The Greek Tragedy: How the Euro Failed to Promote Greek Bilateral Trade

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5/6/2013

In this paper, I recreate and extend Micco, Stein, and Ordonez (2003) and find that changing the inclusions of free trade agreements and continuing the data until 2011 leads to dramatic changes in estimates of the euro effect. Moreover, this euro effect is country-specific, with that of Greece being the most statistically significantly negative. After developing a good model to predict this euro effect, I focus on Greece and discover that decreasing competitiveness of Greek exports has been the leading catalyst to their worsening bilateral trade conditions.

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◊ I would like to thank Professor Obstfeld for his endless support during my analysis and writing process – without him, there would be no paper. I would also like to thank James Church for his help with data accumulation and Harrison Dekker for counseling my Stata coding.

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I. Introduction

At the end of the 1990's, a group of 11 European countries set out on arguably the biggest macroeconomic experiment: adopting a single common currency called the euro. Eurozone membership expanded considerably since then, rising to a current group of 17 countries in 2011, and could possibly reach 19 members by 2015.[1] Having been implemented for almost 15 years, we now have enough data to see how much using the euro has affected bilateral trade in these economies.

Rose (2000) was the first to consider how a currency union impacts trade. Because its originality and timing were so close to the implementation of the euro, his research opened the floodgates of massive inspection on how the euro had the potential of increasing bilateral trade within the Eurozone (usually referred to as the "Rose effect" or the "euro effect"). Although Rose first estimated an increase in trade of around 200% between common currency users, these estimates were quickly grounded (after an uproar from essentially every economist) to somewhere in the range of 5-10%.[2] However, these estimates were for the Eurozone as a whole, not for a specific country; testing the Rose effect by country, economists found somewhat unanimously that the estimated Greek euro effect is negative for both intra and inter-Eurozone trade: a result that contradicts common intuition that a country should only (greatly) benefit.

Consequently, the focus of this paper is to find out why Greek bilateral trade has suffered much more than bilateral trade in the rest of the Eurozone. In order to do so, I format the paper in the following way: Section II provides a literature review. In Section III, I discuss my data and theory of methodology. Section IV builds off of the previous section by testing and improving the regressions used, and shows how intra-Eurozone and inter-Eurozone bilateral trade change over time. At the end of that section, I test how the euro effect changes in Greece over time and how the Greek euro effect is different from that of the rest of the Eurozone. Then in Section V I, I

[1] With Latvia and Lithuania scheduled to join (http://www.15min.lt/en/article/politics/lithuanian-government-endorses-euro-introduction-plan-526-310363)

[2] Baldwin (2006) said it best: "If I had to provide 'the' number, I would – after plenty of provisos about the Rose effect not being a magic wand – say the number is between 5% and 10% to date."

explain how the lack of competitiveness of Greek exports is the main source of their bilateral trade problems. And finally, Section VII provides a summary and conclusion.

II. Literature Review

a. Rose (2000)

It is beyond a reasonable doubt that I, along with other researchers who study currency unions, was inspired by Andy Rose's 2000 paper, "One Money, One Market: Estimating the Effect of Common Currencies on Trade." In this innovative paper, Rose makes a subtle, yet influential, adjustment to the customary formula that predicts bilateral trade: the standard gravity model of trade. Before Rose, the economic model (developed by Tinbergen (1962)) predicts the bilateral trade between two countries based off of the product of GDP and their distance apart. More specifically, the gravity model can be written as

$$(1) T_{ij} = A\frac{GDP_{ij}}{D_{ij}},$$

where T represents bilateral trade between countries i and j, GDP is the economic mass of countries i and j, D represents the distance between the trading partners, and A is some constant. Economists take this "traditional" model and turn it into a log-log regression model to predict bilateral trade empirically. To control for omitted variable bias, the common practice is to add several other explanatory variables, some of which include the product of trading partners' GDP per capita and a handful of dummy variables indicating whether the trading partners speak the same language, practice the same religion, or were at some point part of the same colony. Putting these all together we arrive at the standard gravity model, which is written as

$$(2)\ \log(T_{ijt}) = \beta_0 + \beta_1 \log(GDP_i GDP_j)_t + \beta_2 \log\left(\left(\frac{GDP}{Pop}\right)_i \left(\frac{GDP}{Pop}\right)_j\right)_t + \beta_3 Lang_{ij} + \beta_4 Rel_{ij} + \beta_5 Colony_{ij}.$$

While the common method to estimate these βs is with a time series approach[3], Rose instead does a cross-section. However, regardless of the method, Rose was revolutionary simply because he added ONE additional dummy variable to regression (2), which he called CU, taking a value of 1 if both countries share the same currency. To that effect, he finds in his cross sectional data regression that being in a currency union should increase trade between common currency partners by around 3 times. This paper, though, was focused on general currency unions over a period of 30 years – not to how the Rose effect specifically affected countries adopting the euro.

b. Micco, Stein, and Ordonez (2003)

Rose's research consequently led to a large group of papers in the next decade which focused specifically on how the euro will affect trade for Eurozone countries.[4] One of these papers, specifically Micco, Stein, and Ordonez (2003), quickly became the second most influential paper for my research. Contrary to Rose's cross sectional dataset, the three authors employ panel trade data from the IMF's Direction of Trade Statistics (DOTS) between the years 1992 to 2002. Rather than pursue a cross-sectional dataset to estimate the euro effect, the authors use a country-pair fixed effects version of the standard gravity model. Using this technique considerably condenses the information needed since the distance between two trading countries, the language used, etc., do not change over time and will get absorbed in the country fixed effect). Regression (2), consequently, can be transformed into a fixed effects model with the inclusion of α as appears in regression (3).[5]

$$(3)\ \log(T_{ij}) = \beta_0 + \beta_1 \log(GDP_i GDP_j) + \beta_2 \log\left(\left(\frac{GDP}{Pop}\right)_i \left(\frac{GDP}{Pop}\right)_j\right) + \alpha_{ij}.$$

[3] Like the panel estimation I will do later.
[4] The greater majority of these papers are summarized very nicely in Baldwin (2006), of which I am very thankful.
[5] Regardless of which of the two models used, both for the most part garner the same estimates of the coefficients of interest.

However, rather than stopping simply after getting an estimate of the euro effect, the authors continue by employing a few different techniques to see how the euro effect has changed over time and how the effect is different for each country in the Eurozone.

More specifically, Micco et al. include a dummy variable that measures the effect of Eurozone trade that occurs with countries not in the Eurozone. In doing so, the authors get a complete picture of trade in the Eurozone. They then map how these increases in intra-Eurozone[6] trade and inter-Eurozone[7] change year to year, and find that over time both types of bilateral trade have increased logarithmically to around a 14% increase. In the conclusion of their analysis, the authors find that not all countries have the same euro effect, and that Greece as an outlier has a statistically significant negative effect. However, like I mentioned in Section I, this stops short of answering why exactly there are differences in euro effects among the countries in the Eurozone. Consequently, in the next few sections, I will restate the methodology used by Micco, Stein, and Ordonez, but with an updated and revised dataset.

III. Methodology and Data

a. Methodology

Throughout the remainder of this paper, I will be using some adaption of the fixed effects gravity model. Like Rose, I will include a dummy variable to indicate a common currency union between trading partners. To indicate explicitly, the model upon which I will continue to build is written as regression (4),

$$(4)\ \log(T_{ijt}) = \rho BothEZ_{ijt} + \beta_0 + \beta_1 \log(Y_{it}Y_{jt}) + \beta_2 \log(y_{it}y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt}$$

where:

- T_{ij} represents bilateral trade between country i and country j,
- Y's represents real GDP,

[6] Trade between two Eurozone countries
[7] Trade between a country in the Eurozone and a country outside the Eurozone

- y's represent real GDP per capita
- REER indicates the real effective exchange rate[8],
- FTA is a dummy indicating whether both countries are a part of the same free trade agreement,[9]
- EU is a dummy indicating if countries are part of the EU,
- EUtrend=bothEU*year,
- BothEZ is a dummy for if both countries use the euro at time t.
- α's represent the fixed effect for country pairs,
- the γ's correspond to the time fixed effects, and
- the ε's are the errors.[10]

Consequently, the coefficient of interest is ρ (which stands for rho-se effect[11]), and our "nuisance" coefficients, or coefficients of less interest, are our β's. While the standard gravity model lacks the REERs, FTA, EU, and EUtrend dummy variables, I follow the steps of both Rose and Micco et al. to eliminate any omitted variable bias that may arise from free trade rather than the use of a similar currency. More explanation about each of these variables can also be found in the Appendix.

b. Data

There are three main datasets I concatenated to create the one used for each of the following regressions. Specifically, I used the IMF's DOTS database for statistics on world bilateral trade. While I had the option to use the UN's COMTRADE database (as it was used in other studies on the euro effect[12]), I ended up using the former between the years 1992-2011 for its simplicity and more complete data. Bilateral trade is then calculated as the average of

[8] There is a difference in the data I used for this variable than the one used in Micco, Stein, and Ordonez (2003). See the Appendix for a fuller description.
[9] See footnote 8.
[10] More specifics about each variable and the data collected can be seen in the appendix.
[11] Hopefully this isn't the cleverest thing you find about this paper.
[12] See Flam and Nordstrom (2003)

reported exports and imports between the two countries.[13] For data on economic indicators (which include real GDP, real effective exchange rates, and population), I used the World Bank's World Development Indicators (WDI) database, which again was reliable and had complete statistics. And finally, I used the WTO's statistics database as the list of historical free trade agreements.

As I continue to the next section, I will start referring to three different sample groups: the first, which is referred to as MSO: 1992-2002, is the same "developed countries" sample group used in Micco, Stein, and Ordonez (2003). This sample contains only bilateral trade during 1992-2002 of 11 non-Eurozone countries and the 11 countries who had implemented the euro before 2002. The second sample, which is referred to as MSO: 1992-2011, is simply the first group extended until 2011. And finally, the third group, which I refer to as Updated MSO, is the second group extended to include all current Eurozone members – which adds any country that adopted the euro after 2002.

It is worth mentioning the two discrepancies in my samples. Firstly, the Updated MSO sample goes from 1994-2011 rather than starting from 1992. I chose to do this since there was a breakup of countries in Europe in 1993 (for instance Czechoslovakia became the Czech Republic and Slovakia), and my assumption was that trade in 1993 would not be representative of "typical" future trade. And, my second discrepancy for the entire dataset is that I dropped Luxembourg from my sample list of countries, even though it is a part of the Eurozone. My decision to do this came from a lack of solely Belgian bilateral trade data pre-1999, which is due to the fact that the IMF recognized "Belgium-Luxembourg" as a single country. To get around this, I renamed "Belgium-Luxembourg," "Belgium," and dropped Luxembourg altogether. Since it is a small country in proportion to Belgium, I do not expect renaming "Belgium-Luxembourg" or dropping Luxembourg to skew my results.

