unpredictable their exchange rate is and therefore less trade occurs. Accordingly, I expect my Peg_Peg variable to have the largest positive effect on trade followed by Peg_Man, Peg_Float, Man_Man, and lastly Man_Float in that order. The more predictable the exchange rate, the more likely trade will be fostered. I expected all of my variables of interest to have a positive effect because these pairings offer more exchange rate predictability than my comparison group of both countries having free floating exchange rate regimes.

My data comes from several sources; the first source being the Direction of Trade Statistics which provided me with bilateral trade data. The World Bank's World Development Indicators Online provided me with population and GDP data. Balazs and Morales (2008) provided me the classifications of each countries' exchange rate regime during my time period. I will use their consolidated classifications for my variable of interest. Country specific data such as language, border, distance, and membership in the EU was collected from the Organization of Economic Co-operation and Development database and World Atlas online.

IV. Results

The results for my two way fixed effects estimation are presented in the Appendix

Table 4. My results show that four variables were statistically significant: the GDP variable which is strongly significant at almost the one percent level, the Peg_Man and Man_Man variables at the five percent level, and Man_Float which is the most statistically significant variable with a p-value of 0.002. The GDP estimate shows that if both countries' multiplied GDPs increases by one percent, then trade between those countries will increase by 0.2815%. This is the positive effect I associated with the GDP variable.

The Peg_Man dummy variable estimate showed that if one country had a pegged exchange rate system while the other had a managed float, then trade would increase by 26.13% compared to a country pairing where both countries had a floating exchange rate system. This is an extremely large increase in trade that follows my reasoning; the more predictability in the exchange rate due to the regime, the more likely trade will be encouraged. The Man_Man dummy variable indicated that if both countries had a managed float exchange rate regime, then trade would increase by 25.72% when compared to a country pairing where both countries had a floating regime. This is also a large positive effect which is slightly weaker than the more rigid Peg_Man variable. It also follows the logic that the added predictability of both countries having a managed float should increase trade. My last statistically significant variable of interest, Man_Float, showed that compared to a country pairing where both regimes were floating, trade increases by 28.98% when one country has a managed float while the other has a free float regime. This variable's effect being greater than the Peg_Man variable, which theoretically has a more predictable exchange rate, is quite surprising. A possible explanation could lie in the fact that all three of my statistically significant variables of

interest involved the managed float regime.

The managed float regime may be most optimal for trade for two reasons. First, currency boards[3] must keep the exchange rate between certain margins, which gives importers and exporters the predictability in the exchange rate they want. Secondly, most stable developing countries in my data set have a managed float regime. Pegged regimes are often kept by countries that are financially or economically weak. The Czech Republic, Slovakia, and Hungary all had a pegged exchange rate regime during their initial emergence from communism and slow construction of their state. Therefore, even though a pegged regime offers traders the predictability they want, the climate for trade is not as conducive as it would be in a more economically strong state. Lastly, I am glad to note that my other two variables of interest, Peg_Peg and Peg_Float, had a positive sign on their coefficient which is what I expected. However, since the results are statistically insignificant, I cannot infer anything.

To be noted is the lack of estimate for the log of distance, border, and language variables which were all lost in the country specific intercept. This is due to my use of the two-ways fixed effects estimation which controls for individual country pair differences. Using two-ways fixed effects for the gravity model is a definite limitation of my research.

Even though the other variables in the gravity model, EU and log of populations multiplied, proved to be statistically insignificant, I find their estimations to go against my intuition. The dummy for EU and log of the product of the two countries' populations both have negative estimates. For the EU dummy variable this means that if both

[3] Currency boards are in charge of managing a country's currency. They are the active arm of a country's monetary body. In the case of the pegged regime, they must act to keep the currency in line with the currency they are mimicking. In the case of a managed float, they must act to keep the currency within a certain bound around the currency they are mimicking. In most cases the Euro for CEE countries.

countries were part of the EU, compared to either country or both countries not being in the EU, trade would decrease by 4.71%. This could be due to uneasy transitions into the EU, or possible restructuring of trade contracts because of a country's entrance. For the log of the product of the two countries' populations variable, if their multiplied populations grew by one percent, then trade would decrease by 0.588%. This goes against my intuition discussed in the methodology section. Previous research has shown joining a currency and trade union, especially one as large as the EU, to have a positive effect on trade (Rose 2000). Also, the population variable in the gravity model is expected to have a positive effect, because larger countries are expected have larger markets with greater room for trade compared to smaller ones.

