Comparing Apples and Oranges:
The Effect of Multilateral Currency Unions on Trade is Small

Volker Nitsch*

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In this paper, I explore whether the two existing multilateral currency unions – the CFA franc zone in West and Central Africa and the Eastern Caribbean Currency Union – have a measurable effect on intraregional trade. I find that membership in a currency union indeed tends to promote trade, but the pattern of intra-union trade deviates much less from otherwise similar non-union trade than previous estimates of a large trade-multiplying effect of common currencies suggest. I also explore whether the common currency effect differs across country pairings, and find that economically large countries benefit most strongly from sharing a common currency. (JEL F15, F33)

Recent empirical findings suggest that the adoption of a common currency has a large positive effect on bilateral trade. Analyzing trade flows between 186 countries, Andrew K. Rose (2000) estimates that membership in a currency union triples trade; two countries that share a common currency trade about three times as much with each other than two otherwise similar countries using different currencies. In a similar fashion, Reuven Glick and Rose (2002) examine changes in exchange rate regimes and find that bilateral trade approximately doubles/halves as a pair of countries forms/dissolves a currency union.

These results, derived from large cross-sectional data sets, have been questioned for at least two reasons. First, the actual number of country pairs that share a common currency is very small, typically less than one percent of the data. In principle, this is no problem but if the small subset differs from the rest of the sample, nonlinearities might affect the results. Second, the common currency group in these data sets covers a large number of very different experiences. In fact, the currency unions can be broadly summarized in three different groups: (1) small, poor and distant dependencies (typically islands) that use the currency of their former colonial power or current home country (e.g., Guadeloupe, St. Helena); (2) countries that have (mainly one-sidedly) adopted the currency of a larger neighboring country (e.g., Bhutan, the Bahamas); and (3) multilateral currency unions among regional neighbors (e.g., the Eastern Caribbean Currency Union). Since there is no reason to assume that the effect of monetary integration on trade is identical across these three

groups[1], a direct application of the estimated coefficient to recently proposed integration schemes may be inappropriate.[2]

To deal with these issues, Rose and his collaborators provide extensive robustness checks. In particular, they experiment with a large number of additional controls. They also present results for different subsets of their sample by dropping observations, and show that their estimates are robust to these modifications. However, since other estimation techniques (Torsten Persson [2001]) and case studies (Rodney Thom and Brendan Walsh [2002], Nitsch [2002b]) yield much smaller estimates, serious doubts remain.

In this paper, I propose an alternative (cross-sectional) approach to estimate the effect of monetary integration on trade. In particular, I focus on the two existing multilateral currency unions, the CFA franc zone in West and Central Africa and the Eastern Caribbean Currency Union, and estimate their effect on the pattern of *intraregional* trade. This approach offers two main advantages. First, both currency unions share several characteristics with other recent projects of multilateral monetary integration such as the European Monetary Union (EMU) or the proposed monetary union among the Arab Gulf states. Most notably, the member countries are a very homogeneous group of geographically proximate countries with similar production structures, similar historical experiences and social customs, and a substantial base of formal and informal cooperation. Second, the focus on intraregional trade allows a *direct* comparison of a country's trade with a currency union member and an "otherwise similar" country using a different currency. Thus, instead of trying to control for a large and diverse set of country characteristics, this approach seeks to avoid nonlinearities in the first place.

To preview the main results, I find that multilateral currency unions have on average a positive effect on intraregional trade. CFA franc countries trade about 55 percent more with each other than with a typical non-union country in West and Central Africa, while the estimate for the Eastern Caribbean Currency Union is smaller and statistically not significantly different from zero. In any case, the trade-enhancing effect of multilateral monetary unions is considerably below Rose's estimate of factor three, thereby confirming other estimates of a positive but moderate effect of common currencies on trade. Moreover, exploring the extent to which the currency union effect differs across country pairs, I find that especially economically large countries appear to benefit from a common currency.

The paper is structured as follows. Section I provides some background about the multilateral currency unions on which the empirical analysis is based. Section II presents the methodology and data. Section III shows the results, and section IV concludes.