[13] i.e., bilateral trade is calculated as the average of 4 numbers (2 reported exported values and 2 reported imported values); however if only one country listed the amounts of imports and exports with a specific trading partner, it would be the average of 2 numbers.

But in summary, the benefit from having these three groups will be to (a) see how the Micco, Stein, and Ordonez paper would have looked both with my dataset and then extended until 2011, and (b) see how the newest members to the Eurozone influence the overall euro effect. More specific information regarding the data, the complete list of countries used in each sample, and list of free trade agreements can be read in the Appendix.

IV. Calculating the Euro Effect Empirically

a. First Impressions

A good place to start is by running the simplest version of the fixed effect gravity model with a currency union dummy variable like regression (4). Table 1A displays (as well as the majority of the following tables) three different columns of regression results, with each column referring to one of the sample groups explained in the previous section.

Table 1A

VARIABLES	MSO: 1992-2002 Log(T)	MSO: 1992-2011 Log(T)	Updated MSO Log(T)
BothEZ	0.0961***	0.129***	0.107***
	(0.0317)	(0.0353)	(0.0346)
GDP	1.166**	0.701**	-0.552
	(0.469)	(0.318)	(0.357)
GDP per Capita	-0.0285	0.0827	1.605***
	(0.529)	(0.362)	(0.379)
FTA	0.109***	0.0859	0.0732
	(0.0280)	(0.111)	(0.105)
EU	-2.897	-3.269	6.242
	(10.06)	(7.475)	(7.333)
EUtrend	0.00147	0.00165	-0.00304
	(0.00505)	(0.00375)	(0.00367)
REER Country 1	0.00117*	0.00400***	0.00746***
	(0.000626)	(0.000892)	(0.000925)
REER Country 2	0.00199***	0.00411***	0.00896***
	(0.000722)	(0.000868)	(0.000949)
Constant	-40.68***	-18.84*	15.41
	(14.68)	(10.20)	(11.77)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes

R-squared	0.601	0.788	0.698
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For each of the three models, I find that the BothEZ term is extremely statistically significant, and, more relevantly, economically significant. The models conclude that, depending on which sample is used, countries in the Eurozone increased trade with other Eurozone members by about 10%-13%.[14] This estimate is fairly consistent with Rose's review of other economic papers researching the euro effect on trade.[15]

To get the complete picture of trade in the Eurozone, I expand regression (4) to include an additional dummy variable, called OneEZ. This new variable, which takes a value 1 if exactly one of the two trading pairs of countries is in the Eurozone, will tell us how using the euro impacted their trade with countries out the Eurozone. Explicitly, I write this new model in regression (5) and display the results in Table 1B.

$$(5)\ \log(T_{ijt}) = \rho BothEZ_{ijt} + \varphi OneEZ_{ijt} + \beta_0 + \beta_1 \log(Y_{it}Y_{jt}) + \beta_2 \log(y_{it}y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt},$$

[14] This bound is calculated as exp(0.0961)-1=0.10, exp(0.129)-1=0.13.
[15] Rose (2008).

Table 1B

VARIABLES	MSO: 1992-2002 Log(T)	MSO: 1992-2011 Log(T)	Updated MSO Log(T)
BothEZ	0.175***	0.223***	0.146***
	(0.0373)	(0.0457)	(0.0449)
OneEZ	0.0947***	0.115***	0.0442
	(0.0250)	(0.0365)	(0.0310)
GDP	1.525***	0.822***	-0.540
	(0.452)	(0.315)	(0.359)
GDP per Capita	-0.479	-0.0966	1.566***
	(0.508)	(0.362)	(0.385)
FTA	0.120***	0.114	0.0849
	(0.0275)	(0.111)	(0.104)
EU	-1.019	-1.210	7.205
	(9.991)	(7.578)	(7.327)
EUtrend	0.000529	0.000618	-0.00353
	(0.00501)	(0.00380)	(0.00366)
REER Country 1	0.00140**	0.00388***	0.00751***
	(0.000623)	(0.000900)	(0.000923)
REER Country 2	0.00210***	0.00411***	0.00902***
	(0.000707)	(0.000857)	(0.000946)
Constant	-50.75***	-21.69**	15.53
	(14.20)	(10.05)	(11.74)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes
R-squared	0.607	0.791	0.699
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

One noticeable consequence of adding the OneEZ variable is how the coefficient of BothEZ has dramatically increased for each of the different samples. For instance in the third sample group, we have increased our estimate for changes in intra-Eurozone trade from an increase of about 11% to an increase of about 16%.[16] The most striking changes in the estimate of the BothEZ coefficient appear in the results from the second sample group, where the estimate of the increase in intra-Eurozone trade grew from around 14% to 25%![17]

[16] These values are calculated as [exp(0.107)-1]*100=11.29, [exp(0.146)-1]*100=15.7.
[17] These values are calculated as [exp(0.129)-1]*100=13.77, [exp(0.223)-1]*100=24.98.

A few other recognizable consequences occur while comparing the three samples. First, there is a dramatic increase in BothEZ and OneEZ effects from switching from the MSO: 1992-2002 sample to the MSO:1992-2011 sample. The results suggest that with the extension of time, the earliest adopters of the euro have benefited even more by being in the Eurozone. Specifically, intra-Eurozone trade has increased from around 19% to 25%, and inter-Eurozone trade has increased from 10% to 12%.

The last fairly recognizable conclusions drawn from Table 1B come from the differences between the MSO sample group and the Updated MSO sample group. While the first two sample groups have a statistically significant and positive OneEZ coefficient, the third sample group has a statistically insignificant effect of OneEZ trade. This could indicate that the more recent Eurozone members have not taken full advantage of their currency with trading partners outside the Eurozone and has caused the coefficient to be insignificant. Along those lines, we see that the estimate of the coefficient for GDP is positive and statistically significant in the first two sample groups, but not in the third. The reverse is also true when looking at the estimate of the coefficient for GDP per capita. While unusual, these results suggest that the income per person was more important for the newest members to the Eurozone, rather than simply the GDP of the country as a whole.

b. Trend Over Time

Regressions (4) and (5) have given us a good introduction to thinking about the euro effect, but they left out a crucial component in which we are very interested: how the euro effect changed over time. There are three ways to measure how the euro effect changes over time. The first method is specifically used in Micco, Stein, and Ordonez (2003). During their analysis of the trend of the euro effect, the authors made 9 interaction terms between EMU2 (which is 1 if

the pair of countries are both in or *will be* in the Eurozone[18]) and an indicator variable for the years 1993-2002. The model can be written as

(6) $\log(T_{ijt}) = \sum_{k=1992}^{2011} \rho_t EMU2_{ij} I(k=t) + \beta_0 + \beta_1 \log(Y_{it}Y_{jt}) + \beta_2 \log(y_{it}y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt}$.

The authors' reasoning behind creating such an EMU2 term is to see in *precisely* which year there was a significant euro effect. Once running regression (6), the authors find that the euro effect started being significant in1998 (as shown in their regression results posted below in Table 2).

Table 2. EMU Effect Over Time

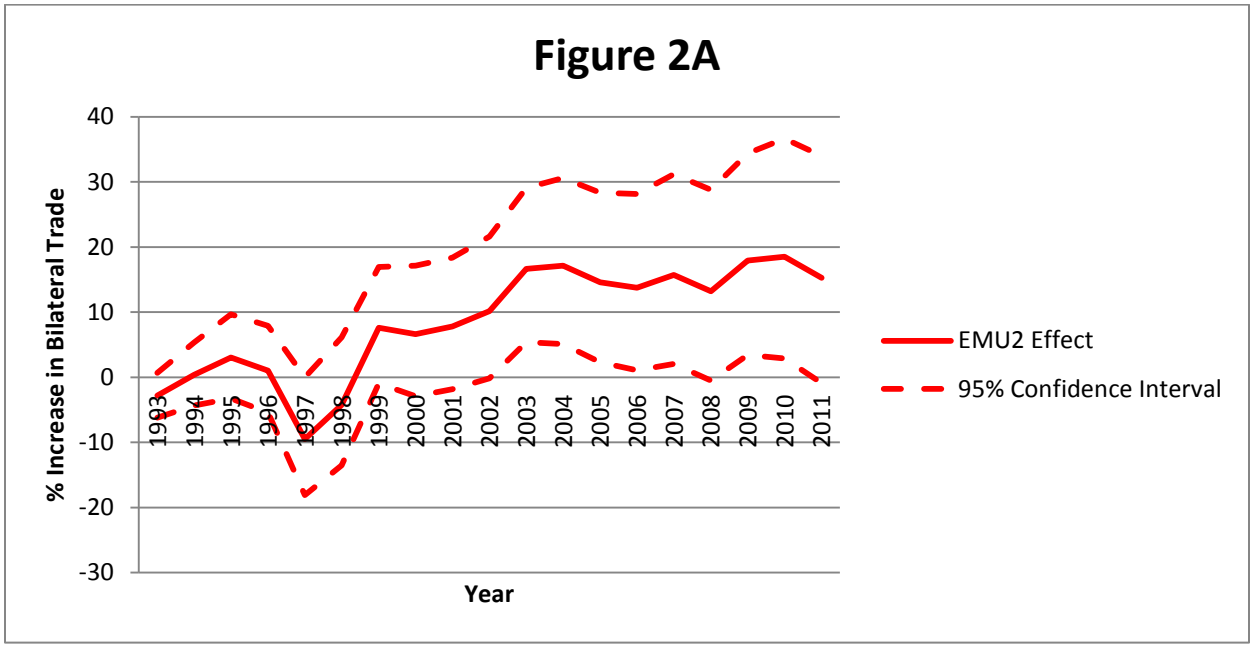
	Developed Sample		*EU Sample*	
	Coef	***S.D.***	***Coef***	***S.D.***
Real GDP	2.185	(0.307)***	2.661	(0.588)***
Real GDP per capita	-1.349	(0.339)***	-2.022	(0.616)***
Free Trade Agreement	0.004	(0.021)	0.023	(0.036)
EU	0.007	(0.022)	0.034	(0.072)
EU Trend	0.006	(0.003)*	-0.018	(0.026)
Real Exchange Rate of Country 1	-0.154	(0.048)***	-0.213	(0.066)***
Real Exchange Rate of Country 2	-0.363	(0.056)***	0.123	(0.110)
EMU2 - 1993	-0.020	(0.032)	-0.005	(0.037)
EMU2 - 1994	0.034	(0.032)	0.024	(0.034)
EMU2 - 1995	0.050	(0.032)	0.022	(0.035)
EMU2 - 1996	0.035	(0.031)	0.011	(0.034)
EMU2 - 1997	0.047	(0.030)	0.033	(0.032)
EMU2 - 1998	**0.099**	**(0.031)*****	**0.078**	**(0.034)****
EMU2 - 1999	**0.123**	**(0.031)*****	**0.088**	**(0.034)*****
EMU2 - 2000	**0.117**	**(0.034)*****	**0.097**	**(0.037)*****
EMU2 - 2001	**0.141**	**(0.035)*****	**0.176**	**(0.036)*****
EMU2 - 2002	**0.141**	**(0.044)*****	**0.153**	**(0.047)*****
Observations	2541	2541	1001	1001
Year Dummies	Yes	Yes	Yes	Yes
Country Pair Dummies	Yes	Yes	Yes	Yes

Robust Standard Error in parentheses.
* significant at 10%, ** significant at 5%, significant at 1%

Source: Micco, Stein, and Ordonez (2003)

[18] For instance, EMU2=1 if the countries are Greece and Germany and year is 1995, even though the euro was not in use.

