

# The Currency Union Effect on Trade: Early Evidence from the European Union

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### *Abstract*

In this paper we estimate the early effect of the European Monetary Union (EMU) on trade. We use a panel data set that includes the most recent information on bilateral trade for 22 developed countries from 1980 through 2001. During this period 12 European countries formally entered into a currency union. This is a unique event that allows us to study the effect of currency union on trade among a relatively homogenous group of industrial countries. Controlling for a host of other factors, we find that a pair of countries which joined the EMU experienced an increase in trade between 12 and 19 percent, depending on the sample. Our estimate is much smaller than that in Glick and Rose (2001), who study a similar problem using a completely different sample, in which currency unions are formed mainly by very small and poor countries. However, the effect of EMU on trade is significant, and economically important, particularly if we consider that our sample only covers the first three years of the EMU, a period in which the Euro did not even circulate.

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## Introduction

In the last couple of years there has been a growing literature on the impact of common currencies on trade. The first paper to tackle this issue directly was Rose (2000), who added a currency union dummy to a gravity model of bilateral trade. In order to have enough country pairs with common currencies to allow an estimation of the effect, he included in his sample not only countries, but also all the dependencies, territories, colonies and overseas departments for which the United Nations collects international trade data. In this way, he put together a sample of 186 countries.<sup>1</sup> To his own surprise, and that of the rest of the profession, Rose found that the impact of common currency on trade is huge! Specifically, other things equal – he controls for such variables as common border, common language, colonial links, membership in same FTA, etc --, two countries that share a common currency trade over three times as much as do otherwise similar countries with different currencies. Rose performed extensive sensitivity analysis and found the result to be very robust. A problem with this finding is that most currency unions in the sample are either formed by very small or very poor countries (such as those in the Eastern Caribbean Currency Area, of the CFA countries in Africa) or by very small or poor countries adopting the currency of larger ones (such as Tonga and Australia, or Reunion and France). It is not clear how applicable these results would be to larger countries.

Rose's first study was based on cross-section analysis. Therefore, the question it answers is whether countries that share a common currency trade more than others that do not. While this question is obviously interesting, it is not exactly the right question from a policy perspective. What one would want to know, as a policymaker, is the impact of a currency union on those countries that adopt it. In order to respond this question, Glick and Rose (2001) study the impact of currency union using panel data from 1948 through 1997. This extended period of time is crucial, since it allows the authors to have enough country pairs with periods in which they shared currencies, as well as periods in which they did not. These are actually the country pairs that provide the information from which the currency union effect is estimated. Glick and Rose's answer to the "right" policy question is that adopting currency unions nearly doubles bilateral trade among member countries.<sup>2</sup> Notice, however, that the sample ends in 1997, before the creation of the EMU. Thus, while Glick and Rose answer the right policy question, their answer is relevant mostly for the case of very small and/or poor countries, which are primarily the ones that have had currency unions in their sample.

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<sup>1</sup> Within this sample, there are over 300 observations for which two countries trade and share a common currency, which allows for the estimation of the currency union effect.

<sup>2</sup> Actually, the sample used by Glick and Rose includes mostly countries that exited currency unions, rather than countries that joined them.

These important and controversial findings by Rose and his co-authors have launched a large number of studies, some of them criticizing their work on methodological grounds, and seeking to “shrink” the currency union effect.<sup>3</sup> Two papers worth mentioning, among Rose’s critics, are those of Persson (2001) and Tenreyro (2002).

Persson (2001) argues that the results in Rose (2000) may be biased due to the combination of two factors. First, the effects of some of the explanatory variables may be non-linear. While size, for example, may affect bilateral trade, it is possible that the effect of size on bilateral trade is different at different sizes. Second, the likelihood that two countries will adopt a common currency is not random, and may depend on some of the explanatory variables. For example, the likelihood of forming currency unions may be larger for small countries. Persson argues that this combination of non-random selection into currency unions and non-linearities can result in biased estimates of the currency union effect.

He proposes a different methodology, based on matching techniques borrowed from the labor literature: he first looks at the determinants of currency unions, and produces a currency union “propensity score” for each country pair. Then, for each “treatment” observation with currency union, he chooses a “control” observation, which is the closest to the “treated” observation according to the propensity score. Finally, he estimates the treatment effects, that is, the effect of currency union on trade, using exclusively these treated observations and their controls. Using this methodology, he finds the effect of currency union on trade to be 65 percent.<sup>4</sup> But while Persson’s methodology solves the problem of non-random selection into currency unions, it does not solve the problem that concerns us: his treatment effect is still only relevant for the type of countries that, in his sample, tend to form currency unions: the very small and poor ones.

Tenreyro (2002), as Persson, also stresses the problem of endogenous selection into a currency union. In addition, she is concerned with Rose’s treatment of the observations with zero trade, which in Rose’s papers are eliminated by the use of log (trade) as the dependent variable. In order to solve the problems of zero-trade observations, she works with trade flows aggregated over five years.<sup>5</sup> To deal with the self-selection issue, she

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<sup>3</sup> The prize for best title among Rose’s critics goes to Volcker Nitsch, for his paper “Honey, I just shrank the currency union effect.”

<sup>4</sup> A different but related methodology used by Persson yields an effect of 13 percent.

<sup>5</sup> While this solves the problem of the countries which trade some years but do not trade in others, it does not address the problem of countries that do not trade throughout the sample, which we believe is a more important one. In particular, if country pairs that do not share a common currency are more likely to have

estimates the determinants of currency unions and then reexamines the impact of currency unions on trade after accounting for self-selection. She finds that the currency union effect increases trade by 60 percent, although the effect is not statistically different from zero. As in the case of Persson, nothing in this paper addresses the issue that concerns us: all the results are derived from currency unions formed primarily by small and/or poor countries.

Two papers that provide some hints about the currency effect on trade in large countries using historical data are Estevadeordal, Frantz and Taylor (2002) and López-Córdova and Meissner (2002). Both of these papers look at the experience of countries during the gold standard, using smaller samples that consist primarily of industrial countries and a small group of large developing countries.<sup>6</sup> Estevadeordal, Frantz and Taylor, using data from 1870 through 1939, find that common participation in the gold standard increased trade between 34 and 72 percent, depending on the specification used. López-Córdova and Meissner, using data from 1870 through 1910, find the gold standard effect to be 60 percent. In addition, they find that currency unions double trade, a result that is very similar to that found by Glick and Rose (2001).

Another recent paper that has addressed this problem is Rose and van Wincoop (2000). This paper, which is in turn based on a model of bilateral trade developed by Anderson and van Wincoop (2000), estimates the *potential* EMU effect on trade, using data on pre-EMU currency unions. According to the theory, bilateral trade between a pair of countries depends on their bilateral trade barrier *relative* to average trade barriers with all trade partners (i.e., their multilateral trade barrier or “multilateral resistance.”). When a country reduces trade barriers vis a vis an important trading partner, the bilateral trade barrier falls, but the multilateral trade barrier falls considerably as well. Thus, the *relative* trade barrier only falls by little. In contrast, a reduction of trade barriers with a country with which one trades very little will have almost insignificant effects on multilateral trade barriers. Thus, the relative trade barrier falls by a lot. This has the following implication: the stronger the level of pre-union trade among the members of a currency union, the smaller the percentage increase in trade among its members. Accordingly, we would expect a currency union between two small and distant countries to have a large trade effect, but a currency union between large and proximate countries to have much smaller effects. Welfare effects, however, are larger among countries that do trade a lot. The methodology allows the authors to estimate the trade effect of different potential

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zero trade, the elimination of these observations would produce biased estimates. However, the effect would be to underestimate the currency union effect, rather than overestimate it.

<sup>6</sup> López-Córdova and Meissner (2002) include the following developing countries in their 29-country baseline sample: Argentina, Brazil, Chile, China, Egypt, India, Indonesia, Mexico and Philippines.

currency unions, even those that have not yet been created. For the case of the EMU, Rose and van Wincoop find that increase in trade would be of the order of 60 percent, while the gain in welfare would be 11 percent.

While the methodology used by Rose and van Wincoop to calculate the implied trade effects of currency unions is quite powerful, the estimated effects depend crucially on assumptions made regarding the elasticity of substitution between different goods. Moreover, it is now possible to estimate the effects of EMU on trade between its members in a direct way, since data on trade are already available for 1999 through 2001. In what follows, we will present our own results on the trade effect of currency unions, which are drawn directly from the early experience of the countries in the European Monetary Union. By focusing on the time series dimension, and by working with countries that joined, rather than exited, currency unions, we respond the “right policy question”: the effect of currency unions on those countries that join them. By focusing on the experience of the EU countries, we provide evidence derived from the other end of the spectrum regarding country size and income.

