

EMU's Potential Effect on British Trade: **A Quantitative Assessment**

Andrew K. Rose*

Updated: 04 July 2000

Comments Welcome.

Abstract

This paper estimates the effect of joining European Economic and Monetary Union (EMU) on British Trade. The United Kingdom is very open to international trade: exports and imports combined together amount to two-thirds of British GDP. About half of this trade is with the Euro-zone. The empirical evidence presented here shows that currency unions are associated with substantially higher trade. There is also evidence that higher trade results in higher economic output. I estimate that British trade with the Euro-zone could increase considerably if the UK joins EMU. The UK's trade with the Euro-zone may conceivably triple, eventually leading to an overall doubling of British trade. A trade increase of this magnitude could result in a substantial boost to British GDP.

Contact: Andrew K. Rose, Haas School of Business,
University of California, Berkeley, CA 94720-1900
Tel: +1 (510) 642-6609
Fax: +1 (510) 642-4700
E-mail: arose@haas.berkeley.edu
URL: <http://haas.berkeley.edu/~arose>

* B.T. Rocca Jr. Professor of International Business, Economic Analysis and Policy, Haas School of Business at the University of California, Berkeley, NBER Research Associate, and CEPR Research Fellow. This paper, written for *Britain in Europe*, borrows from my research in this area, including my *Economic Policy* 2000 paper "One Money, One Market: Estimating the Effect of Common Currencies on Trade", my *California Management Review* 2000 paper "Does A Currency Union Boost International Trade?" and my joint work with Charles Engel and Jeffrey Frankel. My research papers and data sets are freely available at my website.

EMU's Potential Effect on British Trade: A Quantitative Assessment

Andrew K. Rose

The effect of a common currency on trade is an important issue. The increase in trade stemming from a common currency is one of the few undisputed gains from European Economic and Monetary Union (EMU). Even EMU-sceptics such as Feldstein (1997) agree that substituting a single currency for several national currencies reduces the transactions costs of trade within that group of countries. Indeed, this was one of the official motivations behind the EMU project (European Commission, 1990).

Clearly it is cheaper to trade between two countries that use the same currency than between countries with their own monies. The question is: How much? Sceptics believe that (intra-EU) trade may only rise a little because of the Euro. For instance, the 1993 *Economic Report of the President* (pp 294-295) states "... There is uncertainty as to how much additional benefit will be yielded by the permanent fixing of exchange rates implied by a single currency." This seems reasonable: exchange rate volatility was low before EMU, and whatever volatility remained could be inexpensively hedged through the use of forward contracts and other derivatives. Europhiles, in contrast, think that sharing a common currency will lead to an increase in the depth of trading relations, while precluding the "beggar thy neighbour" competitive devaluations that can destroy a common market.

The primary objective of this pamphlet is to resolve the argument by *estimating* the effect of currency union on trade using empirical data. The results are clear. Currency unions *do* in fact have an effect on trade. And it is large; as big as the effect of joining a free trade area like the European single market or NAFTA. In particular, *I estimate that joining EMU might*

eventually triple the UK's trade with Euroland, leading to an overall doubling of British external trade.

If EMU *does* substantially increase European trade, there will be important repercussions. Perhaps most importantly, a big increase in trade will lead to substantial extra gains from trade, primarily for consumers inside EMU. In my work with Frankel (2000), I estimate that joining EMU may eventually raise British GDP by as much as 20%, although this effect would be spread over two or three decades. The reason is that more open economies tend to grow more quickly and consequently enjoy higher standards of living, even controlling for other factors.

To summarize: the UK has much to gain from entering EMU in terms of increased trade and consequently higher GDP, gains that have been under-stated in the existing academic literature.

Methods for Determining the Relationship between Currency Unions and Trade

With such important and interesting issues at hand, it is no surprise that economists have worked hard to quantify the effects of reduced exchange rate volatility on trade. Sadly, there is almost no consensus in the area, save that the effect (if any) is difficult to estimate, even with high-tech time-series econometrics.