However, as Table 2A in the appendix shows, if we extend the sample out to 2011, we completely lose the significance of the EMU2-1998 term. Figure 2A plots in a normalized way the estimates of EMU2 coefficients by year (with the 95% confidence interval being within the dashed lines). Using the MSO:1992-2011 sample, I find that the estimate of the euro effect becomes positive starting in 1999, and significantly positive after 2002. This would then negate the claim made in Micco, Stein, and Ordonez, and instead conclude that the euro effect appears first in the *year it was implemented*.



Since it turned out that the Micco, Stein, and Ordonez paper method of measuring the euro effect over time was not significant during the pre-euro era, we can condense it into the second version: creating an interaction between BothEZ and an indicator of the year going from 2000-2011 (BothEZ-1999 is omitted because of the dummy variable trap). The regression below gives more detail of the model.

$$(7)\ \log(T_{ijt}) = \sum_{k=1999}^{2011} \rho_t BothEZ_{ij} I(k = t) + \beta_0 + \beta_1 \log(Y_{it}Y_{jt}) + \beta_2 \log(y_{it}y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt}$$

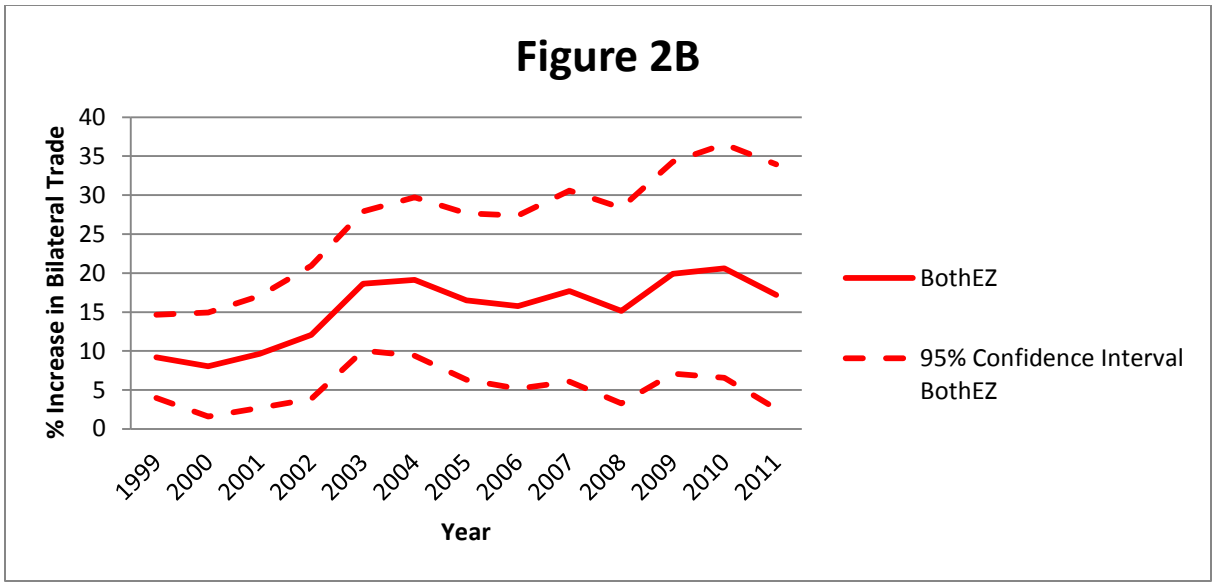
While Table 2B in the Appendix shows the results from the entire regression, the key coefficient estimates are reproduced below in Table 2B Condensed.

Table 2B Condensed

VARIABLES	MSO:1992-2002 Log(T)	MSO:1992-2011 Log(T)	Updated MSO Log(T)
BothEZ-1999	0.104***	0.0878***	0.0754**
	(0.0249)	(0.0248)	(0.0302)
BothEZ-2000	0.0789**	0.0775**	0.0664**
	(0.0330)	(0.0314)	(0.0336)
BothEZ-2001	0.0902**	0.0921***	0.0228
	(0.0360)	(0.0333)	(0.0341)
BothEZ-2002	0.112**	0.114***	0.0622*
	(0.0442)	(0.0387)	(0.0377)
BothEZ-2003		0.171***	0.131***
		(0.0382)	(0.0365)
BothEZ-2004		0.175***	0.178***
		(0.0433)	(0.0382)
BothEZ-2005		0.153***	0.162***
		(0.0465)	(0.0396)
BothEZ-2006		0.146***	0.0984**
		(0.0487)	(0.0417)
BothEZ-2007		0.163***	0.118***
		(0.0528)	(0.0420)
BothEZ-2008		0.141**	0.0709
		(0.0552)	(0.0523)
BothEZ-2009		0.182***	0.110**
		(0.0574)	(0.0532)
BothEZ-2010		0.187***	0.194***
		(0.0630)	(0.0571)
BothEZ-2011		0.159**	0.149***
		(0.0677)	(0.0555)
Observations	2,541	4,620	5,400
R-squared	0.601	0.789	0.699
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Again, since these indicators correspond to a specific year, they can be visualized in a graph with respect to time. Figure 2B shows these changes of the euro effect over time with the area in between the dashed lines as the 95% confidence interval of the estimate.

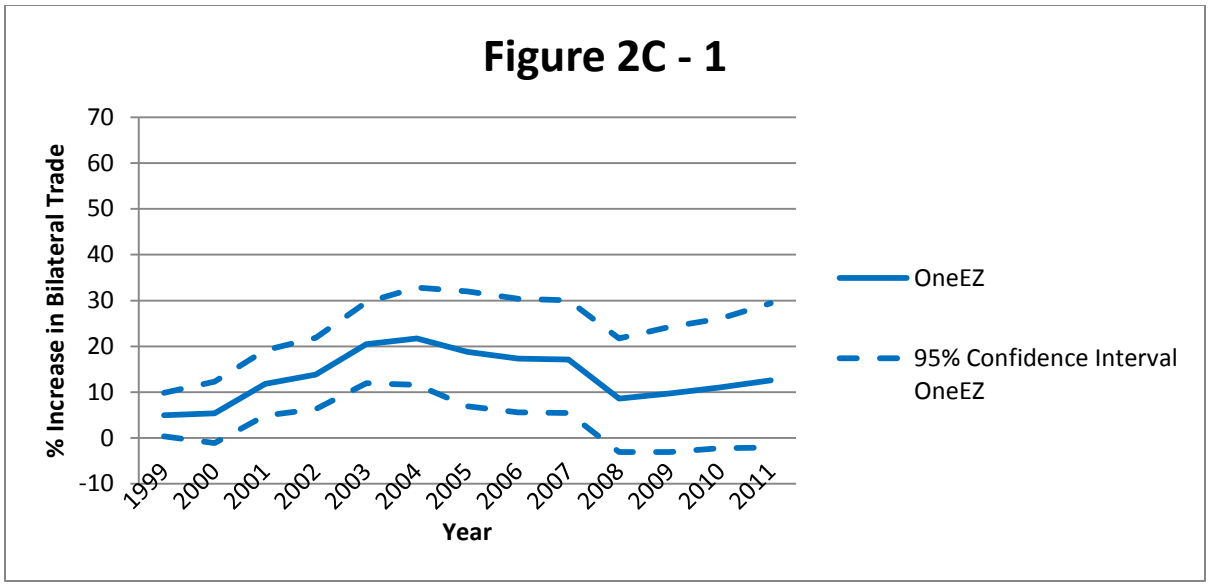


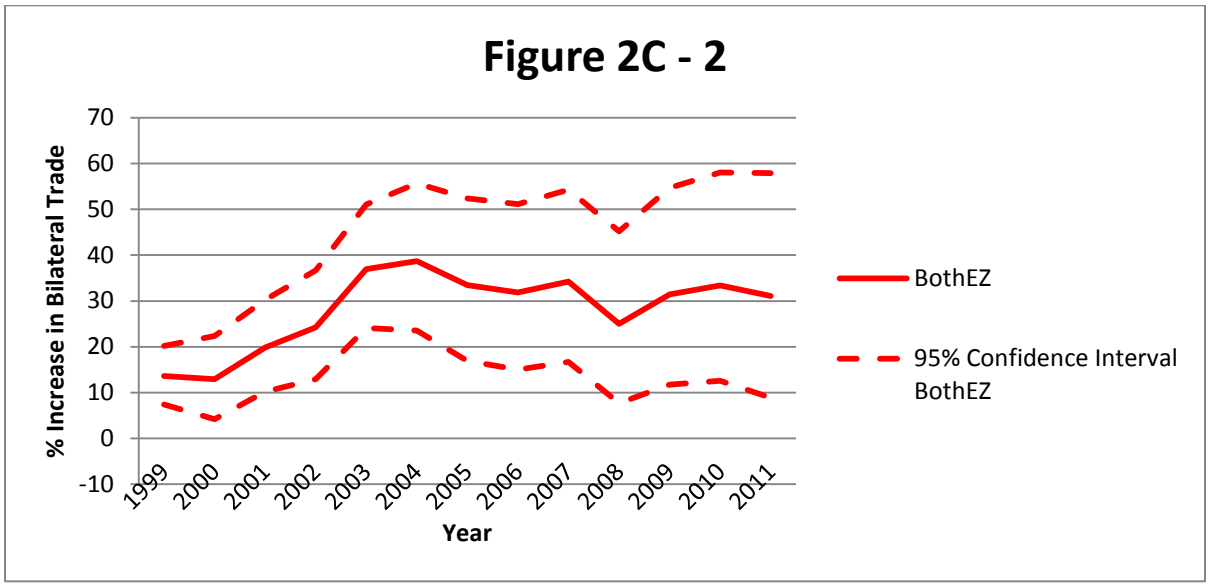
The main difference between Figures 2A and 2B is that all of the euro effects are statistically significant in 2B. Also interesting is the fact that while Figure 2A appears to have a more logarithmic graph of the effect over time, Figure 2B shows the effect plateauing after 2002 at around 7% increase in bilateral trade.