The Hausman Test shown in the Appendix Table 3 indicates that fixed effects analysis should be used over random effects. In this test, the null hypothesis is that random effects analysis is more efficient than fixed effects. The alternative would be that fixed effects should be used instead of random effects because the random effects model is biased. The p-value of 0.0005 indicates that at the ninety-nine percent confidence interval, we can reject the null hypothesis. Therefore, the Hausman test shows that we should use fixed effects analysis instead of random effects because random effects is biased. Also, an F-statistic p-value of less than 0.0001 from my fixed effects' output shows me that I should use my fixed effects estimation. The null hypothesis here is that I should not use my fixed effects estimation, but with a p-value less than 0.0001 I can reject the null. Economically, it means that at least one of my fixed effects' variables matter (or one variable estimate is different from zero). However, since the random effects model includes independent variables my fixed effects model excludes (the

distance, border, and language variables) I will include it in my analysis, but realize that the fixed effects estimation is the stronger of the two. The random effects output is also included in the Appendix Table 3.

Both the random effects and fixed effects output have the GDP variable being statistically significant while the population and EU variables are statistically insignificant. In the random effects model, though, the population and EU variables have the expected positive sign; meaning that if a country joins the EU trade union and has an increase in population, it should in turn have an increase in trade. The estimates for the distance, border, and language variables also have the expected signs on their coefficients. The distance variable is barely statistically insignificant with a p-value of 0.1346. The negative sign on its coefficient is right in line with my methodology, however, showing that the larger the distance (greater the transportation costs) the less trade occurring.

The border and language variables proved to be statistically significant at the ninety-five percent confidence interval. If trading countries share a border, then trade is increased by 82.76%. If trading countries share a language, then trade is increased by 118%. Both of these variables have a very significant economic impact on trade. These variables show that if countries share similarities and a border, they are more likely to trade between each other. As stated earlier, sharing a border and language can also mean that the countries share a history and have similar cultures (in the case of Czech Republic and Slovakia and Croatia and Slovenia).

Both the language and border variable have a greater effect than the GDP variable on trade according to the random effects output. However, the GDP variable in my

random effects model has a greater effect on GDP than in my fixed effects model (0.784 compared to 0.2815). Counter to my fixed effects model, none of my variables of interest are statistically significant in my random effects model. The random effects estimation provided a better or more expected result for my standard gravity model independent variables. However, my fixed effects estimation provided me with better results for my variables of interest.

V. Conclusion

Exchange rate regimes are an exceptionally important part of monetary policy for countries, and are even more important for emerging and developing countries. Exchange rate regimes have been proven to affect many macroeconomic variables, and I set out in this paper to test their effect on trade in CEE countries. I stressed trade (exports plus imports) when other researchers have not, because trade is very important to developing countries like those in CEE. Export growth is a policy goal of most countries because it provides an avenue for domestic companies to grow outside their national realms, and allows for foreign currency to flow into the country. Imports are important as well, because they directly affect the standard of living in developing nations. The smooth flow of imports allows people to consume goods otherwise not produced (or not produced as cheaply) in their domestic market. Through imports consumers can enjoy the benefits of comparative advantage.

The fixed effects results for my paper point to the GDP, Peg_Man, Man_Man, and Man_Float variables being statistically significant. The random effects results conclude that the GDP, border, and language variables are also statistically significant in describing

trade between countries. The GDP variable implied that as countries' multiplied GDPs grow by one percent, then trade will increase between these countries by either a 0.784% or 0.2815% depending on the estimation method used (random effects and fixed effects respectively). This positive result is intuitive because as countries' GDPs rise, they are expected to trade more as they become wealthier. They will import more goods from abroad as their income rises, and they will have more products to export as their production increases.