Much ink has been spilled on the issue of international trade and the international monetary regime; there is a long and inglorious tradition of ambiguous, weak and negative results. For instance, the Calmfors Commission (1997, p. 50) stated “Many empirical studies have been done on the effects of exchange-rate fluctuations on the volume of foreign trade. The somewhat surprising, but fairly unanimous, conclusion is that these fluctuations seem to

influence foreign trade very little, if at all. This conclusion must be regarded as fairly robust, because the various studies have been done with different methods.”

Essentially, researchers have looked at periods of high and low exchange rate volatility and attempted to map them into trade during the same periods. Unfortunately, time-varying exchange rate volatility simply does not seem to have a strong effect on international trade or investment patterns. Basically, exchange rate volatility for most of the OECD was low in the 1960s, much higher in the 1970s and 1980s, and moderate in the 1990s. The problem, for this literature, is that trade has risen continuously. Unsurprisingly, it has been difficult to establish a consensual view about this effect, or even its sign.

Not only is this literature weak; it is not even clear that it is asking the right question. Having even a very stable exchange rate is not the same as being a member of a currency union. Sharing a common currency is a much more serious and durable commitment than a fixed exchange rate. This is manifest empirically in much more intense trade *inside* countries than *between* countries, a phenomenon known as “home bias” in international trade. McCallum (1995) quantifies the size of the intra-national bias at more than twenty to one. In particular, he finds that trade between two Canadian provinces is more than 20 times larger than trade between a comparable Canadian province/American state pair. Part of this home bias effect may stem from the fact that a single currency is used inside a country.

One might imagine that trying to measure the effects of a common currency on trade is a purely academic (i.e., trivial) exercise. The only countries that have adopted a common currency of late are the EMU-11, for whom there are necessarily few data. True enough. But there is no reason to rely on before and after differences to estimate the effect of currency unions on trade, just as one need not use *time-series* variation to discern the effects of exchange rate volatility on

trade. This paper exploits *cross-sectional* variation – using evidence across countries – to trace the effects of currency unions on trade.

Is a cross-country approach to investigating currency unions doomed to failure since there are so few of them? Not at all. Above and beyond the eleven current members of “euroland” (soon to be twelve, with the addition of Greece), some ninety “countries” are currently in some sort of official common currency scheme (thirty-one of these areas are official dependencies or territories), as shown in the table.¹ The empirical work in this paper hinges on exploiting these linkages. In particular, the question is: “Do countries inside currency unions tend to trade more, holding other factors constant?” The other factors held constant are dictated by the “gravity” model of international trade, a framework with a long track record of success.

----- Insert the Currency Union Table around here -----

Estimating the Relationship with a Gravity Equation

The strategy of this paper is to link cross-country variation in currency arrangements to cross-country variation in international trade. Of course, many things affect trade above and beyond international monetary relations. While these other factors are not of direct interest, their effects need to be taken into account so as to be able to see if there is any remaining role for currency unions. Ordinarily, this would be difficult in applied economics. But in this context, there is a simple and persuasive model in which one can embed the objects of interest to me: the “gravity” model of international trade.

¹ Most currency unions occur where one of the geographic units does not issue its own currency, and uses that of another. A few occur where there is massive currency substitution (also known as “dollarization”) and two currencies exist with a long-term peg at 1:1. I do not include currency boards (such as Hong Kong or Argentina),

The gravity model is a very simple empirical model that explains the size of international trade between countries. It models the flow of international trade between a pair of countries as being proportional to their economic “mass” (read “national income”) and inversely proportional to the distance between them (literally interpreted). The gravity equation acquired its name since a similar function describes the force of gravity in Newtonian physics.

The gravity model of international trade has a remarkably consistent (and thus, for economics, unusual) history of success as an empirical tool. The responses of trade to both income and distance are consistently signed correctly, economically large, and statistically significant in an equation that explains a reasonable proportion of the cross-country variation in trade.

The technical details –presentation of the precise model, methodology and data set – are presented briefly in the appendix. The appendix also presents the actual estimates of the model. There are five different sets of estimates to demonstrate that the results do not depend strongly on the exact specification of the econometric model.