### **Methodology, data and empirical results**

Our methodology is based on the gravity equation of bilateral trade. According to the gravity model, bilateral trade depends on the GDPs of the countries involved, and on the distance between them. Additionally, trade between two countries may be affected by whether these countries share a common border, a common language, or are members of the same free trade area. We introduce all these variables in the gravity model, and we augment it by including a dummy variable that takes a value of one when the two countries in the pair belong to the EMU.

We work with trade data from the IMF Direction of Trade statistics, between 1980 and 2001. Trade data are deflated by the US CPI. We use in our analysis two different samples of industrial countries. The first one includes all 22 industrial countries included in the DOTS dataset (see appendix for list of countries). The second one is restricted to the fifteen countries that are members of the European Union (we actually have fourteen countries, since Belgium and Luxembourg are considered together in the dataset). Although smaller, we think that this second sample provides us with the cleanest possible experiment, since all countries are proximate and belong to the same single market. The EU sample results in a total of 91 ( $14 \times 13 / 2$ ) country pairs. Out of these, 10 of them (counting Belgium and Luxembourg as one) are members of the European Monetary

Union.<sup>7</sup> Thus there are 45 country pairs (10x9/2) that share a common currency, and 46 country pairs that do not. We exploit this variation to estimate the effect of EMU on trade. It is worth mentioning that neither of our samples contains observations with zero trade, which saves us the trouble of dealing with this aspect of the gravity model.

Our explanatory variables are taken from different sources. Population and real GDP data (in constant dollars) come from “World Development Indicators”.<sup>8</sup> Most country-specific variables (coordinates, borders, etc) are taken from CIA’s “World Factbook”. Finally, we obtain the information of trade agreements from the Integration Department of the IDB. Following the previous literature, we do cross and panel estimations of the gravity equation.

### *Cross-section analysis*

We begin by estimating the gravity equation year by year using conventional OLS. The gravity models we estimate yearly as a cross section try to explain bilateral trade flows as a function of the EMU dummy, controlling for nominal GDP, nominal GDP per capita, common border, common language, distance, surface, landlocked and island characteristics and free trade agreements. The model we estimate year by year is the following:

$$\begin{aligned} \ln T_{ij} = & \beta_0 + \beta_1 \ln Y_i Y_j + \beta_2 \ln y_i y_j + \beta_3 \text{Cont}_{ij} + \beta_4 \text{Lang}_{ij} + \beta_5 \ln D_{ij} + \beta_6 \text{Surf}_{ij} \\ & + \beta_7 \text{LandLock}_{ij} + \beta_8 \text{Island}_{ij} + \beta_9 \text{FTA}_{ij} + \beta_8 \text{EMU}_{ij} + \varepsilon_{ij} \end{aligned}$$

where  $T$ ,  $Y$ ,  $y$ ,  $Cont$ ,  $Lang$ ,  $D$ ,  $Surf$ ,  $Landlock$ ,  $Island$  and  $FTA$  represent bilateral trade,<sup>9</sup> nominal GDP (in constant US\$), GDP per capita, common language, distance, surface product, the number of landlocked countries in the pair, the number of islands in the pair, and common membership in a Free Trade Area, respectively. In this setup, the dummy EMU takes a value of one for the 45 EMU country-pairs discussed above. Notice that this dummy takes a value of one for these pairs even before the formation of the European Monetary Union. As an example, we assign a value of 1 to the Spain-Germany country pair for the year 1993, even though the EMU did not exist at the time. The goal of our experiment is to follow the value of the coefficient for this dummy over time. If the EMU has an effect on trade, we should observe an increase in the coefficient corresponding to our EMU dummy following its creation.

<sup>7</sup> The accession of Greece to the euro area, as a twelfth member, takes place in January 2001. In the results reported in the main body of the paper, we consider Greece as a non-EMU country. In the appendix, we check the robustness of our results to the inclusion of Greece in EMU.

<sup>8</sup> WDI data on GDP was complemented for 2001 with data from the OECD Main Indicators.

<sup>9</sup> Following Rose (2000), we define trade as the average value of bilateral imports and exports in constants dollars.

The model fits the data well (all the  $R^2$  are near 0.9). The gravity coefficients are economically and statistically significant, and have the expected sign. Countries that are larger, richer, share a common border or a common language tend to trade more, while countries that are more distant tend to trade less. In Table 1, we report only the coefficient corresponding to the EMU dummy year by year beginning in 1992, the year in which the Maastricht Treaty was signed. Each of the coefficients reported in the table for each of the samples corresponds to a separate cross-section regression, in which the rest of the gravity variables were included (but are not reported in the Table).<sup>10</sup>

**Table 1. EMU Coefficients in the cross section model**

Year	Developed		European	
	Coefficient	t-Stat	Coefficient	t-Stat
1992	0.308	(3.89)***	0.217	(2.44)**
1993	0.331	(4.13)***	0.216	(2.36)**
1994	0.315	(3.71)***	0.252	(2.75)***
1995	0.317	(3.55)***	0.222	(2.38)**
1996	0.338	(3.75)***	0.243	(2.59)**
1997	0.346	(3.93)***	0.265	(2.98)***
1998	0.359	(4.20)***	0.314	(3.62)***
<b>1999</b>	<b>0.464</b>	<b>(5.14)***</b>	<b>0.387</b>	<b>(4.22)***</b>
<b>2000</b>	<b>0.467</b>	<b>(5.15)***</b>	<b>0.410</b>	<b>(4.48)***</b>
<b>2001</b>	<b>0.462</b>	<b>(4.96)***</b>	<b>0.417</b>	<b>(4.38)***</b>

Note: Beside EMU, we control for GDP, GDP per capita, distance, land lock, island, FTA, common language and borders. The EMU dummy does not include Greece that becomes member only in the year 2001. The number of observation are 5802 and 2002 when we consider the developed country and European country sample, respectively. The European Monetary Union was created in 1999. Robust t-statistic in parenthesis.

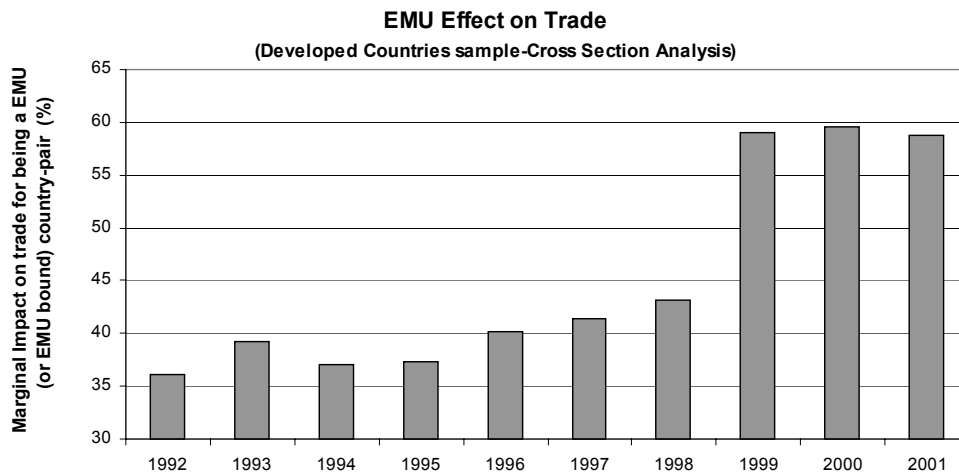
\*\* significant at 5% \*\*\*significant at 1%.