I. Background

Before EMU, there were already two multilateral currency unions, both largely maintaining earlier systems of monetary cooperation after former colonies had gained independence.

In Africa, the French colonial franc was followed by two distinct franc-based monetary unions, the West African Economic and Monetary Union (WAEMU), originally established in 1962, and the Central African Economic and Monetary Community (CAEMC), founded in 1964. These two regional groupings together form the CFA franc zone; although the CFA franc is issued separately by each subzone and stands for the Communauté financière africaine in West Africa and for the Coopération financière en Afrique in Central Africa, it is exchangeable one-for-one against each other and collectively pegged to the euro (and formerly the French franc). Current members of the CFA franc zone are Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo in the WAEMU; and Cameroon, the Central African Republic, Chad, the Republic of Congo, Equatorial Guinea, and Gabon in the CAEMC. Combined, the fourteen members have a population of 102 million, and total GDP was an estimated 47 billion US dollar in 2000.[3]

In the Caribbean, eight small island territories form the Eastern Caribbean Currency Union (ECCU): Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and the two British dependencies Anguilla and Montserrat. Having shared most of their monetary history, British colonial territories in the Caribbean (then also including Barbados, British Guyana, and Trinidad & Tobago) agreed already in 1946 to establish a unified currency system based on the West Indian dollar, and the British Caribbean Currency Board was created in 1950. With the formation of the Eastern Caribbean Currency Authority in 1965, the West Indian dollar was replaced by the Eastern Caribbean dollar. The currency, initially still pegged to the British pound at the same exchange parity, was linked to the US dollar in 1976. The combined population of the ECCU was 568,000 in 1998, with a total GDP of about 2.5 billion US dollar.[4]

The most interesting feature for my purposes, however, is that in both monetary unions internal trade is relatively small. Since the member countries are mainly primary commodity producers, they trade little among themselves; most of their exports and imports are with industrial

countries. Members of the CFA franc zone export coffee, cocoa, cotton, fish products, timber, and groundnuts (with some countries also being strongly dependent on a single commodity such as bauxite in Guinea, uranium in Niger, and oil in Nigeria) so that intra-WAEMU trade is only an estimated 12 percent of the countries' total trade (ignoring informal trade), while for CAEMC, the estimate is even lower at about 6 percent (Masson and Pattillo, 2001). For ECCU members, traditionally producers of banana, sugar, and root crops (tourism is now the most important source of foreign exchange earnings), a rough estimate suggests that internal trade accounts for less than 10 percent of the countries' total trade.

The advantages of monetary integration for promoting trade within these regions may therefore appear to be limited. Even if intraregional trade is small, however, and thus most of the countries' trade is unaffected by the monetary arrangement, the common currency effect (i.e., the percentage change in intra-union trade relative to another regional neighbor country that uses a different currency) can still be important.

II. Methodology and Data

Following Rose (2000), I use an augmented gravity model to estimate the effects of currency unions on trade. The only notable difference is that I run separate regressions for intraregional trade in West and Central Africa and the Caribbean. Given this focus on two very homogeneous country groups, the number of controls is reduced. In fact, apart from the two standard gravity variables distance and output, I add only a few extra conditioning variables. In particular, I estimate an equation of the form:

$$(1) \quad \ln(T_{ijt}) = \alpha + \beta_1 \ln(Y_i Y_j)_t + \beta_2 \ln(Y_i Y_j / Pop_i Pop_j)_t + \beta_3 \ln D_{ij} + \beta_4 Lang_{ij} + \beta_5 Cont_{ij} + \beta_6 ComCol_{ij} + \gamma CU_t + \varepsilon_{ijt}$$

where T_{ijt} denotes the real bilateral trade between countries i and j at time t, Y is real GDP, Pop is population, D is the distance between i and j, Lang is a common language dummy, Cont is a common land border dummy, ComCol is a common colonizer dummy, CU is the common currency dummy, and ε is a stochastic error term.