Unsurprisingly, the standard features of the gravity model of international trade work well. For instance, both higher GDP and higher GDP per capita (for the country pairing) increase trade. The coefficients are statistically significant and economically reasonable; both higher income per capita and larger country size increase trade less than proportionately. The greater the distance between two countries, the lower their trade. All three of these traditional “gravity” effects are intuitively reasonable, similar in magnitude to existing estimates, and very statistically significant. Sharing a land border, a language, or a regional trade agreement also increase trade by economically and statistically significant amounts. Ex-colonies and their

countries that are informally or unofficially dollarized (such as Brazil or Russia), or events like German Unification in 1990, or the re-integration of Okinawa with Japan in 1972.

colonizers, countries with the same colonizer, and geographically disparate areas of the same state (for instance France and its overseas departments) all have disproportionately intense trade, consistent with intuition and received wisdom. Landlocked countries and geographically large countries trade less; islands trade more. The equations fit the data well, explaining almost two-thirds of the variation in bilateral trade linkages. All this is well and good.

Above and beyond all of these real – and conventional – factors, there is compelling evidence that the international monetary regime matters. Countries that use the same currency tend to trade disproportionately, even holding up to eleven other real factors constant. The effect (which is measured as the exponential of the coefficient γ) is economically large. My best estimate is that *countries with the same currency trade over three times as much with each other as countries with different currencies!*²

Without taking the precise estimates too literally, it seems clear that trade is substantially higher for countries that use the same currency, holding other things equal. This positive result stands in contrast to received wisdom. For instance, the European Commission (1990, p 73) wrote: “Since the empirical research has not found any robust relationship between exchange rate variability and trade it is not possible to estimate the increase in intra-EC trade that might derive from the irrevocable fixing of exchange rates.” The mistake the EC made was in identifying currency union with the elimination of exchange rate volatility, when belonging to a currency union is clearly very different from simply stabilising exchange rates.

Extensive sensitivity analysis has been performed to check the robustness of these results; sceptical readers can check it out in Rose (2000b). In particular, the results do not depend sensitively on the exact way that the equation is specified or estimated, or the exact way that the

² Since $\exp(1.25) \approx 3.5$.

variables are measured. An extensive search for omitted variables – which might lead one to conclude incorrectly that currency unions affect trade when it is really some third factor that matters – turned up nothing. Reverse causality also does not explain away the findings. In all, some fifty different perturbations of the basic model yield no smoking gun. The effect of currency unions on trade remains large and significant throughout.

Of course one should remember that no currency union of the size and scope and EMU has been attempted before. Most currency unions involve small and poor nations. The enormous impact that currency unions seem to have on these nations may thus be much bigger than the effect of EMU on European trade. Then again, it may not; the significant “home bias” in trade certainly indicates that a large expansion of intra-European trade is eminently plausible. Only time will tell. Still, it is best not to take the estimation results too literally.

To summarize, the gravity model of international trade works well in a variety of different dimensions. This bolsters confidence in my main finding: *there is a large positive effect of a common currency on trade.*

Understanding the Relationship

It is clear that a common currency should encourage trade. The puzzle is that the effect seems to be so enormous. Why does sharing a currency have such an enormous effect on trade? There are many possible explanations. A common currency represents a serious government commitment to long-term integration. This commitment could, in turn, induce the private sector to engage in much more international trade. Perhaps hedging exchange rate risk is much more difficult than commonly believed, as business managers often state. Alternatively, a common currency could induce greater *financial* integration, which then leads to stronger trade in goods

and services. More generally, money facilitates trade in its roles as both unit of account and as medium of exchange. Fewer, more widely accepted moneys facilitate more trade, as has been recognized since at least Mundell (1961). Still, it is wisest to conclude that we simply don't know why a common currency seems to facilitate trade so much. The most obvious benefit – foregoing the cost of hedging exchange rate risk – appears to be low.