As the table shows clearly, the EMU dummy is always positive and statistically significant. The key, for our purposes, is not the statistical significance of the EMU dummy coefficient, but rather its evolution and in particular the jump in the coefficient after 1999, when the EMU was formally created. This jump is observed under both of our samples. Since the results are fairly similar, here we will discuss only those corresponding to the developed country sample. In order to obtain the trade effect of the EMU dummy for each year, we need to transform the coefficient, since bilateral trade is measured in logs. For example, for the year 1999 the coefficient of the dummy (.464) implies that countries in EMU trade among them 59 percent more [ $\exp(.464) - 1$ ] than countries that do not share the common currency. However, our results show that the EMU countries were already trading more among themselves before the formal creation of the EMU, other things equal. The coefficient for 1996, for example, suggests that two

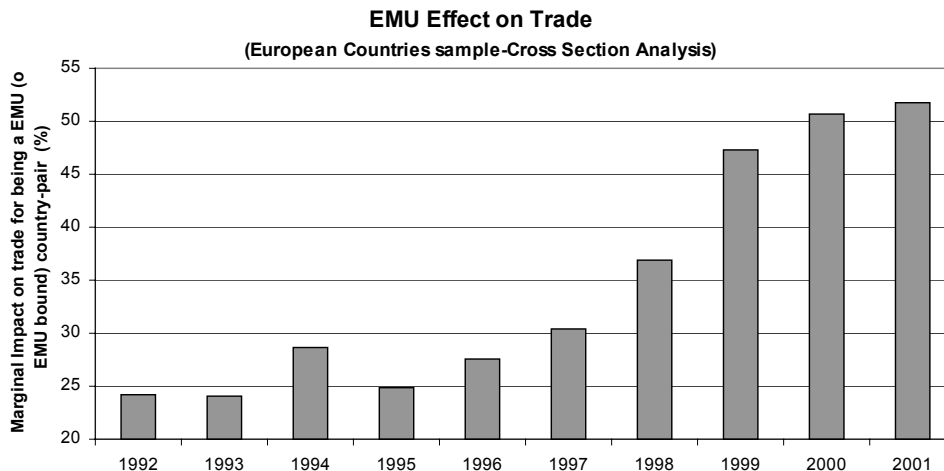
<sup>10</sup> A complete set of results is reported in appendix 1. Appendix 2 reports similar results, including Greece as a EMU country.

EMU-bound countries were trading 40 percent more ( $\exp(.338) - 1$ ) than two otherwise similar countries. If we were to take 1996 as the typical pre-EMU year, these results would suggest that the creation of EMU increased trade among its members by around 14% percent [since  $(1.59/1.40) - 1 = 0.14$ ]. This difference is significant at 1%. Figure 1 presents the yearly EMU trade effects, for the case of the Developed Countries sample and Figure 2 for the case of EU sample. Figure 2 suggests that trade among EMU pairs started to increase before 1999, in anticipation of the formation of EMU. This result does not appear as clearly when we consider the developed country sample (Figure 1).

**Figure 1**



**Figure 2**



A shortcoming of the cross-section analysis presented above is that it does not use all the information available and allows that coefficients (beside EMU) vary over time. In what

follows, we estimate a model using panel data, in which we control by country-pair and by year.

### *Fixed Effects Analysis*

The fixed effect “within” estimator is the most appropriate way to exploit the panel nature of the data and allows us to control for omitted variables. In this setup, we explain trade as a function of nominal GDP, nominal GDP per capita, common membership in free trade agreements, common membership in the European Union, a country-pair fixed effect and year dummies. Variables such as distance, common border and common language are captured by our country-pair fixed effects, as well other unobservable variables. For our first exercise in this section we estimate the following model:

$$\ln T_{ijt} = \beta_{ij} + \beta_1 \ln Y_{it} Y_{jt} + \beta_2 \ln y_{it} y_{jt} + \beta_3 FTA_{ijt} + \beta_4 EU_{ijt} + \sum_{\tau \in \{1981, 2001\}} \beta_{5\tau} I(\tau = t) EMU_{ij} + \varepsilon_{ijt}$$

where  $I(\tau=t)$  is an indicator function that is one if  $\tau$  is equal to  $t$  and zero otherwise, the rest of the variables are defined as before and year dummies are included. The estimated year-coefficients ( $\beta_{5\tau}$ ) for EMU show the excess trade of EMU-bound country pairs across time.<sup>11</sup>

The results are reported in Table 2 (year-coefficients for EMU prior to 1992 are not reported here but are reported in appendix 3), while the estimated trade effects year by year are presented in Figures 3 and 4. Results are similar to the ones using cross-section analysis. We find that the effects after the creation of EMU (starting in 1999) are statistically different from those each of those in the preceding years. This is true both for the developed and the EU sample. In addition it is interesting to note that EMU-bound country pairs increase trade among them (compared to the rest) even before the formation of the EMU. In fact, these countries increase their bilateral trade a 32 % more than the other countries in the developed country sample between 1980 and 1992. Finally, as

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<sup>11</sup> We drop the coefficient for EMU in 1980 because it is collinear with the country pair effect and the other year-coefficient for the EMU dummy variable. As before, we leave Greece out of EMU here, but check for robustness of the results to the inclusion of Greece as an EMU country in Appendix 3.

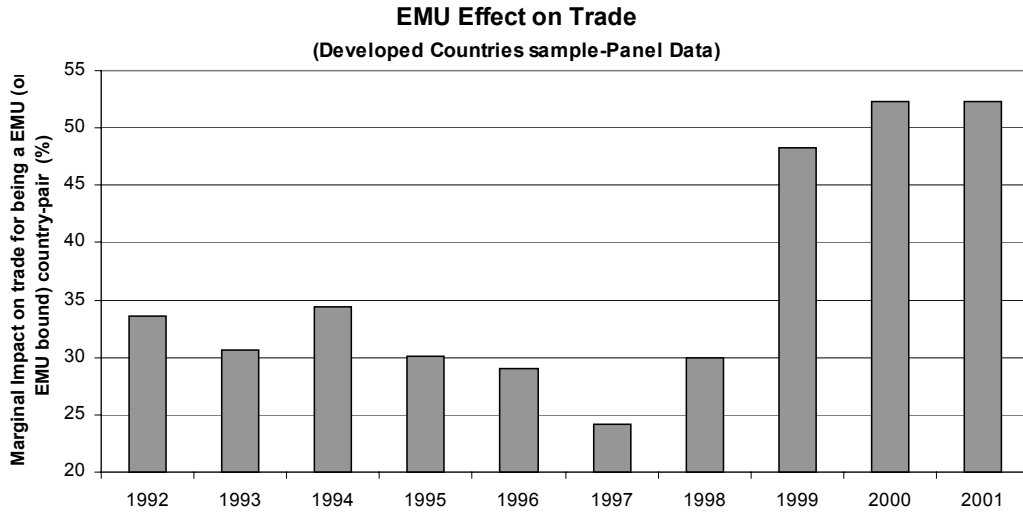
expected, the coefficient in the European Union is positive and significant at 1 percent. This result suggests that the deeper agreement of the EU boosts bilateral trade by around 12 %, beyond the effect of a normal FTA.

**Table 2. EMU Coefficients in the panel model**

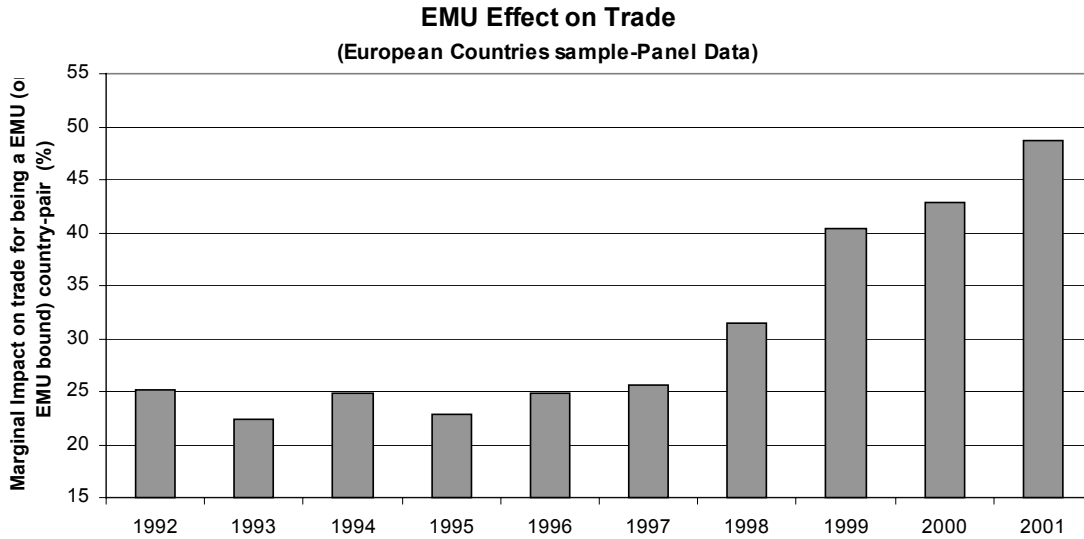
<b>Dependent Variable: Log of Bilateral trade</b>	<b>Developed Europe</b>	
Log GDP	0.611 (9.69)***	0.568 (9.19)***
Log of GDP per capita	-0.044 (0.83)	0.086 (1.72)*
Free Trade Agreement	0.065 (3.46)***	0.095 (4.42)***
European Union	0.113 (5.28)***	0.085 (3.64)***
.....		
1992*EMU	0.290 (6.27)***	0.224 (4.38)***
1993*EMU	0.267 (5.72)***	0.202 (3.91)***
1994*EMU	0.296 (6.08)***	0.222 (4.14)***
1995*EMU	0.263 (5.09)***	0.206 (3.52)***
1996*EMU	0.255 (4.81)***	0.222 (3.69)***
1997*EMU	0.216 (3.50)***	0.228 (3.26)***
1998*EMU	0.262 (4.18)***	0.274 (3.87)***
<b>1999*EMU</b>	<b>0.394</b> <b>(7.30)***</b>	<b>0.339</b> <b>(5.62)***</b>
<b>2000*EMU</b>	<b>0.421</b> <b>(7.49)***</b>	<b>0.357</b> <b>(5.62)***</b>
<b>2001*EMU</b>	<b>0.421</b> <b>(7.51)***</b>	<b>0.397</b> <b>(6.22)***</b>
Year	Yes	Yes
Country pair	Yes	Yes
Observation	5082	2002