However, just as in the previous subsection, we need to check if our inter-Eurozone trade will impact the estimates of our intra-Eurozone trade effect. Consequently, I run a similar regression as before, but now including interaction terms of OneEZ with the indicator of year terms. The regression can be written as:

(8) $\log(T_{ijt}) = \sum_{k=1999}^{2011} \rho_t BothEZ_{ij} I(k=t) + \sum_{k=1999}^{2011} \varphi_t OneEZ_{ij} I(k=t) + \beta_0 + \beta_1 \log(Y_{it}Y_{jt}) + \beta_2 \log(y_{it}y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt}$.

Because of the length of the regression output table (Table 2C), I leave it for reference in the Appendix. However, a visual of each of the euro effect on inter-Eurozone trade and intra-Eurozone trade can be seen in Figure 2C-1 and Figure 2C-2, respectively. Like before, I use the coefficients from the MSO:1992-2011 sample since it allows me to directly compare results in Figures 2B and 2C.





There is quite a bit to interpret from these two Figures: namely, countries who adopted the euro before 2002 have now increased intra-Eurozone trade by 30% and inter-Eurozone trade by around 10-20%! This is extremely large compared to results found in other papers. However, my results do stay consistent as those in Table 1B, since the BothEZ effects are higher than the effect of OneEZ.

Focusing in on Figure 2C – 1, one can see that inter-Eurozone trade has had a more cyclical pattern as time progresses, since the effect shoots up to around 20% increase of trade, wobbles down to 10%, and then picks back up towards 13% in 2011 (however, after around

2008, the estimates stop being significant). This is much less the case for intra-Eurozone trade, which shows bilateral trade increasing to around 35%, and then plateauing (as it plateaued in Figure 2A) to an increase of around 30%. One can feel more confident about the estimates for the BothEZ coefficient, since the 95% confidence interval for the estimate of BothEZ never reaches 0% during the 1999-2011 period.

While the past few regressions have been convenient (since I can actually graph specific values), the third and final method to measure the euro effect over time is the simplest: an interaction of BothEZ*year and OneEZ*year. This is inherently appropriate since the regressions are shorter, but still control for how the euro effect changes over time. The regression specifies the model, and Table 2E shows the results:

$$(9)\ \log(T_{ij}) = \rho(BothEZ_{ijt} * t) + \varphi(OneEZ_{ijt} * t) + \beta_0 + \beta_1 \log(Y_i Y_j) + \beta_2 \log(y_{it} y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt}$$

Table 2D

VARIABLES	MSO:1992-2002 Log(T)	MSO:1992-2011 Log(T)	Updated MSO Log(T)
BothEZ*t	8.73e-05***	0.000111***	7.29e-05***
	(1.87e-05)	(2.29e-05)	(2.24e-05)
OneEZ*t	4.74e-05***	5.72e-05***	2.20e-05
	(1.25e-05)	(1.82e-05)	(1.55e-05)
GDP	1.525***	0.822***	-0.540
	(0.452)	(0.315)	(0.358)
GDP per Capita	-0.479	-0.0965	1.567***
	(0.508)	(0.362)	(0.385)
FTA	0.120***	0.115	0.0850
	(0.0275)	(0.111)	(0.104)
EU	-1.009	-1.144	7.257
	(9.992)	(7.584)	(7.329)
EUtrend	0.000524	0.000585	-0.00355
	(0.00501)	(0.00380)	(0.00366)
REER Country 1	0.00140**	0.00388***	0.00751***
	(0.000623)	(0.000901)	(0.000923)
REER Country 2	0.00210***	0.00411***	0.00902***
	(0.000707)	(0.000857)	(0.000946)
Constant	-50.75***	-21.69**	15.53
	(14.20)	(10.05)	(11.74)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes

Time Effects	Yes	Yes	Yes
R-squared	0.607	0.792	0.699
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results are fairly similar to those in Table 1B, during which I concluded that the BothEZ effect was significant for each sample group, and that only the Updated MSO sample did not conclude that the OneEZ effect was significant. Additionally, the effects come out to be around the same size of an increase: for instance, using the MSO:1992-2011 sample, we see that the effect of using the euro increased intra-Eurozone trade around 25% and increased inter-Eurozone trade around 12% during in the 2000-2011 period.[19]

Summarizing, each of the three methods of measuring the euro effect over time had its own positives and negatives: method 1 could analyze if the euro effect appeared before the currency was actually implemented; however, the regression in each of our samples found that this was not the case. Method 2 was appropriate since it was easy to visualize the particular effects by year, but it created an unnecessarily long regression. And finally, Method 3 was great because of its simplicity and accuracy.

c. <u>Country Specific Effects</u>

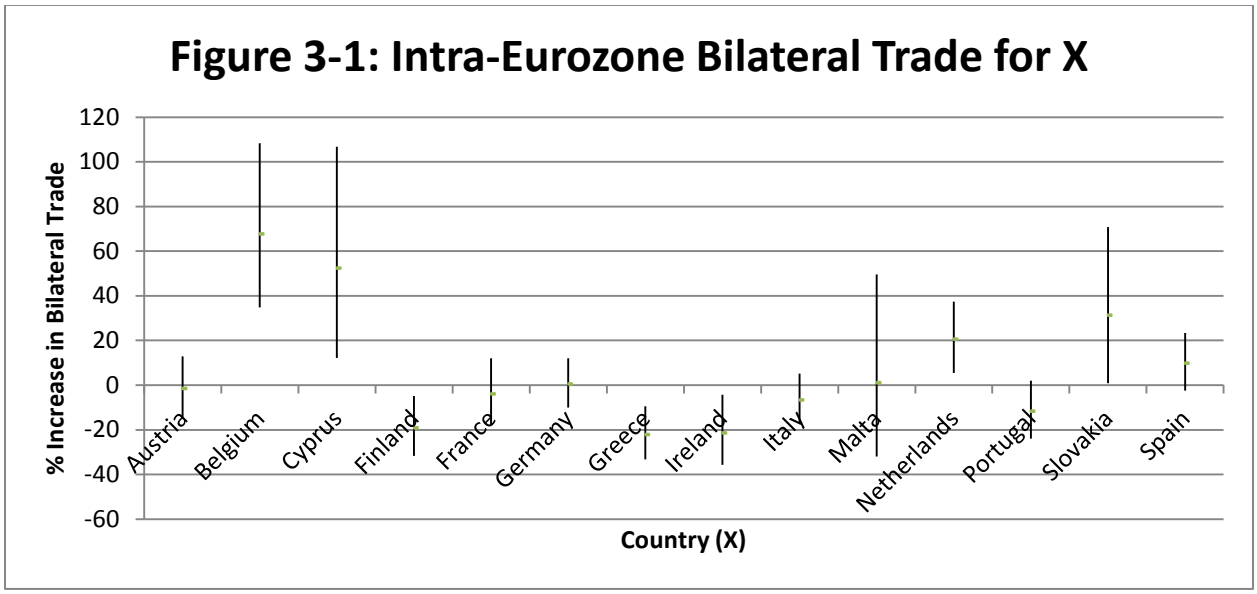
Having found two good methods to control for the euro effect over time, I can now change the model to incorporate country specific euro effects. To do so, I split two of the variables used in regression (9) in to 2 more specific dummy variables. Even more specifically, $(BothEZ_{ijt} * t)$ gets turned in to $(BothEZ_{ijt} * t * X) + (BothEZ_{ijt} * t * NotX)$, and $(OneEZ_{ijt} * t)$ gets turned into $(OneEZ_{ijt} * t * X) + (OneEZ_{ijt} * t * NotX)$, as shown in regression (9) below.

$$(10)\ \log(T_{ij}) = \rho_X(BothEZ_{ijt} * t * X) + \rho_{NotX}(BothEZ_{ijt} * t * NotX) + \varphi_X(OneEZ_{ijt} * t * X) + \varphi_{NotX}(OneEZ_{ijt} * t * NotX) + \beta_0 + \beta_1 \log(Y_{it}Y_{jt}) + \beta_2 \log(y_{it}y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt}$$

[19] As an example, the euro effect for the year 2000 in the MSO:1992-2011 sample can be calculated as [exp(0.000111*2000)-1]*100 = 24.9, which corresponds to a 24.9% increase in intra-Eurozone trade.

Here, X represents a dummy variable that takes a value 1 when country X is one of the trading partners. Likewise, NotX is a dummy variable which takes a value 1 when country X is neither of the two trading partners. This process should make sense intuitively, since essentially we tell regression (9) to split the BothEZ*t coefficient into a weighted sum specific to two groups: NotX and X. It also proves to be a more reliable estimate than say a version of regression (10) that excludes the NotX dummies.

Running this regression 16 times using the Updated MSO sample (once for each country in the Eurozone), I obtain the results which appear in Table 3 in the Appendix. For reference, the most relevant results are plotted in the figures below using estimates for 2010.[20]



[20] Please take note of the different Y-axis values.