The data is taken mainly from Jeffrey A. Frankel and Rose (2002).[5] This data set contains information on total bilateral trade (deflated by the US GDP chain price index) for the period from 1970 to 1995 in five-year-intervals. All the other data are recalculated and cross-checked with their original sources. These are the *Penn World Table* (PWT) 5.6 for population and real GDP per capita data, merged with data from the World Bank's *World Development Indicators* where data from the PWT is missing, and the CIA *World Factbook* for information on geographic coordinates, languages, contiguity, and colonizers.[6]

Since I focus on intraregional trade flows, my samples include the following countries (in addition to the actual currency union members): Angola, the Democratic Republic of Congo, Gambia, Ghana, Guinea, Liberia, Mauretania, Nigeria, and Sierra Leone in West and Central Africa; and Aruba, the Dominican Republic, Guadeloupe, Haiti, Jamaica, Martinique, Netherlands Antilles, and Trinidad & Tobago, in the Caribbean.[7] The Caribbean sample does not include all countries and territories in the region. For ECCU member Anguilla I have no trade data so that this British dependency is dropped. The Bahamas, Barbados, Bermuda, British Virgin Islands, Turks and Caicos Islands, and the US Virgin Islands are excluded because they either use the US dollar directly as their national currency or operate a hard peg to the US dollar; since the Eastern Caribbean dollar is also linked to the US dollar with a fixed parity, an inclusion of these islands would bias the integration effects of the ECCU downward. The Cayman Islands and Cuba are excluded because I have no data on per capita income. Taken together, my samples consist of 23 countries in Africa and 14 countries or territories in the Caribbean, yielding a total of 253 (=23(22)/2) and 91 (=14(13)/2) potential bilateral trade observations per year, respectively. Due to missing observations, however, the actual sample is often considerably smaller.

Table 1 presents some summary statistics of the key variables. At least four observations are noteworthy. First, the actual data sample covers in both cases only less than one-half of the potential universe of observations; the majority of the 1,518 (=253(6) years) data points in Africa and the 546 (=91(6) years) data points in the Caribbean are missing. Second, the data are indeed, as intended, very homogeneous across the two subsets in the regions. Means and standard deviations are broadly similar for the currency union and the non-union samples. However, ECCU members are particularly tiny, a bit poorer, somewhat closer in distance, and have less bilateral trade than the other Caribbean islands in the sample. Third, all members of a currency union speak a common language. (Since Portuguese-speaking Guinea-Bissau entered the CFA franc zone only in 1997, it is consistently treated as a non-member in my data set.) Fourth, the ratio of currency union observations to non-

currency union observations is now about 1:2 compared with 1:100 in Rose's large cross-country sample.

III. Results

A. Basic results

Table 2 shows the results of the gravity regressions. The first column presents the estimation results of pooled regressions for West African trade.[8] The coefficients on the standard controls are all statistically highly significant and economically reasonable; a one percent increase in the countries' GDP raises their bilateral trade by about 0.7 percent, while a one percent increase in the bilateral distance lowers trade by about 0.6 percent.

The main variable of interest, however, is the estimated coefficient on the currency union dummy. This coefficient is positive and statistically significant. The magnitude of 0.63 implies that the countries of the CFA franc zone trade on average about 1.9 times (exp[0.63]=1.88) as much with each other than they do with other countries in West and Central Africa. This estimate confirms findings that a single currency enhances trade, but is considerably smaller than Rose's (2000) estimates of an average common currency effect of more than factor three.[9] There is another notable difference, however. While Rose finds that the currency union effect clearly exceeds the effects of sharing a common border or having the same colonizer, the results for West and Central Africa suggest that the effect of monetary integration on trade is slightly smaller than having the same colonizer, and much smaller than having a common land border. Instead of dominating other forms of integration, membership in a currency union rather yields "conventional" effects of reducing transaction costs (perhaps with one exception: the surprisingly insignificant effect of speaking the same language; this dummy, however, is highly collinear with the common colonizer dummy).[10]

The second column in table 2 performs a similar analysis for the Caribbean sample. Again, the gravity framework works well in explaining bilateral trade flows, even between these tiny Caribbean islands; both higher GDP and shorter distances increase trade. Also, there is a very strong and statistically highly significant effect of having the same (ex-) colonizer. Most notably, however, trade between member countries of the Eastern Caribbean Currency Union does not deviate significantly from the pattern explained by these standard gravity variables; the coefficient on the currency union dummy is statistically indistinguishable from zero at conventional levels of significance.