Note: The EMU dummy does not include Greece that becomes member only in the year 2001. We control for all possible year EMU interactions, we only report the last 10. The European Monetary Union was created in 1999. Robust t-statistic in parenthesis. \* significant at 10%, \*\* significant at 5% and \*\*\* significant at 1%.

**Figure 3**



**Figure 4**



A better way to show the currency union effect in a single estimate is to use a difference-in-difference type approach. This method compares the difference in bilateral trade growth between “treated” country pairs (countries that join EMU) and the rest of the country pairs, which are used as “controls.” In this case we estimate the following model:

$$\ln T_{ijt} = \beta_{ij} + \beta_1 \ln Y_{it} Y_{jt} + \beta_2 \ln y_{it} y_{jt} + \beta_3 FTA_{ijt} + \beta_4 EU + \beta_5 FEMU_{ijt} + \varepsilon_{ijt}$$

where variables are defined as before (including year dummies) except for the FEMU dummy. This variable ( $FEMU_{ijt}$ ) takes a value of one when the two countries in the pair (i and j) formally belong to the EMU in the current year (t) and zero otherwise. Notice that the EMU was formally created in 1999, therefore the FEMU dummy is zero for all country pair before 1999. In addition, due to the fact that the European Union is a deeper agreement than the other FTAs, we include a European Union dummy (EU).<sup>12</sup> In this setup, the effect of the European Monetary Union is estimated by comparing trade for EMU country pairs before and after the creation of the currency union. The other country-pairs are used as controls.

The results are reported in Table 3. The first two columns are estimated using the whole sample (1980-2001), and columns 2 and 4 are estimated restricting the period to 1992-2001. In the latter case our currency union effect (FEMU) estimation does not capture the pre 1992 sharp increase in bilateral trade within EMU-bound countries. For the European sample, we find that the currency union effect is 24 percent when we use the whole period and 12 percent when we restrict the period to 1992-2001; while for the industrialized country sample, these effects are 23 percent and 19 percent, respectively. In this specification, the EU marginal effect over other FTAs is unstable and in some regressions it is not significantly different from zero.

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<sup>12</sup> We did not include this variable in the cross section analysis because it is very collinear with EMU in some years of the sample.

**Table 3: Difference-in difference Model with Fixed Effect**

<b>Dependent Variable: Log of Bilateral trade</b>	<b>1980-2001</b>		<b>1992-2001</b>	
	<i>Developed</i>	<i>European</i>	<i>Developed</i>	<i>European</i>
<b>Formal EMU Dummy</b>	<b>0.211</b>	<b>0.213</b>	<b>0.176</b>	<b>0.111</b>
	<b>(9.61)***</b>	<b>(8.51)***</b>	<b>(11.17)***</b>	<b>(6.33)***</b>
Log of GDP	0.702	0.743	1.964	4.729
	<b>(11.36)***</b>	<b>(11.72)***</b>	<b>(6.74)***</b>	<b>(7.72)***</b>
Log of GDP per capita	-0.091	-0.032	-1.472	-4.486
	<b>(1.75)*</b>	<b>(0.61)</b>	<b>(4.83)***</b>	<b>(6.96)***</b>
Free Trade Agreement	0.071	0.104	0.024	0.044
	<b>(3.74)***</b>	<b>(4.48)***</b>	<b>(1.16)</b>	<b>(1.69)*</b>
European Union	0.157	0.093	0.037	-0.000
	<b>(7.17)***</b>	<b>(3.72)***</b>	<b>(1.84)*</b>	<b>(0.02)</b>
Year Dummy	Yes	Yes	Yes	Yes
Country Pair Dummy	Yes	Yes	Yes	Yes
Observations	5082	2002	2310	910

Note: Robust t-statistic in parenthesis. \* significant at 10%, \*\* significant at 5% and \*\*\* significant at 1%.

To check for robustness, Table 4 presents the same regressions but using standard controls (distance, common language, etc) instead of the country-pair fixed effect. To control for unobservable variables within countries in the European Monetary Union we also include the  $EU_{ij}$  dummy beside  $FEMU_{ijt}$ . As we already mentioned, the dummy EU takes a value of one when the two countries in the pair belong or will belong to the EU and zero otherwise. Instead,  $FEMU_{ijt}$  is one only when both countries formally belong to the European Monetary Union in the current year (t). In this set up, as in the previous regressions the European Monetary Union seem to have an important effect on trade boosting bilateral trade at least in 38% percent (in the case of 1980-2001 european countries sample). The same it is not true for the additional effect of the EU over other FTAs. This dummy is unstable with different sign in different regression.

**Table 4: Difference-in Difference Model with Controls**

Dependent Variable: Log of Bilateral trade	1980-2001		1992-2001	
	<i>Developed</i>	<i>European</i>	<i>Developed</i>	<i>European</i>
<b>Formal EMU Dummy</b>	<b>0.382</b>	<b>0.319</b>	<b>0.341</b>	<b>0.338</b>
	(9.09)***	(6.13)***	(7.83)***	(6.61)***
Landlocked	-0.232	0.012	-0.214	0.003
	(9.91)***	(0.33)	(5.82)***	(0.05)
Island	-0.006	0.000	-0.048	0.000
	(0.19)		(1.02)	
Log of Distance	-0.674		-0.647	
	(43.82)***	(27.27)***	(29.96)***	(18.97)***
Surface Product	-0.049	-0.072	-0.004	-0.005
	(7.66)***	(5.83)***	(0.44)	(0.29)
Contiguity	0.443	0.489	0.467	0.468
	(13.33)***	(11.64)***	(10.01)***	(8.02)***
Common Language	1.146	0.805	1.124	0.801
	(26.67)***	(10.36)***	(17.55)***	(6.93)***
Log of GDP	0.804	0.787	0.769	0.754
	(133.81)***	(70.90)***	(88.06)***	(51.64)***
Log of GDP per capita	0.161	0.214	0.307	0.266
	(8.25)***	(8.81)***	(8.51)***	(6.35)***
Free Trade Agreement	0.217	0.176	0.146	0.038
	(5.61)***	(3.25)***	(2.59)***	(0.41)
European Union	-0.044	-0.258	0.218	-0.139
	(1.12)	(4.49)***	(4.30)***	(1.77)*
Constant	-31.957	-31.016	-34.748	-32.052
	(86.91)***	(52.47)***	(54.34)***	(30.42)***
Year Dummy	Yes	Yes	Yes	Yes
Observations	5082	2002	2310	910
R-squared	0.93	0.94	0.93	0.93

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## Conclusions

In this paper we use a panel data set that includes the most recent information on bilateral trade to estimate the early effect of the European Monetary Union on trade. Our data set includes annual bilateral trade for 22 developed countries from 1980 through 2001. During this period 12 European countries formally entered into a currency union. This is a unique event that allows us to study the effect of currency union on trade among a relatively homogenous group of industrial countries.

Controlling for a host of other factors through an augmented gravity model, even using a within estimation in panels of only 10 years, we find that a pair of countries which joined the European Monetary Union experienced an increase in trade between 12 and 19 percent, depending on the sample. Our estimate is much smaller than that in Glick and

Rose (2001), who study a similar problem using a completely different sample, in which currency unions are formed mainly by very small and poor countries. It is also much smaller than Rose and van Wincoop's (2001) out of sample estimates of the effects of EMU. However, the effect of EMU on trade is significant, and economically important, particularly if we consider that our sample only covers the first three years of the EMU, a period in which the Euro did not even circulate.