Nevertheless, even if we don't know *why* a common currency makes a big difference, it is plausible *that* it does. The evidence presented here has separated the common currency component from the other characteristics that differentiate within-country *intranational* trade from cross-country *international* trade. The evidence of *intranational* bias is clear; trade within countries is simply huge compared to trade between countries, even for countries within well-integrated areas like the European Union. Countries have a number of important aspects for commercial trade, including a common currency, common cultural norms, common legal system, common history, common norms, and so forth. A common currency is a piece of this package; and it seems to be an important piece. One need not take my precise estimates too literally to agree with this reasoning.

Impact on the UK

The United Kingdom currently does approximately half of its external trade with the eleven current EMU countries. The exact figures are in Table 2, and vary slightly depending on whether one uses data from the IMF's "Direction of Trade" or the OECD's "Monthly Statistics of Foreign Trade." Since the UK does not have especially strong trading relationships with Denmark, Greece or Sweden, the numbers do not depend that much on whether one looks at British trade with the EMU-11 or with all fourteen other members of the EU.

----- Insert the British Trade Table around here -----

The UK is also an open economy. 1999 data from the “Pocket Databank” show exports and imports of 249.1 and 286.3 billion pounds sterling (at 1995 prices). Since total British GDP was 788.6 billion pounds, the UK trades just over two-thirds (68%) of its output.

This combination of strong ties to euroland and openness means that the UK has potentially a lot to gain from the trade boost which joining EMU may provide. In my work with Frankel (2000), I estimate that British entry into EMU could result eventually in a tripling of British trade with euroland, raising total trade for the UK conceivably to 130% of GDP. In that work, we also find that every one percent increase in trade (relative to GDP) eventually raises income per capita by roughly 1/3 of a percent over the long run. If our estimates are accurate, the total increase in British GDP that results from the trade expansion spurred by GDP could be substantial. While our estimates lack precision, we estimate the eventual boost to British GDP to be as much as 20%. Of course, there is considerable uncertainty about these results, and one should not take the precise estimates too seriously. More countries in currency unions are considerably smaller than the UK, so that the expansion of British trade may be overstated. And while their might be an immediate expansion of trade, the cumulative effects will take two or three decades to appear fully. But even an effect that is an order of magnitude lower than our 20% estimate, would be of enormous consequence.

Broader Implications

The findings presented in this paper imply that EMU may lead to an expansion of trade inside Europe. The rise in trade could be enormous; my estimate is that intra-European trade may eventually triple. It will also be unexpected.

As a result, there will be great benefits for consumers. The most important consequence of increased trade is increased gains from trade. As the deadweight loss of using different currencies vanishes, competitive pressures increase, prices fall and consumers gain. The size of these gains may be large; Frankel and Romer (1999) estimate that increasing the ratio of trade to GDP by one percentage point raises income per person by between one-half and two percent. Given potential gains of this magnitude, trade need not triple for a common currency to induce large welfare gains! There may also be dynamic gains if growth rates increase.

Even more visible consequences of an increase in trade caused by EMU may take place outside euroland. If EMU causes radically increased intra-European trade and its benefits, other countries may well take the plunge, spreading currency unions even further. Many countries both inside Europe and elsewhere are toeing the water at present. Above and beyond the UK, Sweden, Denmark, and future EU-entrants are contemplating joining EMU; Argentina, Mexico, Ecuador, El Salvador, and Canada are considering adopting the American dollar. If the benefits of a common currency have been underestimated, more will consider relinquishing monetary sovereignty.

A large increase in trade precipitated for whatever reason (such as the introduction of a common currency) brings benefits but may bring also tensions. For instance, there may be an increase in trade disputes as a result of the increase in trade. A common currency may create much trade, but it may also divert trade from low-cost non-European producers to less efficient European producers who benefit from being in EMU (though in my research I find no evidence

of harmful trade diversion in the data). An increase in trade also affects the very sustainability of the currency union. As trade increases, business cycles can in principle move either more asynchronously (as countries specialize to take advantage of comparative advantage) or more closely together (if most shocks are monetary or most trade is intra-industry trade). The relationship between trade and business cycle synchronization depends on the nature of business cycle shocks and the evolving economic structure of the countries. Historically, closer international trade between countries has been associated with more synchronized business cycles. Thus, an increase in intra-European trade precipitated by EMU, could make EMU itself more sustainable by increasing the synchronization of European business cycles.

