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DOLLARIZATION AND TRADE

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ABSTRACT

Dollarization has been suggested as a policy that might, among other goals, promote trade between a country adopting the dollar and the United States. Evidence supporting this conjecture could be drawn from a recent series of papers by Rose and co-authors who show that a currency union increases bilateral trade among its members, and that this effect is both large and statistically significant. In this paper we show that this result is not robust if we consider bilateral United States trade (even though the United States accounts for 60 percent of all observations of currency unions between industrial and non-industrial countries), nor if we consider bilateral trade of countries that have adopted the United States dollar, like Panama. Furthermore, the effect of dollarization on trade with the United States is not statistically distinct from the effect of a fixed dollar exchange rate on trade with the United States.

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I. Introduction

In the ongoing controversy over the appropriate exchange rate regime, events of the 1990s have led some to the "bipolar view" that countries should either allow their currencies to float or opt for a hard peg, like a currency union or dollarization.[1] The hard peg option is seen as having two potential benefits; providing a nominal anchor for macroeconomic stability, and fostering trade integration between an emerging market country and the industrial country to which it links its currency.[2]

The conjecture that currency unions foster trade integration could be supported by reference to a series of papers solely authored and also co-authored by Andrew Rose.[3] Rose and his co-authors demonstrate that membership in a currency union has a large, statistically significant effect on bilateral trade patterns. Using data sets with tens of thousands, or even hundreds of thousands, of observations on the volume of bilateral trade, and augmenting a gravity model analysis with a dummy variable that indicates membership in a currency union, a typical result is that the coefficient on the currency

[1] Stanley Fischer (2001) offers an overview of this debate. It is worth noting at the outset that a currency union and dollarization are conceptually distinct. A currency union involves the establishment of a new central bank that may be administered by representatives from all countries using the new transnational currency. Dollarization, in contrast, implies the adoption of the currency of another country (typically the US dollar). While "currency unions" between non-industrial countries and either the United States or Australia are better characterized as cases of dollarization, we will use these terms interchangeably.

[2] For example, Andrew Berg and Eduardo Borensztein (2000) write "Dollarization may also bring other benefits: closer integration with both the United States and the global economy would be promoted by lower transaction costs and an assured stability of prices in dollar terms." Rudiger Dornbusch (2001) writes "There is a whole range of economies that are doing all right (say, Hungary or Mexico) that would benefit from the immediate introduction of currency boards to deepen economic integration and hence build much better growth prospects." (p. 242). Alberto Alesina and Robert Barro (2001) state that Mexico and many Central American should be interested in dollarization, based on, among other factors, their trade with the United States.

[3] These include Andrew Rose (2000), Jeffrey Frankel and Rose (forthcoming), Reuven Glick and Rose (forthcoming), and Rose and Eric van Wincoop (2001).

union dummy variable is highly significant and its value suggests that membership in a currency union, *ceteris paribus*, nearly quadruples bilateral trade.[4] Based on these results, Rose and van Wincoop (2001) conclude that "Reducing these [trade] barriers through currency unions like EMU or dollarization in the Americas will thus result in increased international trade." Frankel and Rose (forthcoming) offer estimates suggesting that dollarization would raise the trade-to-GDP ratio substantially in many Western Hemisphere countries.[5]

In this paper, we show that there is little robust evidence that dollarization promotes greater trade with the United States, especially among those countries that are the most likely candidates for dollarization.[6] These results contrast with those of Rose and his co-authors. The source of this difference is that this paper focuses on bilateral trade for sets of dyads in which one country is the United States or sets of dyads in which one country has a currency union with the United States (e.g., Panama). In the face of possible parameter heterogeneity, results from these sub-samples offer a more precise gauge of the effect of dollarization than do results from the much wider samples used by

[4] For example, Frankel and Rose (forthcoming) present an estimated coefficient on the currency union dummy variable of 1.38 in their Table 1, with an associated standard error of 0.19. This result suggests that membership in a currency union raises bilateral trade by a factor of 3.97, *ceteris paribus*, since the regressand is the logarithm of trade and $e^{1.38}=3.97$. This result is cited in Rose and van Wincoop (2001).

[5] See their Table V. Some estimates include an increase in trade-to-GDP of 39 percentage points in Guatemala, 24 percentage points in Chile, 91 percentage points in Costa Rica, 7 percentage points in Brazil and 93 percentage points in Mexico.

[6] Other work that revisits the analysis of the effect of membership in a currency union on trade includes Volker Nitsch (forthcoming, 2002a, 2002b), Torsten Persson (2001), Michael Pakko and Howard Wall (2001) and Silvana Tenreyro (2001). Sebastian Edwards (2001) presents evidence on other effects of dollarization, including inflation performance, growth, fiscal performance and the incidence of major current account reversals.

Rose and his co-authors.[7] It is worth noting that dyads that include the United States account for 60 percent of the cases of currency unions between industrial and non-industrial countries that have complete data and can be used in the empirical analysis.[8] In fact, the only industrial country other than the United States that has usable data for sustained currency unions with more than one country in the post-Bretton Woods era is Australia, which had currency unions with the small island nations of Kiribati, the Solomon Islands and Tonga. Dyads including Australia represent another 25 percent of all dyads with currency unions between industrial and non-industrial countries.