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## APPENDIX 1

### Developed Countries Sample. EMU Group without Greece

#### Dependent Variable: Log of Bilateral Trade

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Constant	-35.031 (18.81)***	-34.231 (18.99)***	-33.285 (18.45)***	-32.080 (21.28)***	-30.679 (22.42)***	-30.050 (19.76)***	-31.722 (19.16)***	-30.915 (17.65)***	-32.438 (17.26)***	-32.089 (18.75)***	-32.638 (17.83)***	-32.564 (16.25)***
<b>EMU Group</b>	<b>0.100</b> <b>(1.06)</b>	<b>0.127</b> <b>(1.37)</b>	<b>0.138</b> <b>(1.47)</b>	<b>0.155</b> <b>(1.71)*</b>	<b>0.137</b> <b>(1.49)</b>	<b>0.156</b> <b>(1.68)*</b>	<b>0.183</b> <b>(2.14)**</b>	<b>0.207</b> <b>(2.46)**</b>	<b>0.271</b> <b>(3.11)***</b>	<b>0.263</b> <b>(3.17)***</b>	<b>0.272</b> <b>(3.24)***</b>	<b>0.302</b> <b>(3.61)***</b>
Landlocked	-0.255 (2.20)**	-0.258 (2.36)**	-0.268 (2.47)**	-0.295 (2.73)***	-0.271 (2.57)**	-0.218 (2.12)**	-0.230 (2.31)**	-0.245 (2.43)**	-0.225 (2.24)**	-0.182 (1.78)*	-0.200 (1.93)*	-0.237 (2.20)**
Island	0.033 (0.20)	-0.011 (0.06)	0.112 (0.72)	0.113 (0.77)	0.110 (0.75)	0.138 (0.96)	0.081 (0.61)	0.070 (0.53)	-0.005 (0.04)	0.006 (0.04)	0.063 (0.45)	0.028 (0.18)
Log of Distance	-0.627 (7.45)***	-0.632 (7.68)***	-0.666 (8.39)***	-0.662 (8.99)***	-0.656 (9.00)***	-0.668 (9.04)***	-0.685 (9.58)***	-0.698 (9.81)***	-0.690 (9.45)***	-0.689 (9.56)***	-0.676 (9.47)***	-0.683 (9.22)***
Surface Product	-0.044 (1.41)	-0.079 (2.47)**	-0.085 (2.56)**	-0.100 (3.06)***	-0.096 (2.88)***	-0.083 (2.50)**	-0.062 (2.20)**	-0.056 (1.93)*	-0.050 (1.73)*	-0.064 (2.16)**	-0.069 (2.36)**	-0.071 (2.37)**
Contiguity	0.429 (2.27)**	0.415 (2.17)**	0.394 (2.13)**	0.385 (2.09)**	0.405 (2.21)**	0.392 (2.22)**	0.391 (2.41)**	0.417 (2.64)***	0.396 (2.51)**	0.359 (2.26)**	0.404 (2.59)**	0.391 (2.45)**
Common Language	1.281 (5.91)***	1.253 (5.77)***	1.238 (5.71)***	1.138 (5.60)***	1.125 (5.43)***	1.125 (5.55)***	1.176 (6.05)***	1.168 (5.96)***	1.143 (6.01)***	1.140 (5.89)***	1.191 (6.05)***	1.180 (5.70)***
Log of GDP	0.807 (29.50)***	0.812 (29.40)***	0.825 (28.84)***	0.812 (29.16)***	0.809 (28.53)***	0.798 (27.09)***	0.798 (30.88)***	0.800 (31.21)***	0.810 (31.75)***	0.823 (33.01)***	0.833 (33.07)***	0.822 (32.36)***
Log of GDP per capita	0.287 (3.40)***	0.287 (3.50)***	0.223 (2.81)***	0.217 (3.06)***	0.149 (2.19)**	0.132 (1.78)*	0.186 (2.58)**	0.129 (1.76)*	0.166 (2.10)**	0.133 (1.76)*	0.127 (1.55)	0.154 (1.61)
Free Trade Agreement	0.224 (1.86)*	0.183 (1.64)	0.163 (1.41)	0.203 (1.74)*	0.175 (1.52)	0.116 (0.99)	0.069 (0.61)	0.054 (0.49)	0.072 (0.63)	0.087 (0.81)	0.064 (0.60)	0.059 (0.55)
Observations	231	231	231	231	231	231	231	231	231	231	231	231
R-squared	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.94	0.93	0.93

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

*APPENDIX 1*

**Developed Countries Sample. EMU Group without Greece**

**Dependent Variable: Log of Bilateral Trade**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Constant	-32.155 (15.87)***	-32.029 (18.05)***	-35.193 (20.09)***	-34.624 (18.54)***	-36.010 (18.91)***	-37.622 (19.03)***	-36.769 (17.83)***	-35.872 (17.30)***	-34.726 (18.12)***	-34.998 (17.53)***
<b>EMU Group</b>	<b>0.308</b> <b>(3.89)***</b>	<b>0.331</b> <b>(4.13)***</b>	<b>0.315</b> <b>(3.71)***</b>	<b>0.317</b> <b>(3.55)***</b>	<b>0.338</b> <b>(3.75)***</b>	<b>0.346</b> <b>(3.93)***</b>	<b>0.359</b> <b>(4.20)***</b>	<b>0.464</b> <b>(5.14)***</b>	<b>0.467</b> <b>(5.15)***</b>	<b>0.462</b> <b>(4.96)***</b>
Landlocked	-0.214 (1.97)*	-0.226 (2.02)**	-0.290 (2.55)**	-0.291 (2.41)**	-0.256 (2.25)**	-0.220 (1.84)*	-0.162 (1.31)	-0.249 (2.04)**	-0.247 (2.01)**	-0.194 (1.58)
Island	0.036 (0.24)	-0.026 (0.17)	-0.084 (0.54)	-0.060 (0.41)	-0.021 (0.15)	-0.048 (0.33)	-0.008 (0.05)	-0.071 (0.45)	-0.117 (0.73)	-0.060 (0.39)
Log of Distance	-0.680 (9.26)***	-0.724 (10.05)***	-0.635 (10.00)***	-0.655 (10.66)***	-0.664 (10.92)***	-0.638 (9.82)***	-0.611 (9.06)***	-0.622 (9.23)***	-0.635 (9.26)***	-0.614 (8.71)***
Surface Product	-0.046 (1.58)	-0.015 (0.51)	-0.000 (0.01)	0.016 (0.59)	0.016 (0.61)	0.009 (0.32)	0.010 (0.34)	-0.021 (0.72)	-0.023 (0.76)	-0.018 (0.58)
Contiguity	0.375 (2.31)**	0.309 (1.79)*	0.394 (2.48)**	0.397 (2.51)**	0.371 (2.39)**	0.436 (2.90)***	0.457 (3.06)***	0.459 (2.98)***	0.473 (3.18)***	0.512 (3.48)***
Common Language	1.206 (5.85)***	1.229 (5.66)***	1.167 (5.88)***	1.154 (5.77)***	1.144 (5.85)***	1.011 (4.92)***	0.997 (4.88)***	1.094 (5.25)***	1.115 (5.41)***	1.072 (5.30)***
Log of GDP	0.799 (30.69)***	0.765 (29.92)***	0.767 (29.51)***	0.762 (30.52)***	0.766 (31.66)***	0.778 (32.65)***	0.785 (31.05)***	0.786 (30.96)***	0.786 (29.42)***	0.783 (29.76)***
Log of GDP per capita	0.160 (1.50)	0.225 (2.22)**	0.319 (3.27)***	0.289 (2.99)***	0.349 (3.59)***	0.402 (3.96)***	0.325 (3.17)***	0.326 (3.17)***	0.287 (2.96)***	0.289 (2.91)***
Free Trade Agreement	0.074 (0.67)	0.049 (0.44)	0.313 (2.25)**	0.254 (1.77)*	0.259 (1.86)*	0.243 (1.66)*	0.261 (1.80)*	0.211 (1.41)	0.234 (1.54)	0.275 (1.78)*
Observations	231	231	231	231	231	231	231	231	231	231
R-squared	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