Figure 3-2: Intra-Eurozone Bilateral Trade for X

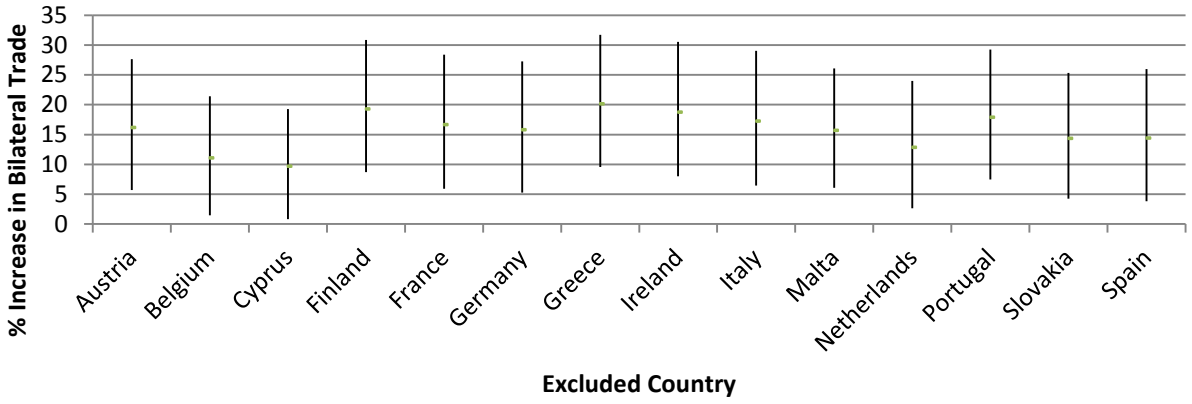


Figure 3-3: Inter-Eurozone Bilateral Trade for X

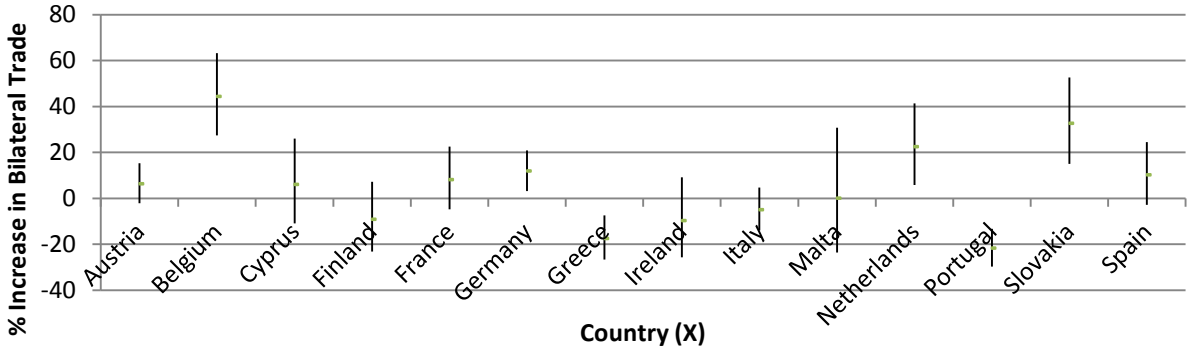
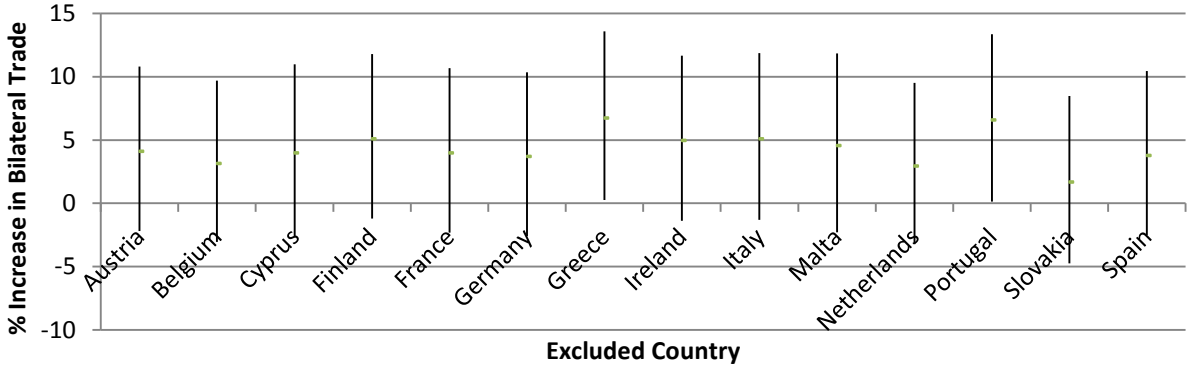


Figure 3-4: Inter-Eurozone Bilateral Trade for NotX



As a note, each graph shows the 95% confidence interval for the estimated percent increase in bilateral trade for a certain country, X [group of countries, NotX], and a certain region of trading partners (intra-Eurozone or inter-Eurozone). For example, a correct interpretation of Figure 3-1 would be, "according to Figure 3-1, a 95% confidence interval for the estimated *decrease* in intra-Eurozone bilateral trade for Greece is between 10 to 30%." Likewise, an equally correct statement about Figure 3-2 would be, "according to Figure 3-2, a 95% confidence interval for the estimated increase in intra-Eurozone bilateral trade for countries that are not Greece is between 10 to 30%."

These figures, while giving a good visual of how bilateral trade has changed during the euro era, do not answer an overlaying question of is intra-Eurozone and inter-Eurozone bilateral trade the same for whether you are a specific country or not; or, put in the context of regression (10), is $\rho_x = \rho_{NotX}$ and $\varphi_X = \varphi_{NotX}$ for each country X? Thankfully, this can be solved quickly with 16 appropriate series of F-tests with the null hypothesis that the means are equal. The p-values from the 16*2 F-tests appear in Test Table 3, and provide a good complement to Figures 3-1 to 3-4.

Test Table 3

Country	BothEZ*t*X = BothEZ*t*NotX	OneEZ*t*X = OneEZ*t*NotX
Austria	0.093	0.730
Belgium	0.002	0.000
Cyprus	0.055	0.859
Finland	0.000	0.117
France	0.074	0.622
Germany	0.112	0.195
Greece	**0.000**	**0.000**
Ireland	0.001	0.151
Italy	0.016	0.116
Malta	0.526	0.770
Netherlands	0.502	0.042
Portugal	0.004	0.000
Slovakia	0.355	0.002
Spain	0.665	0.442

Comparing these results to the figures above, we notice that Greece is an unfortunate standout from the Eurozone members for the following reasons: both its estimated values of

change in bilateral intra-Eurozone trade and inter-Eurozone trade are negative, while NotGreece has positive effects. Moreover, we can reject a null hypothesis that the estimated values for Greece and NotGreece are the same at the 1% level.

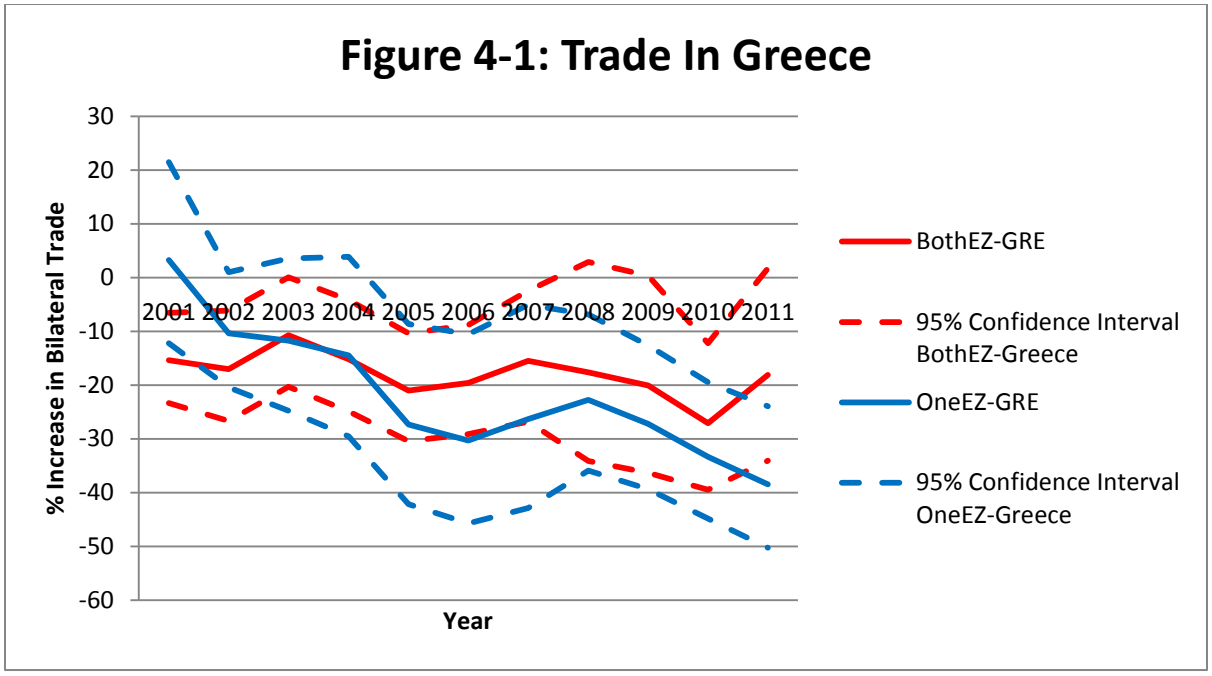
In summary, we just went through the rigorous process of finding a good way to estimate the euro effect for the entire Eurozone by year, and specific to countries. We can now specify this model to Greece and explore the Greek euro effect by year.

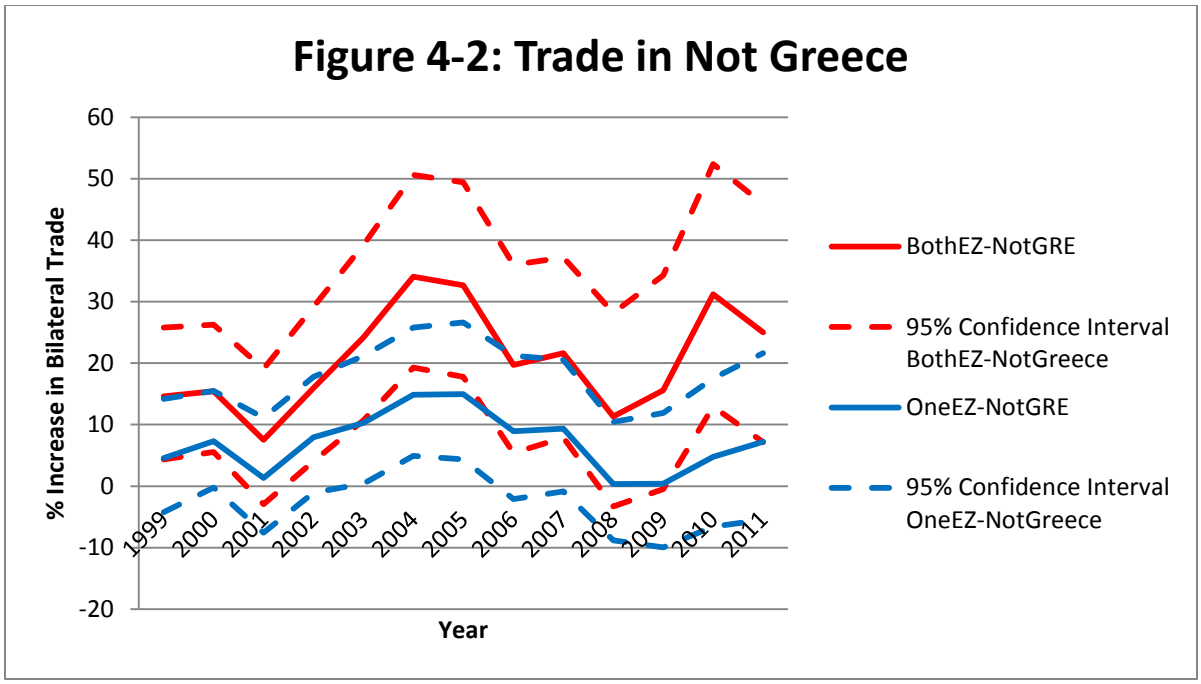
d. Greek Intra-Eurozone and Inter-Eurozone Bilateral Trade Over Time

I now expand the regression to its final version, which will predict how the euro effect for Greece and NotGreece change by year. More specifically, the model can be written as

$$(11)\ \log(T_{ijt}) = \sum_{k=1999}^{2011} \rho_{GRE_t} BothEZ_{ij} I(k=t) Greece_{ij} + \sum_{k=1999}^{2011} \rho_{NotGRE_t} BothEZ_{ij} I(k=t) Greece_{ij} + \sum_{k=1999}^{2011} \varphi_{GRE_t} OneEZ_{ij} I(k=t) Greece_{ij} + \sum_{k=1999}^{2011} \varphi_{NotGRE_t} OneEZ_{ij} I(k=t) NotGreece_{ij} + \beta_0 + \beta_1 \log(Y_{it} Y_{jt}) + \beta_2 \log(y_{it} y_{jt}) + \beta_3 REER_{it} + \beta_4 REER_{jt} + \beta_5 FTA_{ijt} + \beta_6 EU_{ijt} + \beta_7 EUtrend_{ijt} + \alpha_{ij} + \gamma_t + \varepsilon_{ijt}.$$

While specific results can be found in column 1 of Table 4 in the Appendix, the main conclusions are summarized visually in Figures 4-1 and 4-2.