The Peg_Man, Man_Man, and Man_Float binary variables were all statistically significant and had large, positive effects on trade. Notably, all three variables include at least one country which had a managed float regime. This tells us that managed float regimes are what increase trade, and therefore more countries should implement them. I believe that managed float regimes have this positive effect, because they offer the predictability that traders need and are the exchange rate regime often kept by "stable" developing countries in my data set. I expected pegged exchange rate regimes to have the largest positive effect on trade when compared to floating regimes, because they offer the most predictability in the exchange rate. However, in my data set the countries with pegged regimes are in "unstable" economic times. For example, Bulgaria had a pegged exchange rate regime from 1997 through 2005. This was the exact same time they were recovering from a deep recession with double digit unemployment and inflation (the inflation lasted through 2008).

Theoretically, then, I believe that "unstable" countries use a pegged exchange rate regime to stabilize themselves. In this case, trade would be lower with these unstable countries, because they are "unstable". Since "stable" countries also employ free floating

regimes (notably Poland, Czech Republic, and Slovakia in their build up to EU entrance), there must be a reason that managed float regimes are better than free floating regimes in my results. My conclusion is that the improved predictability of the exchange rate in the managed float regime is the reason for its superiority to the free floating regime. That is why my variables of interest which involved managed float regimes have the statistically significant positive effect I observe. They are countries enjoying mostly "stable" economic times, while having a regime that offers the predictability in the exchange rate that free floating regimes do not.

By switching from their current exchange rate regime to a managed float, countries can increase their bilateral trade which has the positive connotations discussed previously. My random effects model showed me that as countries share similarities (geography, language, culture, history, etc.) they are more likely to trade between each other. Economically, this may deal with lower transaction costs because the countries have a better understanding of each other and are more easily able to communicate.

Due to my results, my conclusion is that the GDP, border, language, Peg_Man, Man_Man, and Man_Float variables have a positive effect on trade. I believe, however, that the distance, EU membership, and population variables are relevant, but proved to be statistically insignificant due to the estimation techniques and data set used. Using two-ways fixed effects on a gravity model is a limitation on my paper because it controls for distance which is a major aspect of the gravity model. Another limitation is my model not controlling for the amount of reform CEE countries undertook during their transition from communism to more open economies, which is part of the time period my data set covered (1994-2005). By using some measure or proxy to control for reform (like the

Heritage Foundation's Index of Economic Freedom), I would expect improved results. I left this variable out due to time constraints. The amount of economic freedom is a good proxy for reform because countries generally increase these freedoms as they reform from closed, communist economies to open ones. Also, the Index shows how much a country has improved its economic and political openness, both of which have been shown to increase trade (Holland and Pain 1998).

I have mixed impressions regarding my fixed and random effects models. The large r-squared of 0.9336 for my fixed effects model shows that it is very effective in describing the variation in the data, but the low r-squared of 0.3361 for my random effects model shows that it is quite poor. However, since only four of my independent variables were statistically significant in my fixed effects estimation and three in my random effects estimation in an often used econometric model, I am open to possible alternatives (a new variable) to improve my results.

Econometrically, I was not able to perform time series analysis which would have controlled for autocorrelation issues. There is a potential issue of autocorrelation, because trade contracts can be written for greater than one year durations, which means there is a possibility that trade in year t is affected by trade in year t-1. This issue of autocorrelation is a limitation of my paper, and controlling for it would have improved my estimation by relieving some of the bias it creates. By controlling for autocorrelation, trade in year t would be unaffected by trade in year t-1.

According to my results, however, there is some positive effect upon trade by exchange rate regime pairings that have more predictability in the exchange rate compared to that of a pairing where both countries are free floating and therefore offer

most unpredictability. A managed float regime proved to be most effective; therefore central bankers of developing countries (especially those in CEE) should transition their exchange rate regime to one of a managed float. Future researchers may receive improved results by minding my limitations.

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VII. Appendix

Table 1: Description of the variables used in the analysis

Variable name	Variable description
$\log(Trade_{ijt})$	Log of bilateral trade between countries i and j at time t.
$\log(GDP_{it}GDP_{jt})$	Log of GDP's of country i and j multiplied at time t.
$\log(DIST_{ij})$	Log of the distance between capital cities of countries i and j.
$\log(pop_{it}pop_{jt})$	Log of the populations of countries i and j multiplied at time t.