Conclusion

The decision to enter a currency union is based on many economic and political criteria. This paper has ignored nearly all of them. Still, currency union-sceptics are sceptical in part because they perceive few advantages from a common currency. One of the few undisputed benefits of joining a currency union is the encouragement of trade. That effect has not been quantified until now. Instead, economists have used the negligible effect on trade of eliminating exchange rate volatility. As a result, the current consensus is that currency unions have hardly any effect on trade. The case for a common currency is weaker accordingly.

I contend that such scepticism is unwarranted, so that a potent argument in favour of currency unions has been under-stated in the literature. Data for the many countries that share currencies in the real world point to an unambiguous conclusion. Even after taking a host of other considerations into account, countries that share a common currency engage in substantially higher international trade. And more trade results in higher income. My estimate is

that British trade with euroland may eventually triple as a result of British entry into EMU, conceivably resulting in a doubling of British trade and a 20% boost to British GDP in the long run.

Sovereign monies are important (though perhaps inadvertent) national barriers to trade. The monetary barriers are now falling across Europe. The UK should seriously consider whether it wishes to forgo this historic opportunity for an enormously beneficial expansion of its European trade.

Table 1: Currency Unions, 1970-1995

Australia

Christmas Island (territory)
Cocos (Keeling) Islands (territory)
Norfolk Island (territory)
Kiribati
Nauru
Tuvalu
Tonga (pre '71)

Denmark

Faroe Islands (part of Denmark)
Greenland (part of Denmark)

East Caribbean Currency Area

Anguilla (territory of UK)
Antigua and Barbuda
Dominica
Grenada
Montserrat (territory of UK)
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines

France

French Guiana (overseas department)
French Polynesia (overseas territory)
Guadeloupe (OD)
Martinique (OD)
Mayotte (territorial collectivity)
New Caledonia (OT)
Reunion (OD)
Saint Pierre and Miquelon (TC)
Wallis and Futuna Islands (OT)
Monaco

France and Spain

Andorra

India

Bhutan

Belgium

Luxembourg

CFA Franc Zone

Benin
Burkina Faso
Cameroon
Central African Republic
Chad
Comoros
(Republic of) Congo
Cote d'Ivoire
Equatorial Guinea (post '84)
Gabon
Guinea-Bissau
Mali (post '84)
Niger
Senegal
Togo

Italy

San Marino
Vatican

Morocco

Western Sahara

Norway

Svalbard (territory)

South Africa

Lesotho
Namibia
Swaziland

Switzerland

Liechtenstein

New Zealand

Cook Islands (self-governing, associated with NZ)
Niue (self-governing, associated with NZ)
Pitcairn Islands (territory of UK)
Tokelau (territory of NZ)

Turkey

Northern Cyprus

UK

Falkland Islands (territory)
Gibraltar (territory)
Guernsey (dependency)
Jersey (dependency)
Man, Isle of (dependency)
Saint Helena (territory)
Scotland (?)
Ireland (pre '79)

USA

American Samoa (territory)
Guam (territory)
US Virgin Islands (territory)
Puerto Rico (commonwealth associated with US)
Northern Mariana Islands (commonwealth in political union with US)
British Virgin Islands (territory of UK)
Turks and Caicos islands (territory of UK)
Bahamas
Bermuda
Liberia
Marshall Islands
Micronesia
Palau
Panama
Barbados (? 2:1)
Belize (? 2:1)