One might expect to find larger estimates of the effect of currency unions on trade in the sub-sample of dyads in which one country is the United States, as compared to the wider samples used by Rose and his co-authors, since, presumably, countries in sustained dollar currency unions are those that most benefit from membership and increased trade with the United States is one such benefit. However, this is not the case. For example, as shown in Section II.1, the coefficient on the currency union dummy variable is highly significant for the full sample, and even larger and almost as significant for trade between industrial and non-industrial countries. But, as shown in Section II.2, the coefficient on the currency union dummy variable is only about one-third as large using the sample of

[7] A related question linked to the issue of parameter stability across subsets of the wide sample has to do with the likely trade effects of EMU. The only observations in the samples used by Rose and his co-authors that represent a currency union between industrial countries are those of trade between Great Britain and the Republic of Ireland. Rodney Thom and Brendan Walsh (2001) conclude that this currency union had only a negligible effect on trade, a result that Glick and Rose (forthcoming) maintain "cannot be reasonably generalized." (p. 9). Nitsch (2002b) concludes that the currency union between Belgium and Luxembourg did not lead to a significant increase in trade between these countries.

[8] Here, countries with an IFS identification number less than 200 are classified as "Industrial" while those with an IFS identification number greater than 200 are classified as "Non-Industrial." See the appendix for a list of "Industrial" and "Non-Industrial" countries.

dyads in which one country is the United States. This coefficient is not significant at the 5 percent level for all United States bilateral trade, and it is not significant at the 10 percent level when we slightly modify the way in which one of the control variables is defined, or when we restrict the sample to all United States trade with non-industrial countries. If we hone in even more closely on a sub-sample that reflects current and potential candidates for dollarization, by considering dyads consisting of the United States and other Western Hemisphere countries (a sub-sample that consists of almost 90 percent of the actual currency union observations for the United States), we find that the currency union coefficient is about one-fifth of its full sample value and is not significant at the 25 percent level. Furthermore, as shown in Section II.3, regressions using dyads centered on countries that had a currency union with the United States fail to offer significant coefficients on currency unions.

The regressions presented in Section II.4 consider the effect of a sustained fixed dollar exchange rate, as well as a currency union, on trade with the United States. The inclusion of the dummy variable for a fixed dollar exchange rate raises the significance of the currency union dummy variable, but not beyond the 20 percent level for a regression using the sample consisting of trade between the United States and other Western Hemisphere countries. These regressions also show that dollarization does not have an effect on trade with the United States that is statistically distinct from the effect of maintaining a fixed dollar exchange rate, even though it is often maintained that dollarization is somehow different than a fixed exchange rate along this dimension.

The one case in which we do find a robust effect of dollarization on trade is for currency unions with the Australian dollar rather than the greenback. These results are

presented in Section II.5. But, as noted above, this result is based on currency unions for three very small island nations and one may not want to generalize this result.

II. Currency Unions and Bilateral Trade

The basic approach used to determine whether a currency union promotes trade, first employed by Rose (2000), is to augment a gravity model of trade flows with a dummy variable representing membership in a currency union. The time-series cross-section model has, as its dependent variable, the logarithm of bilateral trade denominated in thousands of real American dollars. The regressors include, along with a dummy variable indicating membership in a currency union, the logarithm of distance between the countries, the logarithm of the product of their real national incomes, the logarithm of the product of their real per capita national income, the logarithm of the product of their land areas and dummy variables representing the presence of a common border, a common language, a free trade agreement, a common colonizer, political union, and whether one country is an ex-colony of another. The specification of all of the regressions in this paper replicates the functional form used in Glick and Rose (forthcoming) that includes, along with these regressors, fixed effects for years.[9] The data set used in this paper, which is from Glick and Rose (forthcoming), includes annual observations on 165 countries (27 industrial countries and 138 non-industrial countries).[10]

[9] Rose states on his website that he is most favorably disposed towards the fixed effects method used in Glick and Rose (forthcoming). Two authors applying alternative estimation methods to these data are Persson (2001), who uses a matching technique, and Tenereyro (2001) who corrects for possible sample selection bias.

[10] Rose makes other data sets on currency unions and trade available on his website but he states that these data have been the most extensively checked. As noted in Glick and Rose (forthcoming), there are many gaps in the data due to both missing data and values of trade that

Glick and Rose (forthcoming) use data from 1948 to 1997, but in this paper we focus on data from the post-Bretton Woods period and all regressions use data from 1974 to 1997, inclusive.[11]

II. 1 Full Sample Results

We begin by presenting two regressions, one that uses the full sample of dyads and another in which the sample consists of dyads representing trade between industrial countries and non-industrial countries. Table 1 reports the estimates from these regressions, with the full sample results in Column I and the results from the regression using the sub-sample consisting of trade between industrial countries and non-industrial countries in Column II. This table also reports the number of total observations used in the regression, the number of observations in which there is a currency union between two countries, the percentage of total observations accounted for by dyads with a currency union, and the geometric average of the bilateral trade variable.

The results in this table are typical of those presented by Rose and his co-authors. For the full sample (Column I), the coefficient on the currency union dummy variable equals 1.52 and the associated t-statistic is 9.11. This result suggests that a currency union increases trade by a factor of 4.57 (exp(1.52) = 4.57), *ceteris paribus*. This result is based on a sample with 152,960 observations, representing trade flows among 165

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equal zero which, when the logarithm of trade is calculated, are set to missing. The appendix lists the countries represented in the data set.