*APPENDIX 1*

**European Countries Sample. EMU Group without Greece**

**Dependent Variable: Log of Bilateral Trade**

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Constant	-33.273 (12.46)***	-31.658 (13.27)***	-31.101 (12.34)***	-29.486 (11.86)***	-27.731 (11.64)***	-28.596 (11.81)***	-29.520 (11.24)***	-28.744 (10.75)***	-28.951 (10.60)***	-27.304 (10.02)***	-27.308 (9.21)***	-28.516 (9.92)***
<b>EMU Group</b>	<b>0.063</b> <b>(0.54)</b>	<b>0.082</b> <b>(0.73)</b>	<b>0.053</b> <b>(0.48)</b>	<b>0.024</b> <b>(0.23)</b>	<b>0.035</b> <b>(0.32)</b>	<b>0.040</b> <b>(0.36)</b>	<b>0.067</b> <b>(0.68)</b>	<b>0.095</b> <b>(0.97)</b>	<b>0.162</b> <b>(1.63)</b>	<b>0.153</b> <b>(1.64)</b>	<b>0.174</b> <b>(1.88)*</b>	<b>0.207</b> <b>(2.28)**</b>
Landlocked	0.045 (0.26)	0.108 (0.70)	0.097 (0.57)	0.032 (0.19)	0.127 (0.71)	0.103 (0.59)	-0.028 (0.16)	-0.034 (0.20)	-0.000 (0.00)	0.034 (0.20)	0.028 (0.16)	-0.014 (0.09)
Log of Distance	-0.713 (4.74)***	-0.758 (6.04)***	-0.794 (5.93)***	-0.788 (5.62)***	-0.852 (6.11)***	-0.824 (5.99)***	-0.783 (6.03)***	-0.802 (6.25)***	-0.825 (6.54)***	-0.833 (6.66)***	-0.833 (6.44)***	-0.786 (6.79)***
Surface Product	-0.044 (0.75)	-0.082 (1.37)	-0.109 (1.66)	-0.117 (1.78)*	-0.102 (1.53)	-0.141 (2.16)**	-0.144 (2.19)**	-0.116 (1.82)*	-0.128 (1.94)*	-0.130 (2.04)**	-0.136 (2.14)**	-0.146 (2.59)**
Contiguity	0.529 (1.97)*	0.473 (1.73)*	0.454 (1.73)*	0.428 (1.66)	0.378 (1.43)	0.378 (1.44)	0.495 (2.28)**	0.511 (2.47)**	0.498 (2.41)**	0.482 (2.37)**	0.506 (2.57)**	0.509 (2.63)**
Common Language	0.775 (2.16)**	0.712 (2.38)**	0.723 (2.52)**	0.744 (2.60)**	0.756 (2.68)***	0.747 (2.74)***	0.724 (2.19)**	0.758 (2.04)**	0.748 (1.92)*	0.723 (1.91)*	0.734 (1.73)*	0.701 (1.77)*
Log of GDP	0.736 (13.40)***	0.737 (13.52)***	0.766 (13.29)***	0.763 (13.70)***	0.762 (13.54)***	0.788 (14.41)***	0.838 (13.74)***	0.840 (14.22)***	0.850 (14.10)***	0.843 (14.80)***	0.859 (14.86)***	0.839 (16.23)***
Log of GDP per capita	0.423 (3.66)***	0.414 (3.68)***	0.357 (3.22)***	0.296 (2.85)***	0.212 (2.15)**	0.228 (2.23)**	0.116 (0.95)	0.037 (0.30)	0.039 (0.30)	-0.016 (0.13)	-0.057 (0.44)	0.045 (0.32)
Free Trade Agreement	0.074 (0.48)	0.039 (0.31)	-0.045 (0.35)	-0.090 (0.73)	-0.087 (0.71)	-0.146 (1.25)	-0.274 (1.78)*	-0.290 (1.86)*	-0.297 (1.78)*	-0.294 (1.87)*	-0.314 (1.97)*	-0.242 (1.70)*
Observations	91	91	91	91	91	91	91	91	91	91	91	91
R-squared	0.93	0.93	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.94	0.94	0.95

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

*APPENDIX 1*

**European Countries Sample. EMU Group without Greece**

**Dependent Variable: Log of Bilateral Trade**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Constant	-29.192 (9.78)***	-27.532 (8.44)***	-30.679 (10.38)***	-30.686 (9.60)***	-30.535 (9.61)***	-33.290 (10.30)***	-33.581 (10.45)***	-33.817 (9.45)***	-34.351 (9.65)***	-34.281 (9.31)***
<b>EMU Group</b>	<b>0.217</b> <b>(2.44)**</b>	<b>0.216</b> <b>(2.36)**</b>	<b>0.252</b> <b>(2.75)***</b>	<b>0.222</b> <b>(2.38)**</b>	<b>0.243</b> <b>(2.59)**</b>	<b>0.265</b> <b>(2.98)***</b>	<b>0.314</b> <b>(3.62)***</b>	<b>0.387</b> <b>(4.22)***</b>	<b>0.410</b> <b>(4.48)***</b>	<b>0.417</b> <b>(4.38)***</b>
Landlocked	-0.032 (0.23)	-0.046 (0.27)	-0.033 (0.19)	-0.060 (0.35)	-0.010 (0.06)	0.058 (0.32)	0.084 (0.50)	-0.041 (0.23)	-0.069 (0.40)	0.081 (0.44)
Log of Distance	-0.785 (7.15)***	-0.829 (6.83)***	-0.747 (6.35)***	-0.747 (6.21)***	-0.772 (6.34)***	-0.768 (6.00)***	-0.749 (6.05)***	-0.752 (5.91)***	-0.748 (5.81)***	-0.782 (5.69)***
Surface Product	-0.117 (2.12)**	-0.065 (1.05)	0.019 (0.37)	0.013 (0.25)	0.010 (0.20)	0.077 (1.44)	0.100 (2.01)**	0.008 (0.16)	0.012 (0.23)	0.020 (0.36)
Contiguity	0.481 (2.42)**	0.432 (2.06)**	0.404 (1.87)*	0.400 (1.83)*	0.383 (1.80)*	0.385 (1.90)*	0.371 (1.91)*	0.354 (1.73)*	0.381 (1.97)*	0.358 (1.77)*
Common Language	0.702 (1.80)*	0.685 (1.67)*	0.795 (2.21)**	0.740 (2.02)**	0.798 (2.13)**	0.709 (1.64)	0.701 (1.63)	0.823 (2.19)**	0.865 (2.37)**	0.843 (2.24)**
Log of GDP	0.813 (16.03)***	0.772 (13.29)***	0.701 (15.37)***	0.725 (15.32)***	0.732 (15.27)***	0.730 (14.67)***	0.707 (15.37)***	0.733 (15.05)***	0.736 (14.08)***	0.752 (14.20)***
Log of GDP per capita	0.110 (0.76)	0.092 (0.58)	0.301 (2.35)**	0.245 (2.01)**	0.229 (1.87)*	0.292 (2.29)**	0.330 (2.68)***	0.389 (3.09)***	0.416 (3.46)***	0.368 (2.98)***
Free Trade Agreement	-0.229 (1.76)*	-0.311 (2.18)**								
Observations	91	91	91	91	91	91	91	91	91	91
R-squared	0.95	0.94	0.94	0.93	0.93	0.94	0.94	0.94	0.94	0.93