Singapore

Brunei

Table 2: British Trade

UK Merchandise Trade				
	1998	1999Q3	1998	1999Q3
Total Trade	Exports		Imports	
IMF	268150	67116	309790	79811
OECD	22770		26411	
Trade with EMU-11				
IMF	130974	32916	139971	35851
OECD	12177		13242	
Trade with EU-14				
IMF	142009	35464	150063	38457
OECD	13211		14208	
Percentage Trade with EMU-11				
IMF	49%	49%	45%	45%
OECD	53%		50%	
Percentage Trade with EU-14				
IMF	53%	53%	48%	48%
OECD	58%		54%	
IMF Data from <i>Direction of Trade Statistics</i> March 99 millions of US\$				
OECD Data from <i>Monthly Statistics of Foreign Trade</i> 1999				
millions of US\$ at monthly rates				

Technical Annex

This appendix describes the model, methodology and data set used to estimate the effect of common currencies and exchange on trade.

The Methodology

An augmented gravity model is used to estimate the effects of currency unions and exchange rate volatility on trade. The model is “augmented” in that the standard gravity model only includes income and distance variables. In order to account for as many other factors as possible, the equation adds a host of extra conditioning variables as well as the all-important monetary variables:

$$\begin{aligned} \ln(X_{ijt}) = & \beta_0 + \beta_1 \ln(Y_i Y_j)_t + \beta_2 \ln(Y_i Y_j / \text{Pop}_i \text{Pop}_j)_t + \beta_3 \ln D_{ij} + \beta_4 \text{Cont}_{ij} + \beta_5 \text{Lang}_{ij} + \beta_6 \text{FTA}_{ijt} \\ & + \beta_7 \text{ComNat}_{ij} + \beta_8 \text{ComCol}_{ij} + \beta_9 \text{Colony}_{ij} + \beta_{10} \text{Land}_{ij} + \beta_{11} \log(\text{Area}_i + \text{Area}_j) \\ & + \beta_{12} \log(\text{Area}_i \text{Area}_j) + \beta_{13} \text{Island}_{ij} + \gamma \text{CU}_{ijt} + \varepsilon_{ijt} \end{aligned}$$

where i and j denotes countries, t denotes time, and the variables are defined as:

- X_{ij} denotes the value of bilateral trade between i and j ,
- Y is real GDP,
- Pop is population,
- D_{ij} is the distance between i and j ,
- Cont_{ij} is a binary variable which is unity if i and j share a land border,
- Lang_{ij} is a binary variable which is unity if i and j have a common official language,
- FTA_{ij} is a binary variable which is unity if i and j belong to the same regional trade agreement,

- $ComNat_{ij}$ is a binary variable which is unity if i and j are part of the same nation (e.g., France and its overseas departments),
- $ComCol_{ij}$ is a binary variable which is unity if i and j were colonies after 1945 with the same colonizer,
- $Colony_{ij}$ is a binary variable which is unity if i colonized j or *vice versa*,
- $Land_{ij}$ is 2 if both i and j are land-locked, 1 is one of them is, and 0 otherwise,
- $Area_i$ is the area of country i ,
- $Island_{ij}$ is 2 if both i and j are islands, 1 is one of them is, and 0 otherwise,
- CU_{ijt} is a binary variable which is unity if i and j use the same currency at time t ,
- β is a vector of nuisance coefficients, and
- ϵ_{ij} represents the myriad other influences on bilateral exports, assumed to be well behaved.

The coefficient of interest is γ , the effect of a currency union on trade flows. This is a coefficient that has not been estimated by others in the literature to my knowledge.

This equation is estimated with ordinary least squares, though the exact estimation technique turns out not to matter very much. I estimate various specifications of pooled regression with year controls (individual year results can be found in Rose, 2000b). To test the significance of individual coefficients, standard errors are reported which are robust to heteroskedasticity and clustering.

Substantial sensitivity analysis can be found in Rose (2000b). In that paper I show that my results are robust to: the exact measurement of CU , the exact measure of distance, the inclusion of extra controls, sub-sampling, and different estimation techniques.