[11] We focus on the post-1973 period since the effects of dollarization on trade would likely be stronger when the rest of the world is not on a dollar-based exchange rate standard since, after the Bretton Woods era, there is a greater distinction between dollarization and the exchange rate arrangements of the rest of the world.

countries, a sample that includes 1,783 dyads with currency unions (1.17 percent of the total sample). As shown in Column II, the estimated effect of a currency union on trade between industrial and non-industrial countries is even larger, increasing that trade by a factor of 5.53 (= exp(1.71)), *ceteris paribus*. The coefficient on the currency union dummy variable is significant at more than the 99 percent level of confidence in this sample, which includes 65,059 observations, with 175 of them representing dyads in which there is a currency union (0.27 percent of the sample). In both regressions, almost all the other regressors are significant at the 99 percent level of confidence.

II. 2 Dollar Currency Unions and United States Bilateral Trade

We next consider a sample in which each observation represents trade between the United States and another country. This sample selection enables us to gauge more precisely, in the face of possible parameter heterogeneity, the effects of dollarization on trade. To begin, we list in Table 2 all the countries that had a currency union with the United States in the post-Bretton Woods era and that had data for all variables used in the regression, and the years during which they had a currency union with the United States. For the sake of completeness, we also list all other currency unions in the post-1973 sample in which one of the countries is an industrial country and for which complete data are available such that the observations can be included in the regression analysis.[12] As shown in Table 2, the countries that joined currency unions with industrial countries were

[12] Observations in the data set that represent currency unions between industrial and non-industrial countries in the post-Bretton Woods era, but do not have complete data, include three currency unions involving the United Kingdom (with the Falkland Islands, Gibraltar and St. Helena), two currency unions involving Australia (with Nauru and with Tuvalu), and the currency unions between the United States and Guam, and between France and St. Pierre & Miquelon.

generally quite small. Among the usable, post-1973 data, dyads that include currency unions with the United States account for 60 percent of all dyads between industrial countries and non-industrial countries in which there is a currency union, and dyads that include currency unions with Australia account for another 25 percent of the total.

Table 3 reports the results for gravity equations augmented with a currency union dummy variable in which each dyad includes the United States as one of the trade partners. Columns I.a and I.b in this table report regressions in which the sample includes United States bilateral trade with all countries in the sample. The first column uses the Glick and Rose data without modification. In this case, the coefficient on the currency union dummy variable is 0.50, with an associated p-value of 0.065. Thus, this estimate suggests that a U.S. dollar currency union increases trade by 65 percent (exp(0.5)=1.65), but this result, significant at the 93.5% level of confidence, is much less precise than those from the full sample cited above.

This result, however, is sensitive to a slight modification of the value of the dummy variable that represents whether one country in the dyad was a former colony of the other country in the dyad. In the Glick and Rose data set, the ex-Colony dummy variable equals 1 for two sets of dyads involving the United States: the United States and the Philippines and the United States and the United Kingdom. In the Column I.b in Table 3, we modify this definition of ex-Colony for the United States by including both the United States – United Kingdom dyad as a separate dummy variable and by scoring the Unite States – Liberia dyad as one representing a former colonial relationship.[13] The

[13] Liberia, the only country outside the Western Hemisphere that had a currency union with the United States in the post-Bretton Woods era, was founded in 1822 as a result of the efforts of the American Colonization Society to settle freed American slaves in West Africa. Over the course of forty years, about 12,000 slaves were voluntarily relocated. The colony became the Free and

results in this column suggest that it is important to separate a dummy variable for United States – United Kingdom trade from that of the other two colonial relationships since the coefficient on the US – UK trade dummy variable is negative whereas the coefficient on the newly defined ex-Colony dummy variable is positive, and both coefficients are significant at better than the 99 percent level of confidence. But more to the point, with the inclusion of Liberia as an ex-colony of the United States, the coefficient on the currency union dummy is no longer significant at standard levels of confidence, with its p-value equal to 0.146 and its value falling by 30 percent to 0.35.[14]

Most of the countries that are seen as potential candidates for dollarization are non-industrial countries. Column II of Table 3 investigates the estimated effect of currency unions on trade between the United States and non-industrial countries.[15] The sample used in this regression includes 2,870 observations, which is 83 percent of the number of observations in Column I, but with the same 105 dyads representing currency unions as in the regressions reported in Column I. Note that the average level of trade between the United States and non-industrial countries is almost twice that of the average level of trade between all industrial countries and non-industrial countries. Comparing the regression results in Column II with those in Column I.a (since we keep the original

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Independent Republic of Liberia in 1847. The English-speaking Americo-Liberians, descendants of former American slaves, make up only 5% of the population of Liberia, but have historically dominated its intellectual and ruling class. (from the Learning Network site www.infoplease.com/ipa/A0107718.html).

[14] If we have the only modify the ex-Colony dummy variable by changing its value from 0 to 1 for the US – Liberia dyad then the coefficient on the currency union dummy variable is 0.45 and the associated t-statistic is 0.25, resulting in a p-value of 0.076.

[15] See the appendix for a list of all the countries used in the regression analysis, including the breakdown into those that are non-industrial and those that are in the Western Hemisphere.