And, like before, a good complement to Figures 4-1 and 4-2 is Test Table 4, which shows the 11*2 p-values of F-tests by year with the null hypothesis that the estimated Greek effect is the same as the NotGreece effect.

Test Table 4

t	BothEZ*Greece*I(Year=t) = BothEZ*NotGreece*I(Year=t)	OneEZ*Greece*I(Year=t) = OneEZ*NotGreece*I(Year=t)
2001	0.004	0.852
2002	0.001	0.025
2003	0.001	0.025
2004	0.000	0.008
2005	0.000	0.001
2006	0.000	0.002
2007	0.001	0.006
2008	0.050	0.022
2009	0.018	0.007
2010	0.000	0.000
2011	0.004	0.000

As one can see in the Figures and confirm in the Test Table, both the OneEZ and BothEZ effect is much different for Greece than it is for NotGreece. Not only that, but has a statistically significant negative impact on Greek bilateral trade. One similarity between the Figures 4-1 and 4-2 would be that the BothEZ coefficient is consistently greater than the estimated effect of

OneEZ on bilateral trade. However, this makes sense since we have reached the same conclusion in each of the previous regressions.[21]

Possibly the most important difference between the two Figures is that there is a downward trend of the euro effect for Greece, while an upward trend for all countries in the Eurozone which aren't Greece. *This* is the moment to which the paper has been building up, and now one must ask the question: how is Greece getting worse off by being in the Eurozone? And, is there a way to change it?

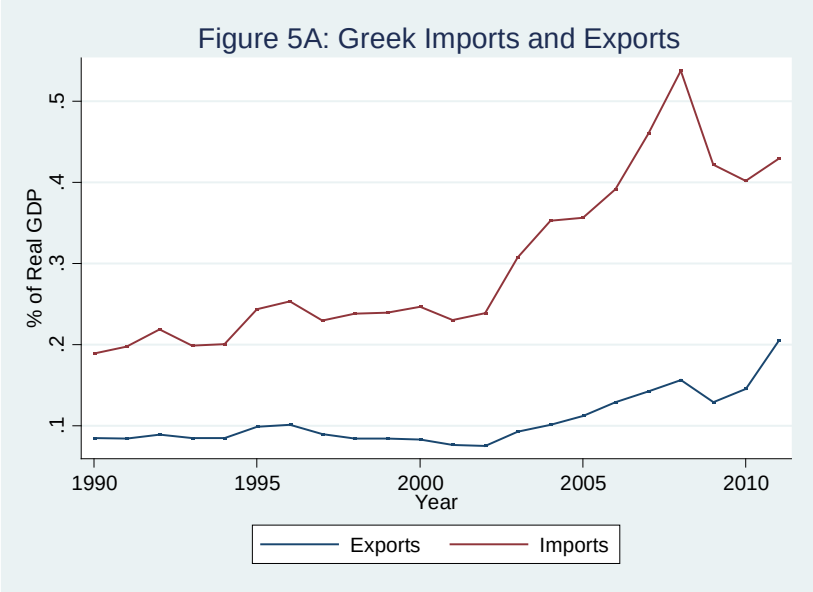
V. The Greek Tragedy: Lack of Competitiveness

The answer to the previous question will soon become undoubtedly clear to be the lack of competitiveness of Greek exports. There has been a plethora of literature on the how export performance, commodity makeup, and competitiveness have diminished through the years. Specifically, the Global Competitiveness Report Series and Athanasoglou, Backinezos, and Georgiou (2010) highlight country-specific and export-specific problems, respectively.

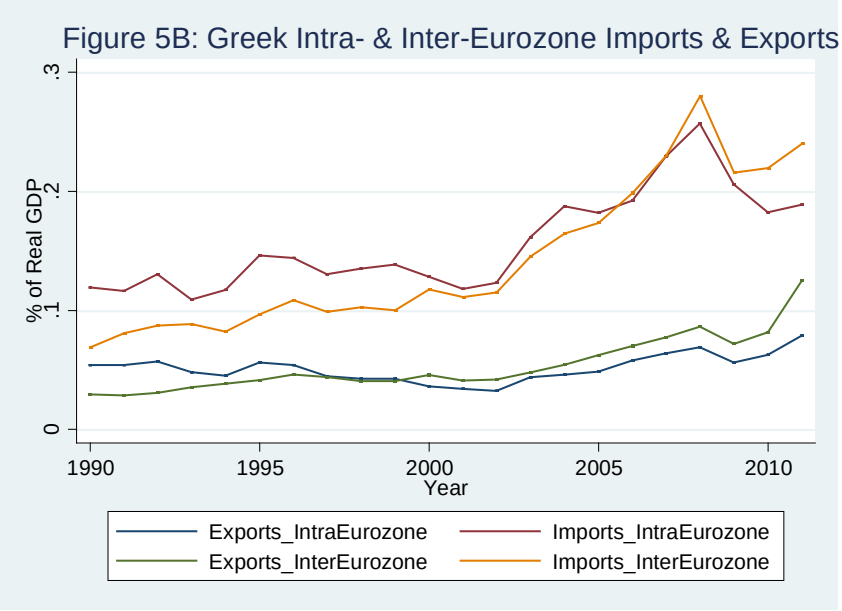
a. Export-Specific Issues

Before getting into the nitty-gritty of Greek exports, it would help to see a visual of how Greek exports play a role bilateral trade.

[21] Another question that could be asked is whether the crisis post 2007 had any significant effects on the Greek Euro effect. However, results in column 2 of Table 4 in the Appendix (during which the years after 2007 were dropped) garner fairly similar, if not slightly lower (more negative) estimates of the Greek euro effect. This would seem to imply that the recessionary period did not have much of an effect on the regression.

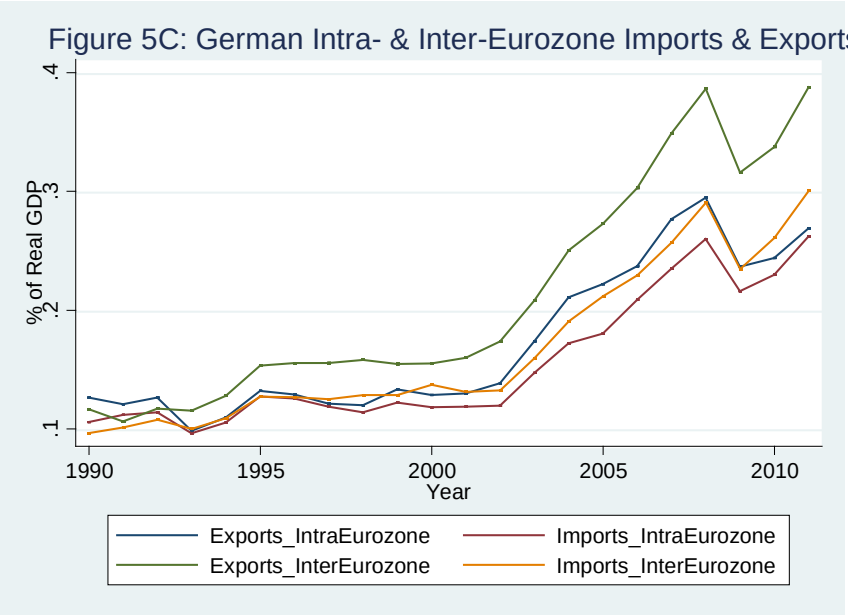


As Figure 5A shows, imports are a much greater factor in Greek bilateral trade. Expanding the picture to Figure 5B, we can separate total exports and imports to Greek intra-Eurozone and inter-Eurozone imports and exports.



As one can see, imports and exports have changed very similarly in both areas of trading partners, with exports again playing a very small role in Greek GDP. As a matter of fact, according to statistics from the OECD, Greece has the lowest exports as a percentage of GDP in

the entire EU-15 area.[22] For instance, Figure 5C shows a similar breakdown in bilateral trade in Germany.



The most immediate takeaway from Figure 5C is that German imports and exports are very similar in magnitude in Germany. Not only that, but comparing Figures 5B and 5C one can see that since the adoption of the euro, German exports have flourished (and are continuing to grow), while exports remain constant in Greece. The question, consequently, becomes: why does Greece have such a small export market even though trade appears to be increasing for other Eurozone countries? The answer is (again) that Greeks have "unimpressive goods" – or goods that lack in quality and price and cost competitiveness – relative to the products being sold elsewhere.