If anything, the negative γ coefficient suggests that trade between islands sharing a common currency may be less-than-proportional. This result generally confirms the findings for the CFA franc zone; monetary integration on a multilateral basis has a much smaller effect on trade than pooled estimates for a broad set of currency unions suggest, even if the exact size of the trade effect may vary across the different experiences of monetary integration.

B. Extensions

To check the robustness of the results, I provide two sorts of extensions. In a first exercise, I follow Rose and Eric van Wincoop (2001) and add country specific effects. As shown in the two left columns of table 3, this specification tends to yield lower estimates of γ (similar to Rose and van Wincoop's findings). The estimated γ coefficient for the CFA franc zone falls to 0.35, meaning that the trade-enhancing effect of a common currency is reduced to only 42 percent (exp[0.35]=1.42). With a t-statistic of 0.82, the coefficient is even no longer statistically different from zero. For the ECCU, the estimated common currency effect becomes positive (and thus correctly signed), but remains statistically insignificant. Without taking the result too literally, the estimate suggests that intra-ECCU trade exceeds trade between islands using different currencies by about 9 percent (exp[0.09]=1.09).

A second extension deals with one of the major shortcomings of the previous analysis, the fact that the results are based on only a small fraction, less than one-half, of the potential universe of country pairings. Mostly due to missing trade data, many country pairings are excluded from the analysis. In the remaining two columns of table 3, I present the results of a very crude approach to proxy for these missing trade observations. In particular, I fill in missing trade observations with the average (real) trade values for the years for which I have data. This appears to be a more promising approach than simply substituting missing trade values by a hypothetically small figure.[11]

The results are interesting. In West and Central Africa, the estimated trade-expanding effect of the CFA franc zone falls again sizably relative to the base specification. The coefficient on the currency union dummy, while still significant, drops to 0.46, implying that members of the CFA franc zone trade about 58 percent (exp[0.46]=1.58) more than West and Central African countries with different currencies. This result strongly confirms other estimates of a positive but relatively moderate currency union effect on trade (Mélitz [2001], Persson [2001]).

In the Caribbean, the trade effect of a common currency remains statistically insignificant; the estimated γ coefficient becomes essentially zero when the number of observations is increased.

C. Does the Currency Union Effect Differ Across Country Pairs?

Another interesting issue is to explore whether the trade effect of monetary integration differs across country pairings. The aim of this exercise is twofold. First, there is some interest in the fact itself; to find that monetary integration affects the intensity of trade relations within a currency union differently would provide additional evidence that the aggregate estimate of the common currency effect on trade masks considerable heterogeneity among individual experiences (Levy Yeyati [2001], Michael W. Klein [2002], Nitsch [2002a]). Second, if the common currency effect varies within the union, one might then also ask under which conditions monetary integration is likely to add to the intensity of trade relations among members.

To test the extent to which the common currency effect varies across country pairs, I add a number of interaction terms, in which the currency union dummy is multiplied by bilateral distances, pairwise output and pairwise output per capita, respectively, measured as the difference from the mean for the currency union sample. Positive coefficients on these variables would then imply that the trade effect of monetary integration is particularly strong in country pairs with this specific characteristic, and vice versa, while the γ coefficient captures the trade effect for a country pair with sample-average incomes, per capita incomes and distance.

Table 4 shows the results.[12] Interestingly, a clear pattern emerges. While for both analyzed currency unions, bilateral distance between members has no measurable effect on their intensity of trade, the interaction term with pairwise output is positive and statistically significant. This implies that the trade effect of a common currency is particularly strong for economically large countries. A potential explanation for this finding is that larger countries are more likely to have a diversified production structure and, generally, may operate as regional suppliers so that they benefit most strongly from a single currency.