Glick and Rose ex-Colony variable), we see that most of the coefficients in Column II are quite close to their values in Column I.a, but the significance of the currency union dummy variable has now decreased such that its p-value is 0.126.[16]

A further refinement of the sample considers only trade between the United States and countries in the Western Hemisphere since these countries are the most likely candidates for a dollar currency union (as opposed to countries outside the Western Hemisphere that may be candidates for linking their currencies to the euro or some other currency). The average level of trade in this sub-sample is more than triple the average level of trade between the United States and all non-industrial countries. Column III of Table 3 presents the results of a regression in which one member of each dyad is the United States and the other member is a country in the Western Hemisphere. This sample includes 764 observations, 12 percent of which represent currency unions, a figure that is much larger than in the other sub-samples. While distance, the product of countries' GDP, and common language retain their significance in this regression, the currency union dummy variable does not (nor do some of the other control variables). The p-value of the currency union dummy variable in this regression is 0.267.[17]

[16] If we include Liberia as an ex-Colony, the coefficient on the currency union dummy variable is 0.28, with a standard error of 0.25, which implies a p-value of 0.267.

[17] The only industrial country trading with the United States in this sample is Canada. If we exclude Canada from the Western Hemisphere sample, the average level of trade is $3,003,233 thousand. In a regression with all Western Hemisphere countries but for Canada, the coefficient on the currency union dummy variable is 0.29, with a standard error of 0.27, resulting in a p-value of 0.279.

II. 3 Bilateral Trade of Countries Linked to the Dollar

The results presented in the previous section cast doubt on whether the United States trades more with countries that have dollarized. A related, though distinct, question is whether countries that have dollarized trade more with the United States than with other countries. This question is addressed by the regression results in Table 4. Each column in this table reports a regression in which the observations are all the dyads that include the country listed at the head of the column. These countries are the ones listed in Table 2 that had a currency union with the United States in the post-Bretton Wood era. For reasons discussed in more detail below, we also include regressions representing Argentine trade in Table 4.

The results in Table 4 provide little evidence that linking to the U.S. dollar promoted greater trade with the United States.[18] The only case where there is a positive and significant coefficient on the currency union dummy variable is for the Dominican Republic, in which case the estimated value of the coefficient is 0.83 and its associated p-value is 0.06. In the other two cases in which the estimated coefficient is positive, the Bahamas and Liberia, the p-values are 0.189 and 0.311, respectively. The estimated coefficients on the currency union dummy variables are negative for the regressions for Bermuda, Guatemala and Panama, although none of the associated p-values are less than 0.13.

Table 4 does provide an example, however, of an estimated currency union coefficient that is both negative and significant (at better than the 10 percent level of

[18] Furthermore, one might expect that these countries were the most likely to have demonstrated trade benefits from a currency union since they did, in fact, choose to dollarize. Alesina and Barro (2001) present a model in which the country that most gains from adopting the currency of another country is one that is small, open, and has its trade centered with one particularly large partner.

confidence). Argentina adopted the peso on January 1, 1992, with its value pegged to the United States dollar at a rate of one peso to one dollar. This currency board continued until December 2001, four years beyond the end of the sample of trade data available to us. The column labeled "Argentina" in Table 4 reports an estimate of a regression for all bilateral Argentine trade in which the currency union dummy variable is set equal to 1 for the years 1992 – 1997. As shown in that column, the estimated coefficient on the currency union dummy variable is –0.57, with a standard error of 0.31, resulting in a p-value of 0.068.[19]

II. 4 Dollarization Versus a Fixed Exchange Rate

Rose (2000) distinguishes between the effect of a currency union on trade and the effect of a fixed exchange rate on trade, writing "…a very stable exchange rate may not be the same as membership of a common currency area. Sharing a common currency is a much more serious and durable commitment than a fixed rate." (pp. 10-11). Rose tests whether the effect of a currency union on trade goes beyond its effect on stabilizing the exchange rate by including various measures of exchange rate volatility, along with the currency union dummy variable and the other regressors discussed above, in the gravity trade equation. Rose finds that exchange rate volatility enters the regression with a negative and significant coefficient. More to the point, the coefficient on the currency union dummy variable is significant, even with the inclusion of exchange rate volatility as a regressor.

[19] While the decision to adopt a currency board in Argentina reflected the policy goal of monetary stabilization rather than trade promotion, we might still have expected to see evidence of the latter.

An alternative way to test whether there is a distinct difference between dollarizing and having a fixed exchange rate, one that allows us to address this issue more directly, is to include a separate dummy variable for a fixed exchange rate in the gravity regression. While a relatively small number of countries dollarized, many more pegged their currencies to the U.S. dollar at some time during the post-Bretton Woods era. Table 5 presents all the observations among the data used in the regressions in which there was not a currency union but, nonetheless, there was a consecutive period of at least five years during which the respective U.S. dollar exchange rates varied by less than 1 percent each year.[20] As shown in Table 5, there are 508 dyads among the usable data that meet this criterion (recall from Table 2 that these data include 105 dyads in which there is a currency union with the United States). These 508 dyads include 357 dyads between the United States and another country in the Western Hemisphere (as compared to 92 currency union dyads), and 151 dyads between the United States and a country outside the Western Hemisphere, either in Africa or Asia (as compared to 13 currency union dyads).