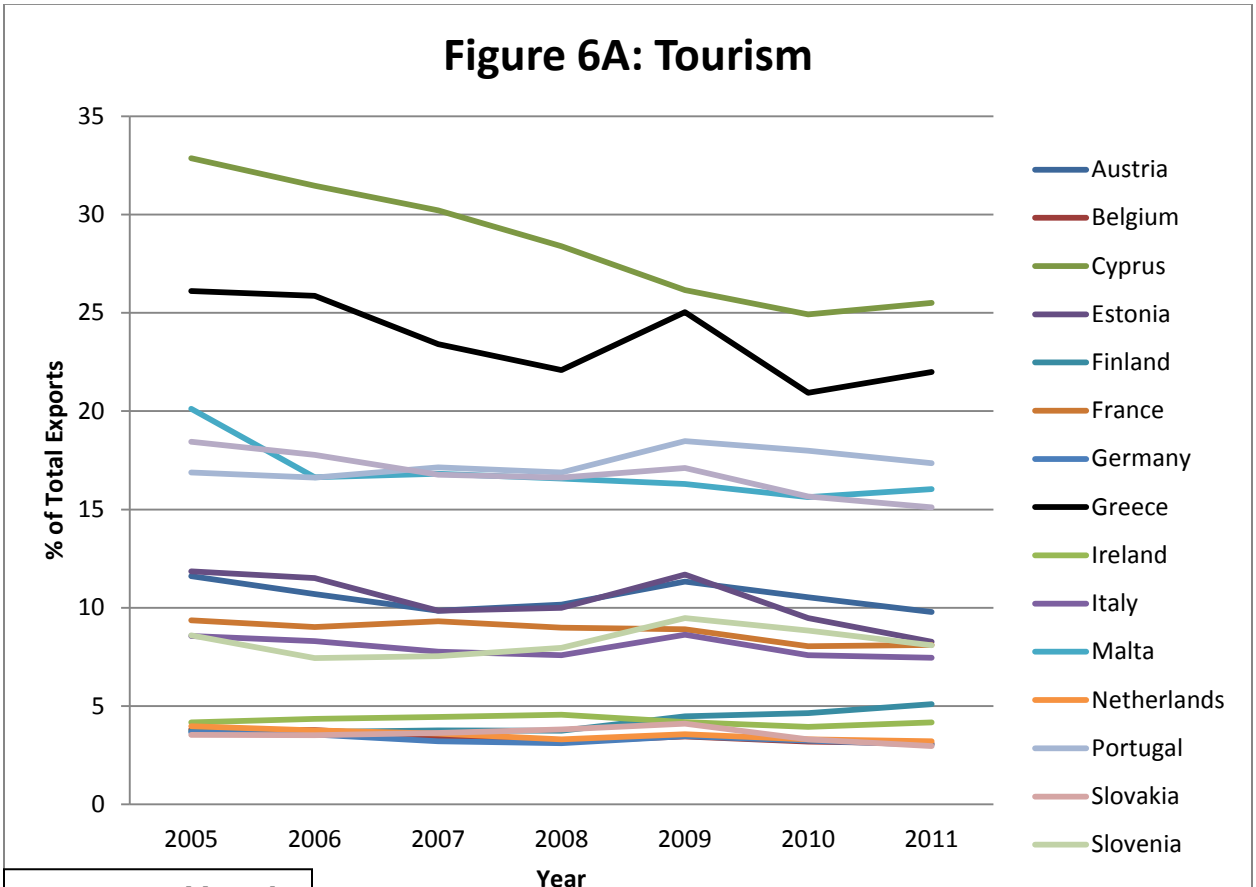
i. Type and Quality

As Athanasoglou, Backinezos, and Georgiou (2010) explain in their working paper, "Greek exports, as well as the exports of other EU countries (like Portugal) that specialize in low technology products, face strong competition from countries with low labor costs, such as China." While Greece has slowly progressed into producing more medium-technology products,

[22] The EU-15 area consists of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

it still has a large proportion of its exports attributed to low-technology products. And, according to the three authors, Greece produces and exports a limited variety of such products.

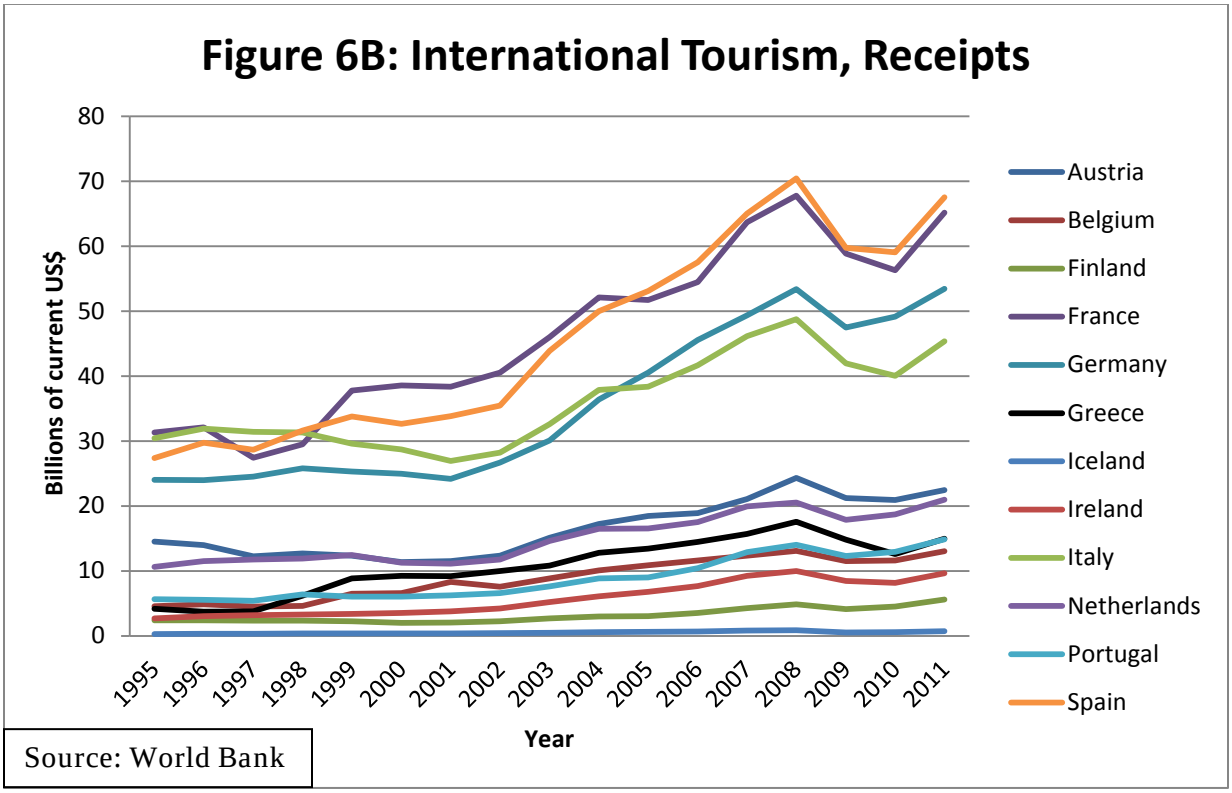
One of these types of exports worth discussing is tourism, which is interesting for Greece because of the percent of exports it makes up. As Figure 6A shows, according to the World Bank, tourism makes up about 20% to 25% of exports in Greece during 2005-2011, a proportion second only to Cyprus for Eurozone countries. The value of total tourism is also increasing, as shown in Figure 6B. Thompson and Thompson (2010) credit this increasing trend to entering the euro, finding in their paper that the adoption of the currency had a large positive impact on Greek tourism revenue.



Source: World Bank

However, this says quite a bit about the competitiveness of other goods Greece exports. Since tourism is a huge industry everywhere in Europe (as noticeable in Figure 5C), but the percent of exports attributed to tourism is not as high in other Eurozone countries as it is in Greece, it must

mean that the other Eurozone countries export other products which are competitive in the market (if they were not competitive, then importing countries would trade with a more competitive country, and tourism as a percent of exports would increase to a level close to that in Greece). Therefore, by the contrapositive argument, Greece must not have competitive goods other than tourism, otherwise tourism as a percent of exports would be at a level closer to the majority of the Eurozone members.



Source: World Bank

The large role of tourism in the export sector may also hint at the lack of quality of Greek goods. Athanasoglou, Backinezos, and Georgiou (2010), in search for a more definite answer, calculates the quality of Greek exports over the 1996-2006 time period. Their results show that the quality of goods sold had in fact deteriorated in the last several years. In addition, according to a study conducted by the IMF[23], the quality of Greek exports is lower than those in Portugal and Spain, two Eurozone countries which could be seen as better alternatives to Greece. All said, the type

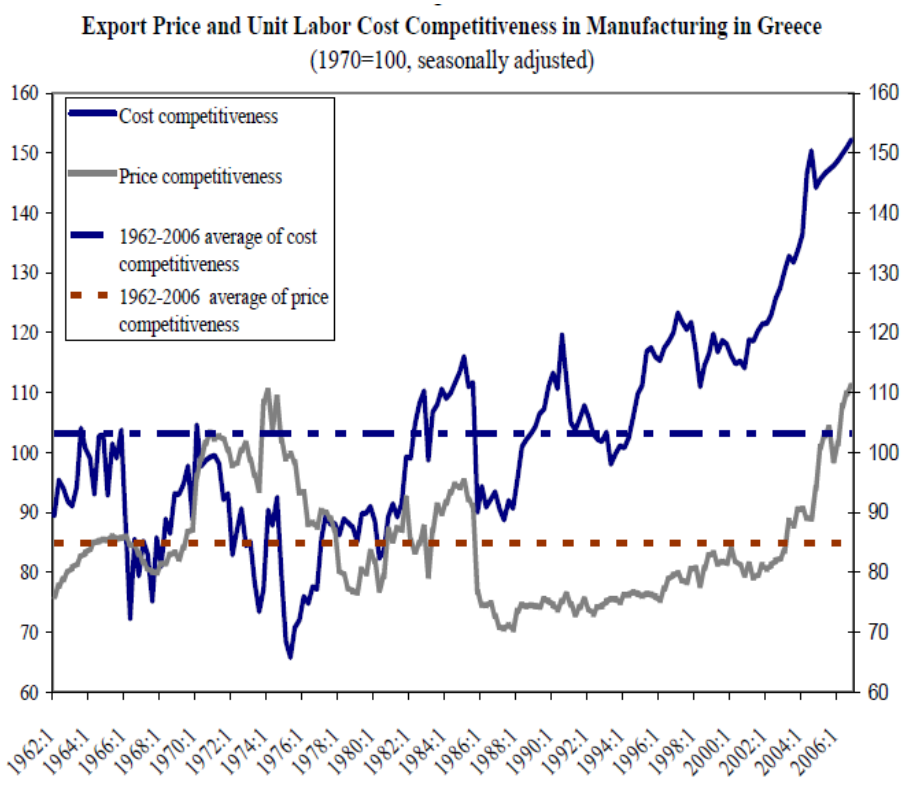
[23] Bennett, Escolano, Fabrizio, Gutierrez, Ivaschenko, Lissovolik, Moreno-Badia, Schule, Tokarick, Xiao, and Zarnic (2008).

and quality of exports from Greece plays a significant factor in the lack of competitiveness, and the lack of improvement after adopting the euro has harshened the negative euro effect.

ii. Price and Cost Competitiveness

Athanasoglou and Bardaka (2008) describe how price competitiveness (or selling price relative to other countries) and cost competitiveness (or cost to make the good) has changed in Greece. They note how during the years 2001 to 2006, cost and price competitiveness worsened dramatically for the production of manufactured goods, with cost competitiveness at levels almost 36% higher than price competitiveness. That means that Greek goods were costing much more than the price they sold, which is an inefficient design – or the so called "competitiveness deficit." Figure 7 shows this more explicitly.