The Data Set

The model is estimated using a data set with 41,678 bilateral trade observations spanning six different years (1970, 1975, 1980, 1985, 1990, and 1995). Observations are missing for some

of the regressors so the usable sample is smaller. All 186 countries, dependencies, territories, overseas departments, colonies, and so forth for which the United Nations Statistical Office collects international trade data are included in the data set. For convenience, all of these geographical units are referred to as “countries.” In this sample, there are 406 observations where two countries trade and use the same currency.

The trade data are taken from the *World Trade Database*, a consistent recompilation of the UN trade data presented in Feenstra, Lipsey and Bowen (1997). This data set is estimated to cover 98% of all trade. Further description of the data set can be found in my Rose (2000b).

Table A1: Estimation Results

Currency Union	2.11 (.13)	1.53 (.13)	1.22 (.13)	1.25 (.13)	1.37 (.13)
(Log) Distance	-1.22 (.01)	-1.09 (.02)	-1.09 (.02)	-1.04 (.02)	-1.06 (.02)
(Log Product) Real GDP per capita	.66 (.01)	.64 (.01)	.66 (.01)	.56 (.01)	.49 (.01)
(Log Product) Real GDP	.78 (.01)	.79 (.01)	.80 (.01)	.88 (.01)	.94 (.01)
Regional Trade Agreement		1.31 (.07)	1.25 (.07)	1.08 (.07)	1.17 (.07)
Common Language		.73 (.03)	.44 (.04)	.57 (.04)	.53 (.03)
Common Land Border		.37 (.07)	.43 (.07)	.62 (.07)	.63 (.07)
Common Colonizer			.65 (.05)	.47 (.05)	.45 (.05)
Same Nation			1.08 (.28)	.97 (.28)	.99 (.29)
Colonial Relationship			2.19 (.07)	1.99 (.07)	1.99 (.07)
Number of Landlocked Countries				-.39 (.03)	
(Log of) Sum of Land Area				-.22 (.01)	
(Log of) Product of Land Area					-.15 (.01)
Number of Island Countries					.04 (.02)
R²	.61	.62	.63	.64	.64
RMSE	2.05	2.03	2.00	1.98	1.98

OLS estimation. Robust standard errors recorded in parentheses.

Year-specific intercepts not recorded.

Sample size = 31,101. Regressand is log of bilateral trade.

References

- Calmfors Commission (1997) "EMU: A Swedish Perspective" (Kluwer, Norwell).
- Commission of the European Communities (1990) "One Market, One Money" *European Economy* 44.
- Feenstra, Robert C., Robert E. Lipsey and Harry P. Bowen (1997) "World Trade Flows, 1970-1992, with Production and Tariff Data" NBER Working Paper No. 5910.
- Feldstein, Martin (1997) "The Political Economy of the European Economic and Monetary Union" *Journal of Economic Perspectives* 11-4, 23-42.
- Frankel, Jeffrey A. and David Romer (1999) "Does Trade Cause Growth?" *American Economic Review* 89-3, 379-399.
- H.M. Treasury (2000) *Pocket Databank* April 28 available from http://www.hm-treasury.gov.uk/e_info/overview/pdb280400.PDF
- International Monetary Fund (1999) *Direction of Trade Statistics* March.
- McCallum, John (1995) "National Borders Matter: Canada-U.S. Regional Trade Patterns" *American Economic Review* 85-3, 615-623.
- Mundell, Robert A. (1961) "A Theory of Optimum Currency Areas" *American Economic Review* 51, 509-517.
- OECD (1999) *Monthly Statistics of Foreign Trade* December.
- Rose, Andrew K. (2000a) "Does a Currency Union Boost International Trade?" *California Management Review*.
- Rose, Andrew K. (2000b) "One Money, One Market: Estimating the Effect of Common Currencies on Trade" *Economic Policy*.
- Rose, Andrew K. and Charles M. Engel (2000) "Dollarization and Integration" available at <http://haas.berkeley.edu/~arose>.
- Rose, Andrew K. and Jeffrey Frankel (2000) "An Estimate of the Effect of Currency Unions on Trade and Growth" available at <http://haas.berkeley.edu/~arose>.

Endnotes