In Table 6 we use these data on the occurrence of sustained fixed exchange rates to augment the gravity trade equation. The regressions presented in Table 6 differ from those presented earlier in this paper through the inclusion of a dummy variable denoting the presence of a sustained fixed exchange rate that is not a currency union. The columns represent results using different sub-samples of the data. The data used to generate the

[20] For ease of exposition, we refer to the currency behavior for the country – year pairs listed in Table 5 as fixed exchange rates, even though the dollar exchange rate may have moved by as much as 1 percent over the course of a year. These data are from Shambaugh (2001) and were kindly provided by the author. Shambaugh reports that a listing of annual exchange rate pegs based on actual behavior, like the one in Table 5, differs from a listing based on the reported IMF exchange rate status in only about 12% of the cases.

results in Column I are all dyads pairing the United States with any other country, the data used in Column II includes all dyads between the United States and non-industrial countries, and the data used in Column III includes all dyads between the United States and other countries in the Western Hemisphere. The regressions in Columns I and III of Table 6 are comparable to those presented in Columns I.b, and III of Table 3, respectively, while the regression reported in Column II in Table 6 is comparable to the one mentioned in footnote 16 in which the coefficient on the currency union dummy variable is 0.28, with a p-value of 0.267.[21]

The results presented in Table 6 demonstrate that the augmentation of the regression specification with a dummy variable representing a fixed exchange rate increases the value of the coefficient on the currency union dummy variable and also makes this coefficient more significant. For example, the coefficient on the currency union dummy variable for a sample of all bilateral United States trade is 0.35, with an associated p-value of 0.146, when the regression does not include a fixed exchange rate dummy variable (Table 3, Column I.b), and this coefficient is 0.53, with a p-value of 0.039, when a fixed exchange rate dummy variable is included in the regression (Table 6, Column I). But dollarization is not the only exchange rate arrangement that promotes trade in this sample, as the coefficient on the fixed exchange rate dummy variable is 0.40, with a p-value of 0.033. Furthermore, we cannot distinguish between the effect of a currency union and the effect of a fixed exchange rate. As shown in Column I of Table 6, the F-statistic testing the equality of the two coefficients is 0.32 and, with 3,404 degrees

[21] The ex-Colony dummy variable in the regressions in Table 6 equals 1 for both United States – Philippines dyads and United States – Liberia dyads. Recall that the ex-Colony dummy variable used in the regression reported in Column II of Table 3 equals 1 for the United States – Philippines dyad only.

of freedom, the p-value for the hypothesis that these coefficients are equal is 0.57. Thus, while both coefficients are significant in this sample, we cannot distinguish between them statistically and there is no significant evidence of a special dollarization effect on trade different from that of a sustained fixed exchange rate.

The results in Columns II and III in this table demonstrate that the coefficient on the currency union dummy variable in more narrowly defined samples is not significant at the 95 percent level, even though the inclusion of a dummy variable representing fixed exchange rates increases the size and significance of the currency union coefficient. For a regression using a sample consisting of observations of United States bilateral trade with non-industrial countries, the coefficient on the currency union dummy variable is 0.49 and the associated p-value is 0.093. For a regression drawing on bilateral trade between the United States and countries in the Western Hemisphere, a sample that is focused on countries that are most likely to consider dollarization, the estimated coefficient on the currency union dummy variable is 0.39, with a p-value of 0.216. In both of these cases, the coefficient on the fixed exchange rate dummy variable is statistically indistinguishable from the coefficient on the currency union dummy variable at standard levels of significance. Thus, there is no evidence that the effects of dollarization on trade, to the extent that they exist at all, are distinct from the effects of a sustained fixed exchange rate on trade.

II. 5 Dollarization Down Under

As shown in Table 2, Australia is the only industrial country other than the United States in the post-Bretton Woods era that has had a sustained currency union with more

than one other country that has complete data and, therefore, can be included in the empirical analysis. The currency of the Republic of Kiribati continues to be the Australian dollar while the Australian dollar was the currency of Tonga up until 1990 and of the Solomon Islands up through 1978. All three of these countries are small island nations in the Western Pacific. Each is a former colony of Britain. Tonga became independent in 1970, the Solomon Islands in 1978, and the Republic of Kiribati in 1979. The estimated 2000 national income of these countries is $76 million for the Republic of Kiribati, $900 million for the Solomon Islands and $225 million for Tonga, and the estimated per capita national incomes are $850, $2,000 and $2,200, respectively.[22]

Table 7 presents estimates of gravity trade regressions for Australia to demonstrate the effect of currency unions on bilateral Australian trade. Column I presents the results of a regression in which the observations represent all dyads that include Australia, while Column II presents the results of a regression in which each dyad includes Australia and a non-industrial country. The coefficients on the currency union dummy variables in these regressions are quite large and significant at greater than the 99.9 percent level. The coefficient on the currency union dummy variable is 2.68 in the regression that uses all observations of Australian bilateral trade and 2.32 in the regression using only observations of trade between Australia and non-industrial countries. These coefficients suggest that a non-industrial country that adopts the Australian dollar increases its trade with Australia by a factor of 10.18 (=exp(2.32)). Because this very large effect is based upon an estimate that draws on trade between Australia and three very small island nations, one might want to use some caution in

[22] The information on these countries comes from the CIA World Factbook website, at http://www.odci.gov/cia/publications/factbook.

applying this result to other countries. It is reasonable to be even more reticent to apply the estimate from the full-sample Australian bilateral trade regression, presented in Column I, that suggests that dollarizing (with the Australian currency) increases trade by a factor of 14.58 (=exp(2.68)).