$BORD_{ij}$	Dummy variable concerning both countries sharing a border. If country i and j border, then the dummy variable is given a value of one; otherwise zero.
EU_{ijt}	Dummy variable concerning both countries membership in the European Union. If both countries i and j are in the European Union in year t, then the dummy variable is given a value of one; otherwise zero.
$LANG_{ij}$	Dummy variable concerning both countries sharing a language. If both countries i and j share a language, then the dummy variable is given a value of one; otherwise zero.
Peg_Peg_{ij}	Dummy variable concerning the pairing of both countries exchange rate regime. If country i and j both have a pegged exchange rate regime system, then the dummy variable is given a value of one; otherwise zero.
Peg_Man_{ij}	Dummy variable concerning the pairing of both countries exchange rate regime. If country i has a pegged exchange rate system while country j's system is a managed float, then the dummy variable is given a value of one; otherwise zero.
Peg_Float_{ij}	Dummy variable concerning the pairing of both countries exchange rate regime. If country i has a pegged exchange rate system while country j's system is a free float, then the dummy variable is given a value of one; otherwise zero.
Man_Man_{ij}	Dummy variable concerning the pairing of both countries exchange rate regime. If country i and j both have a managed float exchange rate regime system, then the dummy variable is given a value of one; otherwise zero.
Man_Float_{ij}	Dummy variable concerning the pairing of both countries exchange rate regime. If country i has a managed float exchange rate system while country j's system is a free float, then the dummy variable is given a value of one; otherwise zero.
$Float\_Float_{ij}$	Dummy variable concerning the pairing of both countries exchange rate regime. If country i and j both have a free floating exchange rate regime system, then the dummy variable is given a value of one; otherwise zero.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
Trade	1,250,103,185	2,272,828,767	1,600,000	20,154,000,000
GDPxGDP	5.6869E+21	1.0382E+22	1.3691E+20	9.5221E+22
PopxPop	6.8846E+14	1.3938E+15	8.8033E+12	7.7018E+15
Distance (km)	869	463	116	1936
EU	0.03704	0.18903	0	1

Border	0.3333	0.47184	0	1
Language	0.0667	0.24968	0	1
Peg_Peg	0.0241	0.15342	0	1
Peg_Man	0.1778	0.38268	0	1
Peg_Float	0.1278	0.33415	0	1
Man_Man	0.1963	0.39756	0	1
Man_Float	0.3426	0.47502	0	1
Float_Float	0.1315	0.33842	0	1

Note: The composite of the means of my variables of interest is 1.0001 due to rounding in the reporting of my descriptive statistics.

Table 3: Two-Stage Random Effects Output

Variable	Parameter Estimate	Standard Error	p-value
lnGDP_GDP	0.783969	0.0621	<.0001
lnpop_pop	0.140468	0.1159	0.2260
lndistance	-0.49946	0.3333	0.1346
EU	0.058045	0.1278	0.6498
Border	0.827565	0.3329	0.0132
Language	1.179945	0.4958	0.0177
Peg_Peg	0.171075	0.1698	0.3142

Peg_Man	0.06254	0.1095	0.5683
Peg_Float	0.067968	0.1107	0.5395
Man_Man	-0.07173	0.1083	0.5079
Man_Float	0.10689	0.0916	0.2437
R-Squared	0.3361		
Degrees of Freedom	528		
Hausman Test	DF=8	m Value=2.78	Pr>m: 0.0005

Table 4: Two-Stage Fixed Effects Output

Variable	**Parameter Estimate**	**Standard Error**	**p-value**
lnGDP_GDP	0.281462	0.1145	0.0143
lnpop_pop	-0.58803	1.5036	0.6959
lndistance	0	0	.
EU	-0.04706	0.1370	0.7313
Border	0	0	.
Language	0	0	.
Peg_Peg	0.217416	0.1759	0.2170

Peg_Man	0.26129	0.1191	0.0287
Peg_Float	0.182255	0.1163	0.1177
Man_Man	0.257164	0.1191	0.0313
Man_Float	0.289816	0.0931	0.0020
R-Squared	0.9336		
Degrees of Freedom	476		
F-value	45.02		Pr > F: <0.0001