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

*APPENDIX 2*

**Developed Countries Sample. EMU Group with Greece**

**Dependent Variable: Log of Bilateral Trade**

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Constant	-34.919 (17.75)***	-33.909 (17.96)***	-32.950 (17.38)***	-31.965 (19.85)***	-30.398 (21.27)***	-29.781 (18.98)***	-31.822 (18.27)***	-31.135 (16.64)***	-32.702 (16.17)***	-32.534 (17.63)***	-33.175 (16.76)***	-33.153 (15.20)***
<b>EMU Group</b>	<b>0.042</b> <b>(0.43)</b>	<b>0.028</b> <b>(0.29)</b>	<b>0.034</b> <b>(0.35)</b>	<b>0.080</b> <b>(0.83)</b>	<b>0.032</b> <b>(0.33)</b>	<b>0.045</b> <b>(0.47)</b>	<b>0.124</b> <b>(1.37)</b>	<b>0.155</b> <b>(1.69)*</b>	<b>0.194</b> <b>(2.05)**</b>	<b>0.217</b> <b>(2.41)**</b>	<b>0.222</b> <b>(2.43)**</b>	<b>0.243</b> <b>(2.67)***</b>
Landlocked	-0.256 (2.20)**	-0.259 (2.36)**	-0.268 (2.46)**	-0.295 (2.72)***	-0.272 (2.55)**	-0.220 (2.12)**	-0.232 (2.33)**	-0.249 (2.47)**	-0.230 (2.28)**	-0.188 (1.85)*	-0.209 (2.02)**	-0.248 (2.29)**
Island	0.028 (0.17)	-0.018 (0.11)	0.103 (0.66)	0.109 (0.74)	0.101 (0.68)	0.128 (0.88)	0.079 (0.59)	0.068 (0.51)	-0.010 (0.07)	0.006 (0.04)	0.064 (0.45)	0.026 (0.17)
Log of Distance	-0.628 (7.44)***	-0.638 (7.77)***	-0.673 (8.49)***	-0.667 (9.08)***	-0.662 (9.11)***	-0.674 (9.16)***	-0.686 (9.60)***	-0.698 (9.80)***	-0.691 (9.41)***	-0.689 (9.54)***	-0.674 (9.41)***	-0.680 (9.10)***
Surface Product	-0.045 (1.45)	-0.081 (2.54)**	-0.087 (2.63)***	-0.102 (3.12)***	-0.099 (2.95)***	-0.085 (2.58)**	-0.064 (2.26)**	-0.057 (1.99)**	-0.053 (1.82)*	-0.067 (2.24)**	-0.072 (2.44)**	-0.073 (2.47)**
Contiguity	0.444 (2.37)**	0.438 (2.34)**	0.419 (2.31)**	0.406 (2.24)**	0.430 (2.40)**	0.419 (2.43)**	0.410 (2.56)**	0.437 (2.79)***	0.424 (2.71)***	0.383 (2.43)**	0.430 (2.78)***	0.421 (2.67)***
Common Language	1.281 (5.90)***	1.254 (5.76)***	1.239 (5.69)***	1.140 (5.57)***	1.127 (5.41)***	1.127 (5.52)***	1.175 (6.02)***	1.168 (5.93)***	1.143 (5.97)***	1.141 (5.85)***	1.194 (6.03)***	1.184 (5.68)***
Log of GDP	0.808 (29.58)***	0.814 (29.48)***	0.828 (28.93)***	0.814 (29.33)***	0.812 (28.67)***	0.801 (27.21)***	0.800 (31.02)***	0.802 (31.37)***	0.813 (31.94)***	0.825 (33.21)***	0.835 (33.25)***	0.824 (32.54)***
Log of GDP per capita	0.280 (3.24)***	0.270 (3.23)***	0.206 (2.51)**	0.210 (2.83)***	0.133 (1.90)*	0.117 (1.54)	0.190 (2.50)**	0.138 (1.76)*	0.177 (2.07)**	0.154 (1.88)*	0.152 (1.71)*	0.182 (1.75)*
Free Trade Agreement	0.232 (1.95)*	0.176 (1.56)	0.155 (1.34)	0.193 (1.65)*	0.168 (1.46)	0.108 (0.93)	0.068 (0.59)	0.051 (0.45)	0.069 (0.60)	0.079 (0.73)	0.057 (0.53)	0.052 (0.47)
Observations	231	231	231	231	231	231	231	231	231	231	231	231
R-squared	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

*APPENDIX 2*

**Developed Countries Sample. EMU Group with Greece**  
**Dependent Variable: Log of Bilateral Trade**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Constant	-32.824 (14.78)***	-32.616 (16.61)***	-35.827 (19.01)***	-35.406 (17.87)***	-37.020 (18.05)***	-38.536 (17.95)***	-37.722 (16.94)***	-37.139 (16.51)***	-35.908 (17.40)***	-36.211 (16.91)***
<b>EMU Group</b>	<b>0.251</b> <b>(2.86)***</b>	<b>0.274</b> <b>(3.01)***</b>	<b>0.242</b> <b>(2.43)**</b>	<b>0.263</b> <b>(2.52)**</b>	<b>0.302</b> <b>(2.85)***</b>	<b>0.277</b> <b>(2.69)***</b>	<b>0.278</b> <b>(2.75)***</b>	<b>0.383</b> <b>(3.62)***</b>	<b>0.396</b> <b>(3.75)***</b>	<b>0.383</b> <b>(3.58)***</b>
Landlocked	-0.226 (2.06)**	-0.237 (2.09)**	-0.298 (2.57)**	-0.299 (2.43)**	-0.268 (2.30)**	-0.225 (1.84)*	-0.167 (1.31)	-0.255 (2.03)**	-0.251 (1.98)**	-0.197 (1.57)
Island	0.034 (0.23)	-0.028 (0.18)	-0.087 (0.56)	-0.061 (0.42)	-0.021 (0.15)	-0.049 (0.33)	-0.007 (0.05)	-0.071 (0.45)	-0.115 (0.72)	-0.052 (0.34)
Log of Distance	-0.676 (9.11)***	-0.724 (9.98)***	-0.628 (9.78)***	-0.649 (10.44)***	-0.659 (10.70)***	-0.630 (9.58)***	-0.600 (8.81)***	-0.610 (8.93)***	-0.625 (8.99)***	-0.603 (8.45)***
Surface Product	-0.048 (1.64)	-0.015 (0.52)	-0.001 (0.05)	0.017 (0.60)	0.017 (0.63)	0.008 (0.28)	0.008 (0.27)	-0.023 (0.77)	-0.025 (0.80)	-0.020 (0.63)
Contiguity	0.405 (2.52)**	0.340 (1.98)**	0.427 (2.72)***	0.426 (2.70)***	0.398 (2.55)**	0.473 (3.18)***	0.500 (3.40)***	0.510 (3.37)***	0.523 (3.58)***	0.564 (3.89)***
Common Language	1.212 (5.83)***	1.232 (5.63)***	1.165 (5.88)***	1.155 (5.78)***	1.146 (5.85)***	1.008 (4.93)***	0.995 (4.90)***	1.092 (5.25)***	1.113 (5.38)***	1.067 (5.27)***
Log of GDP	0.800 (30.78)***	0.765 (29.84)***	0.768 (28.96)***	0.762 (30.07)***	0.766 (31.15)***	0.780 (32.48)***	0.788 (31.11)***	0.788 (30.91)***	0.788 (29.40)***	0.786 (29.63)***
Log of GDP per capita	0.193 (1.66)*	0.257 (2.31)**	0.346 (3.19)***	0.324 (3.04)***	0.397 (3.63)***	0.439 (3.87)***	0.362 (3.15)***	0.379 (3.26)***	0.338 (3.08)***	0.340 (3.04)***
Free Trade Agreement	0.066 (0.59)	0.038 (0.33)	0.330 (2.27)**	0.265 (1.77)*	0.261 (1.79)*	0.261 (1.70)*	0.283 (1.84)*	0.228 (1.44)	0.248 (1.55)	0.295 (1.83)*
Observations	231	231	231	231	231	231	231	231	231	231
R-squared	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## APPENDIX 2

### European Countries Sample. EMU Group with Greece Dependent Variable: Log of Bilateral Trade

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Constant	-33.131 (12.09)***	-31.551 (12.83)***	-30.966 (12.21)***	-29.406 (11.80)***	-27.661 (11.71)***	-28.527 (11.77)***	-29.584 (11.04)***	-28.929 (10.56)***	-29.281 (10.25)***	-27.789 (9.93)***	-27.990 (9.11)***	-29.412 (9.38)***
<b>EMU Group</b>	<b>-0.030</b> <b>(0.22)</b>	<b>-0.026</b> <b>(0.21)</b>	<b>-0.060</b> <b>(0.48)</b>	<b>-0.058</b> <b>(0.49)</b>	<b>-0.082</b> <b>(0.68)</b>	<b>-0.068</b> <b>(0.57)</b>	<b>-0.004</b> <b>(0.04)</b>	<b>0.028</b> <b>(0.25)</b>	<b>0.060</b> <b>(0.53)</b>	<b>0.077</b> <b>(0.74)</b>	<b>0.087</b> <b>(0.83)</b>	<b>0.124</b> <b>(1.17)</b>
Landlocked	0.057 (0.33)	0.117 (0.75)	0.103 (0.60)	0.035 (0.21)	0.130 (0.72)	0.107 (0.62)	-0.021 (0.12)	-0.028 (0.16)	0.010 (0.06)	0.040 (0.24)	0.033 (0.19)	-0.010 (0.06)
Log of Distance	-0.702 (4.66)***	-0.748 (5.81)***	-0.778 (5.65)***	-0.774 (5.36)***	-0.831 (5.78)***	-0.805 (5.73)***	-0.772 (5.83)***	-0.793 (6.06)***	-0.813 (6.20)***	-0.823 (6.45)***	-0.818 (6.17)***	-0.772 (6.43)***
Surface Product	-0.049 (0.82)	-0.091 (1.55)	-0.118 (1.82)*	-0.124 (1.90)*	-0.112 (1.70)*	-0.149 (2.34)**	-0.149 (2.30)**	-0.121 (1.92)*	-0.135 (2.10)**	-0.137 (2.18)**	-0.145 (2.30)**	-0.155 (2.80)***
Contiguity	0.564 (2.10)**	0.516 (1.90)*	0.498 (1.91)*	0.461 (1.78)*	0.425 (1.61)	0.421 (1.61)	0.524 (2.40)**	0.539 (2.58)**	0.541 (2.60)**	0.515 (2.51)**	0.545 (2.73)***	0.549 (2.79)***
Common Language	0.794 (2.30)**	0.726 (2.55)**	0.741 (2.71)***	0.758 (2.76)***	0.774 (2.89)***	0.764 (2.95)***	0.735 (2.30)**	0.765 (2.12)**	0.758 (2.02)**	0.728 (1.99)*	0.742 (1.80)*	0.704 (1.83)*
Log of GDP	0.743 (13.76)***	0.747 (14.14)***	0.776 (13.87)***	0.770 (14.24)***	0.773 (14.27)***	0.797 (15.12)***	0.844 (14.09)***	0.846 (14.60)***	0.860 (14.70)***	0.851 (15.29)***	0.869 (15.41)***	0.849 (17.10)***
Log of GDP per capita	0.402 (3.34)***	0.391 (3.42)***	0.330 (2.98)***	0.276 (2.68)***	0.186 (1.94)*	0.205 (2.05)**	0.107 (0.89)	0.034 (0.28)	0.037 (0.28)	-0.008 (0.06)	-0.044 (0.33)	0.072 (0.49)
Free Trade Agreement	0.076 (0.52)	0.020 (0.16)	-0.058 (0.46)	-0.096 (0.81)	-0.097 (0.83)	-0.154 (1.37)	-0.275 (1.79)*	-0.293 (1.89)*	-0.303 (1.85)*	-0.298 (1.93)*	-0.316 (2.01)**	-0.245 (1.75)*
Observations	91	91	91	91	91	91	91	91	91	91	91	91
R-squared	0.93	0.93	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.94	0.94	0.94