III. Conclusion

Proposals to dollarize economies are based on two goals, monetary stability and trade integration. In this paper, we have shown that there is very little evidence that dollarization promotes trade with the United States for non-industrial countries. This result contrasts with what one might infer from evidence presented in papers by Rose and co-authors that suggests that a currency union has the attractive property of promoting trade. The source of the difference between the results in this paper and the results in the work by Rose and co-authors is that here we focus on samples that may better represent the behavior of potential candidates for dollarization. This distinction is important given the possibility of parameter heterogeneity across samples. In fact, we do find evidence of parameter instability, with differences in the estimated effect of currency unions on trade between a full sample and a sample centered on the United States, as well as between a sample centered on the United States and one centered on Australia. If anything, we would expect these selective samples to be more likely to show evidence of a significant effect of dollarization on trade. But we fail to find virtually any evidence that adopting the United States dollar as a national currency increases trade with the United States.

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Table 1: Bilateral Trade Regressions				
	I. Trade Among All Countries		II. Trade Between Industrial & Non-Industrial Countries	
Variable	***Coefficient***	***s.e.***	***Coefficient***	***s.e.***
Currency Union	1.52**	0.17	1.71**	0.51
$\ln(\text{distance}_{i,j})$	-1.23**	0.03	-1.10**	0.04
$\ln(\text{GDP}_i \times \text{GDP}_j)$	0.97**	0.10	0.99**	0.01
$\ln(\text{GDPpc}_i \times \text{GDPpc}_j)$	0.49**	0.02	0.44**	0.03
Common Language	0.35**	0.05	0.58**	0.06
Common Border	0.54**	0.13	-0.18	0.33
Free Trade Agreement	0.86**	0.15	1.70**	0.56
Landlocked	-0.15**	0.04	-0.23**	0.05
Island	0.04	0.04	-0.13*	0.06
$\ln(\text{Area}_i \times \text{Area}_j)$	-0.10**	0.01	-0.11**	0.01
Common Colonizer	0.34**	0.08	-0.91**	0.21
Current Colony	0.56	0.42	0.31	0.44
ex-Colony	1.52**	0.13	1.31**	0.12
Political Union	-0.62	0.90	-0.60	0.85
p-value of CU coef.	***0.000***		***0.001***	
R^2	0.64		0.72	
no. of observations	152,960		65,059	
observations w/CU	1,783		175	
% of obs. w/CU	1.17%		0.27%	
Av'g. Trade ($ 000s)	$18,366		$51,523	
** Significant at 99% level; * Significant at 95* level.				

Table 2: Post –1973 Currency Unions with Industrial Countries*			
United States	**Australia**	**Portugal**	**France**
Bahamas, 1974 – '95	Kiribati, 1974 – '97	Angola, 1974 – '75	Réunion, 1976 – '89
Bermuda, 1974 – '96	Solomon Isl., 1974 – '78	Cape Verde 1974 – '76	
Dominican Rep., 1974 – '84	Tonga, 1975 – '90	Guinea-Bissau, 1974 – '76	
Guatemala, 1974 – '85		Mozambique, 1974 – '76	
Liberia, 1974 – '86			
Panama, 1974 – '97			
105 dyads	***45 dyads***	***11 dyads***	***14 dyads***
*Based on Glick and Rose (forthcoming), using dyads that have complete data and, therefore, are included in regressions			

Table 3: Bilateral United States Trade Regressions with Currency Union Dummy Variable								
	I. With All Countries				II. With Non-Industrial Countries Only		III. With Countries in Western Hemisphere	
	a. ex-Colonies as in Glick & Rose		b. UK-US Dummy, Liberia as an ex-Colony					
Variable	***Coef.***	***s.e.***	***Coef.***	***s.e.***	***Coef.***	***s.e.***	***Coef.***	***s.e.***
Currency Union	0.50	0.27	0.35	0.24	0.44	0.29	0.30	0.27
$\ln(\text{distance}_{i,j})$	-1.04**	0.16	-1.06**	0.16	-1.05**	0.16	-1.32**	0.34
$\ln(GDP_i \times GDP_j)$	0.91**	0.07	0.91**	0.06	0.92**	0.08	0.90**	0.14
$\ln(GDPpc_i \times GDPpc_j)$	0.42**	0.09	0.44**	0.09	0.43**	0.11	0.34**	0.21
Common Language	0.54**	0.14	0.53**	0.14	0.51**	0.16	0.97**	0.44
Common Border	-0.35	0.37	-0.39	0.37	-0.72**	0.27	-0.84**	0.47
Free Trade Agreement	0.88**	0.20	0.87**	0.19	0.94**	0.20	0.43	0.26
Landlocked	-0.60**	0.20	-0.58**	0.20	-0.67**	0.23	-0.04	0.26
Island	0.16	0.18	0.11	0.18	-0.03	0.24	-0.24	0.54
$\ln(Area_i \times Area_j)$	-0.004	0.06	-0.01	0.06	-0.03	0.07	-0.05	0.10
ex-Colony	0.19	0.47	0.98**	0.22	0.93**	0.30		
US – UK bilateral dummy			-0.44*	0.20				
p-value of C.U. coef.	***0.065***		***0.146***		***0.126***		***0.267***	
R^2	0.84		0.80		0.80		0.92	
no. of observations	3441		3441		2870		764	
observations w/CU	105		105		105		92	
% of obs. w/CU	3.05%		3.05%		3.66%		12.04%	
Av'g. Trade ($ 000s)	$1,656,653				$1,002,272		$3,543,976	
** Significant at 99% level; * Significant at 95* level.								