Another interesting observation is that the particularly low estimate of the integration effects of the Eastern Caribbean dollar appears to be mainly the result of disproportionately low trade between ECCU members with above-average per capita income. For the Caribbean as a whole, I find the standard gravity result; the higher the country pairing's GDP per capita, the larger their bilateral trade. Entering a (separate) control for differences in per capita income among currency union members, however, yields a negative coefficient, suggesting that trade between ECCU country pairings with a high per capita GDP is significantly less-than-proportional. If one controls for this effect, the γ coefficient is positive and statistically highly significant.

IV. Conclusion

Recent findings suggest that the adoption of a common currency has a large positive effect on bilateral trade. The evidence, however, is based on a broad sample of very different experiences, covering overseas territories that use the currency of their colonial power, countries that declare unilaterally the adoption of a foreign currency (dollarization), and countries that decide multilaterally to share a common currency.

This paper aims to disentangle the effect of monetary unions on trade. In particular, the aim is to explore whether the two existing multilateral currency unions – the CFA franc zone in West and Central Africa and the Eastern Caribbean Currency Union – have a measurable effect on *intraregional* trade.

I find that membership in a currency union has only little effect on bilateral trade; two countries sharing a common currency trade, at best, about 55 percent more with each other than with an otherwise similar non-union member in the region. This effect is considerably smaller than previous estimates of a trade-multiplying effect of common currencies of up to 300 percent.

I also explore whether the common currency effect differs across country pairings, and find that economically large countries benefit most strongly from sharing a common currency.

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Endnotes

* Bankgesellschaft Berlin, Volkswirtschaft, Hardenbergstrasse 32, 10623 Berlin, Germany, Tel.: (030) 3109-4462, Fax: (030) 3109-5031, E-Mail: volker.nitsch@bankgesellschaft.de.
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[1] For instance, the currency unions come with very different legal and institutional arrangements. Eduardo Levy Yeyati (2001) and Volker Nitsch (2002a) estimate the trade effects of different currency unions separately and find indeed considerable differences.

[2] It is even debatable whether the first group of currency unions distinguished above, in which the use of a common currency is due solely to a historical accident and not the result of independent choice, provides any useful insights for current moves towards monetary integration. At best, they may form a good control group to disentangle the trade effects of monetary integration from other, non-monetary forms of cooperation.

[3] For more details about the CFA franc zone, see, for example, Ernesto Hernández-Catá (1998) and Paul Masson and Catherine Pattillo (2001). Patrick Honohan and Philip R. Lane (2000) provide an excellent history of monetary integration in Africa.

[4] Frits van Beek et al. (2000) and Masson and Pattillo (2001, appendix 3) provide a good overview about the ECCU.

[5] The data are kindly provided by Andrew Rose on his web site (http://www.haas.berkeley.edu/~arose).

[6] There are some minor differences which do not affect the results. I have also experimented, for instance, with an alternative distance measure derived from the geographic location of the countries' largest cities (see Jacques Mélitz [2001]), but the results were basically identical.

[7] In a few cases, membership changes over time; these changes are considered in the currency union dummy.

[8] I have also experimented with separate regressions for individual years, but due to the wildly varying number of observations, comprising for each year quite different combinations of country pairs, the coefficient estimates were very imprecise.

[9] Using price differences as measure of market integration, David Parsley and Shang-Jin Wei (2001) also find for the CFA franc zone a positive integration effect (i.e., lower price dispersion), but the estimated effect is smaller than that for the US dollar, hard pegs (such as currency boards), and the euro.

[10] I have repeated the regression with Rose's original data and produced basically identical results.

[11] Silvana Tenreyro (2001) proposes a similar approach.

[12] Entering the interaction terms separately does not change the results.