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

*APPENDIX 2*

**European Countries Sample. EMU Group with Greece**

**Dependent Variable: Log of Bilateral Trade**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Constant	-30.450 (9.27)***	-28.425 (8.03)***	-31.704 (9.77)***	-31.744 (9.38)***	-31.775 (9.32)***	-34.436 (9.40)***	-35.578 (9.47)***	-36.837 (8.80)***	-38.272 (9.23)***	-38.402 (9.01)***
<b>EMU Group</b>	<b>0.160</b> <b>(1.49)</b>	<b>0.120</b> <b>(1.12)</b>	<b>0.128</b> <b>(1.19)</b>	<b>0.109</b> <b>(1.01)</b>	<b>0.137</b> <b>(1.25)</b>	<b>0.127</b> <b>(1.30)</b>	<b>0.199</b> <b>(2.13)**</b>	<b>0.297</b> <b>(2.96)***</b>	<b>0.375</b> <b>(3.98)***</b>	<b>0.375</b> <b>(3.83)***</b>
Landlocked	-0.036 (0.25)	-0.045 (0.25)	-0.028 (0.15)	-0.059 (0.32)	-0.008 (0.04)	0.067 (0.35)	0.083 (0.44)	-0.048 (0.24)	-0.090 (0.45)	0.064 (0.31)
Log of Distance	-0.775 (6.87)***	-0.815 (6.36)***	-0.727 (5.97)***	-0.726 (5.84)***	-0.753 (5.96)***	-0.745 (5.59)***	-0.723 (5.49)***	-0.725 (5.26)***	-0.720 (5.15)***	-0.755 (5.10)***
Surface Product	-0.123 (2.27)**	-0.070 (1.17)	0.012 (0.24)	0.006 (0.11)	0.004 (0.07)	0.069 (1.24)	0.093 (1.79)*	0.002 (0.04)	0.008 (0.14)	0.019 (0.34)
Contiguity	0.512 (2.50)**	0.475 (2.23)**	0.457 (2.10)**	0.449 (2.02)**	0.430 (1.99)**	0.447 (2.24)**	0.431 (2.22)**	0.412 (1.99)**	0.430 (2.21)**	0.407 (2.00)**
Common Language	0.699 (1.84)*	0.690 (1.75)*	0.805 (2.36)**	0.747 (2.15)**	0.804 (2.25)**	0.723 (1.77)*	0.707 (1.74)*	0.823 (2.33)**	0.853 (2.47)**	0.836 (2.35)**
Log of GDP	0.819 (16.89)***	0.781 (14.12)***	0.712 (15.95)***	0.736 (15.76)***	0.743 (15.66)***	0.743 (14.95)***	0.721 (15.58)***	0.749 (15.20)***	0.753 (14.37)***	0.768 (14.31)***
Log of GDP per capita	0.160 (1.02)	0.119 (0.71)	0.328 (2.31)**	0.272 (2.06)**	0.265 (1.96)*	0.318 (2.20)**	0.394 (2.76)***	0.496 (3.33)***	0.562 (3.96)***	0.523 (3.63)***
Free Trade Agreement	-0.231 (1.79)*	-0.317 (2.24)**								
Observations	91	91	91	91	91	91	91	91	91	91
R-squared	0.95	0.94	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



### APPENDIX 3

Dependent Variable: Log of Bilateral	EMU without Greece		EMU with Greece	
	Developed	Europe	Developed	Europe
Log GDP	0.611 (9.69)***	0.568 (9.19)***	0.631 (10.03)***	0.571 (9.27)***
Log of GDP per capita	-0.044 (0.83)	0.086 (1.72)*	-0.063 (1.21)	0.084 (1.68)*
Free Trade Agreement	0.065 (3.46)***	0.095 (4.42)***	0.065 (3.49)***	0.093 (4.42)***
European Union	0.113 (5.28)***	0.085 (3.64)***	0.108 (5.16)***	0.091 (3.92)***
1981*EMU	0.022 (0.40)	0.038 (0.60)	-0.000 (0.01)	0.000 (0.01)
1982*EMU	0.047 (0.85)	0.036 (0.60)	0.031 (0.59)	0.006 (0.11)
1983*EMU	0.075 (1.40)	0.020 (0.34)	0.080 (1.55)	0.024 (0.42)
1984*EMU	0.060 (1.17)	0.038 (0.67)	0.051 (1.06)	0.024 (0.43)
1985*EMU	0.064 (1.26)	0.054 (0.94)	0.046 (0.94)	0.026 (0.47)
1986*EMU	0.087 (1.76)*	0.068 (1.24)	0.077 (1.62)	0.060 (1.14)
1987*EMU	0.143 (2.99)***	0.101 (1.92)*	0.139 (3.03)***	0.110 (2.12)**
1988*EMU	0.203 (4.40)***	0.166 (3.21)***	0.173 (3.89)***	0.134 (2.65)***
1989*EMU	0.234 (5.17)***	0.166 (3.25)***	0.230 (5.24)***	0.180 (3.59)***
1990*EMU	0.259 (5.44)***	0.201 (3.76)***	0.248 (5.45)***	0.208 (3.99)***
1991*EMU	0.302 (6.36)***	0.224 (4.24)***	0.286 (6.29)***	0.221 (4.26)***
1992*EMU	0.290 (6.27)***	0.224 (4.38)***	0.279 (6.30)***	0.234 (4.68)***
1993*EMU	0.267 (5.72)***	0.202 (3.91)***	0.253 (5.69)***	0.200 (3.97)***
1994*EMU	0.296 (6.08)***	0.222 (4.14)***	0.270 (5.80)***	0.201 (3.87)***
1995*EMU	0.263 (5.09)***	0.206 (3.52)***	0.254 (5.08)***	0.214 (3.82)***
1996*EMU	0.255 (4.81)***	0.222 (3.69)***	0.245 (4.79)***	0.233 (4.06)***
1997*EMU	0.216 (3.50)***	0.228 (3.26)***	0.180 (3.10)***	0.191 (2.83)***
1998*EMU	0.262 (4.18)***	0.274 (3.87)***	0.224 (3.81)***	0.243 (3.54)***
1999*EMU	0.394 (7.30)***	0.339 (5.62)***	0.350 (6.73)***	0.300 (4.97)***
2000*EMU	0.421 (7.49)***	0.357 (5.62)***	0.383 (7.05)***	0.332 (5.31)***
2001*EMU	0.421 (7.51)***	0.397 (6.22)***	0.382 (7.06)***	0.379 (6.00)***
Year Dummy	Yes	Yes	Yes	Yes
Country pair Dummy	5082	2002	5082	2002
Observations	0.99	0.99	0.99	0.99

Robust t-statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%