Table 4: Bilateral Trade Regressions for Countries in a Currency Union with the US								
	Bahamas		**Bermuda**		**Dominican Republic**		**Guatemala**	
Currency Union	1.38	1.05	-0.47	0.59	0.83	0.44	-0.70	0.47
$\ln(distance_{i,j})$	-0.54	0.31	-1.36**	0.28	-1.54**	0.21	-1.60**	0.20
$\ln(GDP_i \times GDP_j)$	0.55**	0.20	1.05**	0.12	0.95**	0.12	1.07**	0.10
$\ln(GDPpc_i \times GDPpc_j)$	1.28**	0.29	0.95**	0.20	0.96**	0.20	0.87**	0.15
Common Language	0.07	0.49	1.12**	0.36	0.24	0.39	-0.20	0.37
Common Border					-0.50	0.85	-0.84**	0.47
Free Trade Agreement	0.26	0.56					2.35**	0.38
Landlocked	-0.77	0.56	1.03	0.58	-1.02*	0.50	-0.08	0.37
Island	-0.06	0.50	0.98*	0.50	-0.45	0.48	-0.46	0.34
$\ln(Area_i \times Area_j)$	0.19	0.12	-0.13	0.12	-0.13	0.11	-0.22**	0.08
Common Colonizer	-0.45	0.65	-0.87	0.49				
Current Colony			0.54	0.44				
ex-Colony	1.29*	0.59						
p-value of C.U. coef.	***0.189***		***0.425***		***0.060***		***0.134***	
R^2	0.46		0.53		0.53		0.63	
no. of observations	1717		1883		1733		1899	
No. of years w/CU	22		23		11		12	
continued								
	Liberia		**Panama**		**Argentina**			
Currency Union	0.49	0.49	-0.64	0.55	-0.57	0.31		
$\ln(distance_{i,j})$	-1.07**	0.30	-1.16**	0.25	-1.46**	0.34		
$\ln(GDP_i \times GDP_j)$	1.41**	0.14	1.14**	0.14	1.18**	0.09		
$\ln(GDPpc_i \times GDPpc_j)$	0.40	0.23	0.81**	0.19	0.48**	0.12		
Common Language	0.09	0.34	1.02*	0.43	0.07	0.31		
Common Border	1.10	0.68	0.003	0.38	1.15	0.91		
Free Trade Agreement					0.07	0.56		
Landlocked	-0.03	0.70	-0.44	0.53	-0.75**	0.30		
Island	-0.55	0.56	-0.03	0.51	-0.56*	0.29		
$\ln(Area_i \times Area_j)$	-0.49**	0.13	-0.23	0.13	-0.20**	0.06		
Common Colonizer								
Current Colony								
ex-Colony			-0.63	0.44	0.76**	0.26		
p-value of C.U. coef.	***0.311***		***0.250***		***0.068***			
R^2	0.54		0.58		0.71			
no. of observations	1043		2026		2831			
No. of years w/CU	13		24		6			
** Significant at 99% level; * Significant at 95* level.								

Table 5: Countries Maintaining U.S. Dollar Exchange Rate Within 1 Percent Bands for Five or More Consecutive Years (not including Currency Unions)*			
Western Hemisphere		**Africa and Asia**	
Country	**Years**	**Country**	**Years**
Argentina	1992 – 1997	Bahrain	1979 – 1998
Bolivia	1974 – 1978	Iraq	1974 – 1981, 1983 – 97
Costa Rica	1975 – 1980	Oman	1974 – 1985, 1987 – 97
Ecuador	1974 – 1981	Qatar	1980 – 2000
El Salvador	1974 – 1985, 1994 – 1997	Saudi Arabia	1987 – 2000
Haiti	1974 – 1990	Syria	1977 – 1987, 1989 – 97
Honduras	1973 – 1989	United Arab Emir.	1981 – 1997
Nicaragua	1973 – 1978, 1980 – 1984	Egypt	1980 – 1988, 1992 – 97
Paraguay	1973 – 1983	Hong Kong	1984 – 1997
Venezuela	1974 – 1983	South Korea	1975 – 1979
Antigua & Barbuda	1977 – 2000	Pakistan	1974 – 1981
Barbados	1976 – 2000	Djibouti	1974 – 1997
Dominica	1977 – 2000	Angola	1977 – 1990
Grenada	1977 – 2000	Burundi	1977 – 1982
Belize	1978 – 2000	Ethiopia	1974 – 1991
St. Kitts & Nevis	1977 – 2000	Libya	1974 – 1985
St. Lucia	1977 – 2000	Nigeria	1994 – 1997
St. Vincent & the Grenadines	1977 – 2000	Rwanda	1975 – 1982
Suriname	1973 – 1993	Somalia	1974 – 1981
Trinidad & Tobago	1977 – 1984	China	1995 – 1997
357 dyads for Western Hemisphere		**151 dyads for Africa and Asia**	
508 dyads total			
*Based on Shambaugh (2001), listing dyads for years in which there is complete data for regressions			