Table 1: Descriptive statistics

	Total	Currency union	Non-Currency union
		CFA FRANC	
Bilateral trade	7.86 (2.58)	8.26 (2.51)	7.67 (2.60)
Distance	7.24 (0.68)	7.28 (0.62)	7.22 (0.71)
Output	30.85 (1.61)	30.70 (1.08)	30.92 (1.80)
Output per capita	13.81 (0.70)	14.09 (0.79)	13.68 (0.62)
Language	0.60 (0.49)	1.00 (0.00)	0.42 (0.49)
Colonizer	0.49 (0.50)	0.96 (0.21)	0.28 (0.45)
No. of observations	432	134	298
		EASTERN CARIBBEAN DOLLAR	
Bilateral trade	8.13 (2.09)	7.52 (1.43)	8.44 (2.30)
Distance	6.27 (0.94)	5.50 (0.65)	6.66 (0.81)
Output	27.24 (2.71)	24.29 (1.34)	28.75 (1.86)
Output per capita	16.10 (1.00)	15.96 (0.98)	16.17 (1.00)
Language	0.61 (0.49)	1.00 (0.00)	0.42 (0.49)
Colonizer	0.60 (0.49)	1.00 (0.00)	0.40 (0.49)
No. of observations	243	82	161

Notes: The table reports the means (standard deviations) for different data samples.

Table 2: Does a Common Currency Affect Regional Trade Patterns?

	West & Central Africa	Eastern Caribbean
Currency union	0.63*	-0.22
	(0.32)	(0.30)
Distance	-0.60**	-0.67**
	(0.19)	(0.11)
Output	0.71**	0.65**
	(0.07)	(0.07)
Output per capita	0.11	0.44**
	(0.17)	(0.14)
Language	0.14	0.02
	(0.34)	(0.26)
Border	1.60**	
	(0.29)	
Colonizer	0.81*	2.51**
	(0.37)	(0.29)
No. of observations	432	243
S.E.R.	2.10	1.33
R^2	0.34	0.59

Notes: OLS estimation. White heteroskedastic-consistent standard errors are in parentheses. ** and * denote significant at the 1% and 5% level, respectively. Constant and year dummies not reported.

Table 3: Extensions

	Country fixed effects		Proxying for missing trade observations	
	West & Central Africa	Eastern Caribbean	West & Central Africa	Eastern Caribbean
Currency union	0.35	0.09	0.46*	-0.02
	(0.43)	(0.34)	(0.19)	(0.29)
Distance	-0.58*	-0.75**	-0.52**	-0.68**
	(0.26)	(0.12)	(0.13)	(0.10)
Output	3.63*	1.20	0.68**	0.64**
	(1.82)	(0.97)	(0.05)	(0.06)
Output per capita	-2.93#	-0.78	0.17#	0.59**
	(1.75)	(0.84)	(0.10)	(0.12)
Language	0.24	0.26	-0.25	0.23
	(0.35)	(0.92)	(0.22)	(0.24)
Border	1.64**		1.63**	
	(0.33)		(0.18)	
Colonizer	1.05*	1.88	0.68**	2.25**
	(0.47)	(1.49)	(0.22)	(0.26)
Country fixed effects?	Yes	Yes	No	No
No. of observations	432	243	1,007	307
S.E.R.	1.92	1.15	2.08	1.42
R^2	0.45	0.70	0.33	0.56

Notes: OLS estimation. White heteroskedastic-consistent standard errors are in parentheses. **, * and # denote significant at the 1%, 5% and 10% level, respectively. Constant, year dummies and, if applicable, country fixed effects not reported.

Table 4: Does the Currency Union Effect Differ Across Country Pairs?

	West & Central Africa	Eastern Caribbean
Currency union	0.43*	1.26**
	(0.20)	(0.37)
Currency union × Distance	-0.27	-0.15
	(0.19)	(0.20)
Currency union × Output	0.68**	0.50**
	(0.11)	(0.13)
Currency union × Output per capita	0.20	-0.92**
	(0.19)	(0.20)
Distance	-0.44**	-0.65**
	(0.14)	(0.12)
Output	0.59**	0.62**
	(0.05)	(0.06)
Output per capita	0.03	0.70**
	(0.13)	(0.14)
Language	-0.05	0.31
	(0.22)	(0.27)
Border	1.66**	
	(0.18)	
Colonizer	0.36	2.13**
	(0.24)	(0.29)
No. of observations	1,007	307
S.E.R.	2.04	1.40
R^2	0.36	0.57

Notes: OLS estimation. White heteroskedastic-consistent standard errors are in parentheses. ** and * denote significant at the 1% and 5% level, respectively. Constant and year dummies not reported.