Table 6: Bilateral United States Trade Regressions with Currency Union and Fixed Exchange Rate Dummy Variables						
	I. With All Countries		**II. With Non-Industrial Countries Only**		**III. With Countries in Western Hemisphere**	
Variable	***Coef.***	***s.e.***	***Coef.***	***s.e.***	***Coef.***	***s.e.***
Currency Union	0.53*	0.26	0.49	0.29	0.39	0.31
Fixed Exchange Rate	0.40*	0.19	0.36	0.21	0.11	0.13
$\ln(\text{distance}_{i,j})$	-0.99**	0.16	-1.00**	0.17	-1.30**	0.35
$\ln(\text{GDP}_i \times \text{GDP}_j)$	0.92**	0.06	0.93**	0.08	0.92**	0.15
$\ln(\text{GDPpc}_i \times \text{GDPpc}_j)$	0.42**	0.09	0.40**	0.12	0.32**	0.22
Common Language	0.51**	0.14	0.49**	0.16	1.00*	0.46
Common Border	-0.26	0.38	-0.61*	0.29	-0.83	0.47
Free Trade Agreement	0.91**	0.21	1.03**	0.22	0.41	0.27
Landlocked	-0.57**	0.19	-0.65**	0.22	-0.04	0.26
Island	0.16	0.17	0.04	0.23	-0.23	0.53
$\ln(\text{Area}_i \times \text{Area}_j)$	-0.0007	0.06	-0.02	0.07	0.05	0.10
ex-Colony	0.94**	0.22	0.99**	0.25		
US – UK bilateral dummy	-0.36	0.20				
p-value of C.U. coef.	***0.039***		***0.093***		***0.216***	
p-value of Fixed e.r. coef.	***0.033***		***0.080***		***0.402***	
F-stat testing CU = Fixed	***0.32***		***0.23***		***1.07***	
R^2	0.85		0.80		0.92	
no. of observations	3441		2870		764	
observations w/CU	105		105		92	
% of obs. w/CU	3.05%		3.66%		12.04%	
obs. w/Fixed e.r. (not CU)	508		508		357	
% of obs. w/Fix e.r. (not CU)	14.76%		17.70%		46.73%	
** Significant at 99% level; * Significant at 95* level. Ex-Colony dummy = 1 for US-Philippines and US-Liberia dyads.						

Table 7 Bilateral Australian Trade Regressions				
	I. With All Countries		**II. With Non-Industrial Countries Only**	
Variable	***Coefficient***	***s.e.***	***Coefficient***	***s.e.***
Currency Union	2.68**	0.40	2.32**	0.41
Ln(distance$_{i,j}$)	-2.72**	0.24	-2.92**	0.25
Ln(GDP$_i$ x GDP$_j$)	1.04**	0.08	1.01**	0.09
Ln(GDPpc$_i$ x GDPpc$_j$)	0.87**	0.12	0.67**	0.14
Common Language	0.56**	0.20	0.70**	0.23
Free Trade Agreement	0.35	0.54	0.87**	0.11
Landlocked	-0.45	0.28	-0.66*	0.29
Island	0.54*	0.27	0.58	0.32
Ln(Area$_i$ x Area$_j$)	-0.07	0.06	-0.07	0.07
Current Colony	0.06	0.55	0.25*	0.12
Ex-Colony	1.32**	0.31	0.97*	0.47
p-value of CU coef.	***0.000***		***0.000***	
R^2	0.82		0.77	
no. of observations	3342		2771	
observations w/CU	45		45	
% of obs. w/CU	1.35%		1.62%	
** Significant at 99% level; * Significant at 95* level.				

Appendix
Countries Used in Regression Analysis

Industrial Countries: Australia, Austria, Belgium, *Canada*, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom, *United States*, Yugoslavia (n = 27)

Non-Industrial Countries* that had complete data for estimating trade with U.S. and with Australia: *Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela, Antigua & Barbuda, Bahamas, Barbados, Bermuda, Grenada, Guyana, Belize, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Suriname, Trinidad & Tobago*, Bahrain, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Egypt, Republic of Yemen, Bangladesh, Bhutan, Burma (Myanmar), Sri Lanka, Hong Kong, India, Indonesia, South Korea, Lao People's Democratic Republic, Malaysia, Maldives, Nepal, Pakistan, Philippines, Singapore, Thailand, Djibouti, Algeria, Angola, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Republic of Congo, Democratic Republic of Congo (Zaire), Benin, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Guinea, Cote d'Ivoire, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Niger, Nigeria, Reunion, Zimbabwe, Rwanda, Seychelles, Senegal, Sierra Leone, Somalia, Namibia, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Burkina Faso, Zambia, Solomon Islands, Fiji, Kiribati, Vanuatu, Papua New Guinea, Samoa, Tonga, Armenia, Georgia, Kazakhstan, Kyrqyz Republic, Bulgaria, Moldova, China, Ukraine, Czech Republic, Slovak Republic, Estonia, Latvia, Hungary, Lithuania, Mongolia, Slovenia, Poland, Romania. (n = 138)

Countries in italics are in the Western Hemisphere.

* Non-industrial countries are those with an IMF IFS identification number greater than 200.