Figure 7



Source: Athanasoglou and Bardaka (2008)

Consequently, their results discuss the lack of innovation in Greece. For, while prices had remained somewhat competitive, the manufacturing industry was not able to create more efficient ways of creating goods. This draws on some of the problems in the Greek labor force, which is discussed in the next subsection.

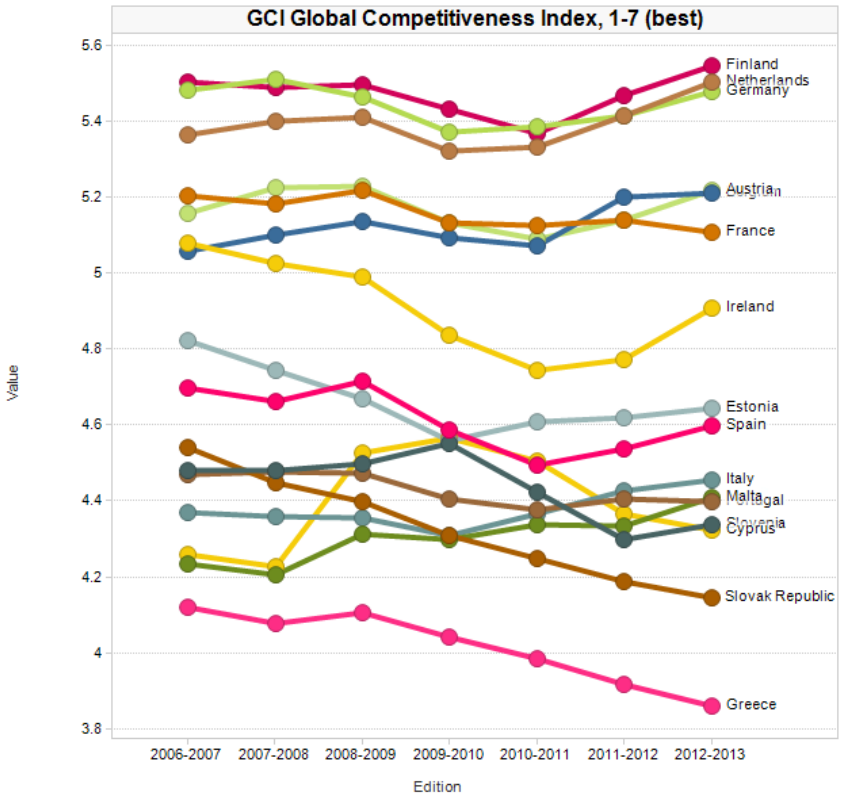
b. Country-Specific Issues

Starting in 2006, the World Economic Forum has published the Global Competitiveness Index (GCI). This index, which rates a country's competitiveness based on 12 different "pillars"[24] then ranks each of the 144 countries in the world. Greece, since the start of this index, has ranked the lowest in the Eurozone and EU (a visual can be seen in Figure 8). This poor ranking, as the GCI notes, is due to Greece's poor macroeconomic environment (where Greece ranks dead last), and its inefficient labor force, the subjects of the two next subsections.[25] The third subsection describes the differences between trade in Greece and the rest of the Eurozone.

[24] http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/gcr_2006/chapter_1_1.pdf

[25] Naturally it would be interesting to see how including the GCI into the previous regressions would change the magnitude of the euro effect (since one could assume that low competitiveness decrease the opportunities to trade). However, a lack of data pre-2006 restricts the ability to compare how competitiveness has changed before and after the implementation of the euro.

Figure 8



Source: World Economic Forum

i. Macroeconomic Environment in Greece

Certainly more recently, Greece has faced a tremendous amount of macroeconomic turmoil because of the Sovereign Debt Crisis. During this time, the government budget as a percent of GDP has plummeted to -9.2, while the government debt has reached large superfluous levels around 160.8 percent of GDP. In order to meet the economic requirements enacted by the European Central Bank, Greece has spent the past few years implementing austerity measures, such as higher taxes on citizens and businesses, which have further contracted the Greek economy. Moreover, because of Greece's near default on its debt, the Greek credit rating has also hit its lowest level. This makes it much more expensive for Greeks to take a loan from a bank, which then would reduce any investment businesses make. In other words, this is certainly not the sort of environment that encourages businesses to innovate.

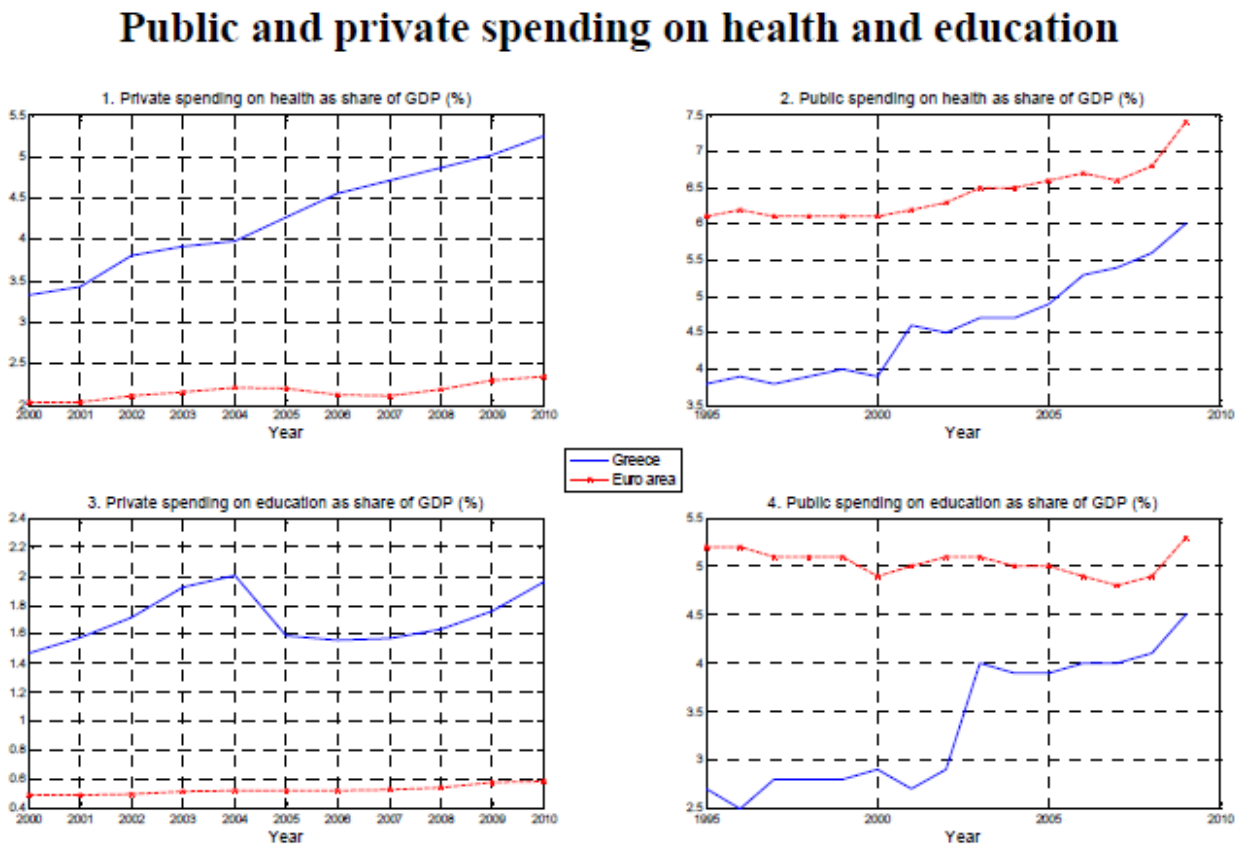
Rather, businesses and people are leaving the country.[26] As a result, Greek exports suffer, and the adoption of a fixed currency prohibits Greece from depreciating their currency to stimulate trade.

ii. Greek Labor Force

It seems natural to think that there is a two-way causality between a poor macroeconomic environment and an inefficient labor force. For instance, GCI finds a few of the biggest inefficiencies in the Greek workforce are pay and productivity, as well as brain drain. However, if a Greek (or any foreigner for that matter) does not get paid an equal proportion to a similar job elsewhere, he or she would not have any economic incentive to either take the job, or to work as hard had he or she been paid more. This could then lead to brain drain, which occurs when the educated workers leave the country to find work more suited to their expertise. Since Greece still largely exports low-technology goods, there is less of a demand for these skilled workers. As a result of this "catch-22," Greece is left only producing low-technology goods, which as discussed before, face strong competition from low labor cost countries. Although this has been the case in Greece even before the adoption of the euro, it could be argued that the macroeconomic environment (and the austerity measures enacted by the ECB) has aggravated the inefficiency of the Greek labor force. However, as shown in Figure 9A, the Greek public and private sectors are increasing spending on education, so there is a possibility of resolving the inadequacies of the labor force in the future.

[26] http://www.guardian.co.uk/global-development/2013/jan/30/great-escape-european-migrants-fleeing-recession

Figure 9A

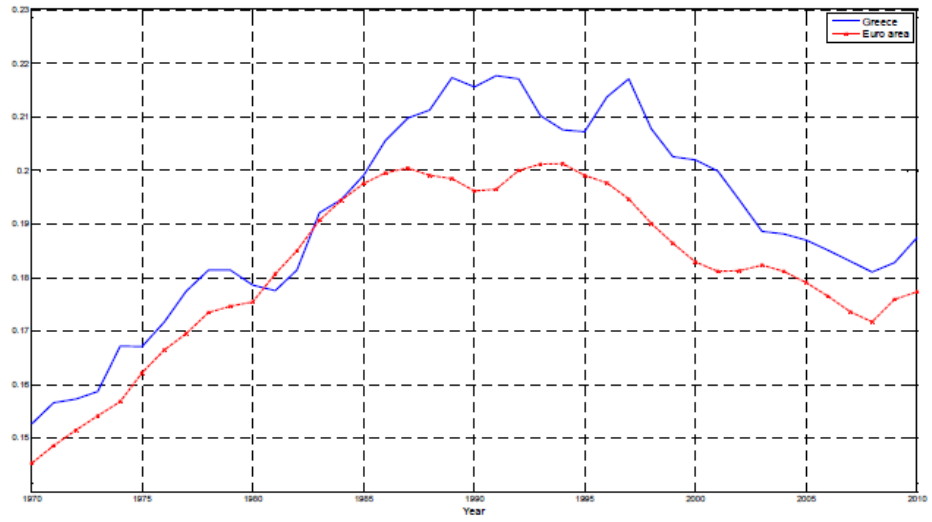


Source: Kollintzas, Papageorgiou, and Vassilatos (2012)

Another unique trait of the Greek labor force comes from its makeup of mostly public sector and self-employed workers. Figures 9B and 9C give visuals of these percentages of the labor force in comparison to the rest of the Eurozone.

Figure 9B

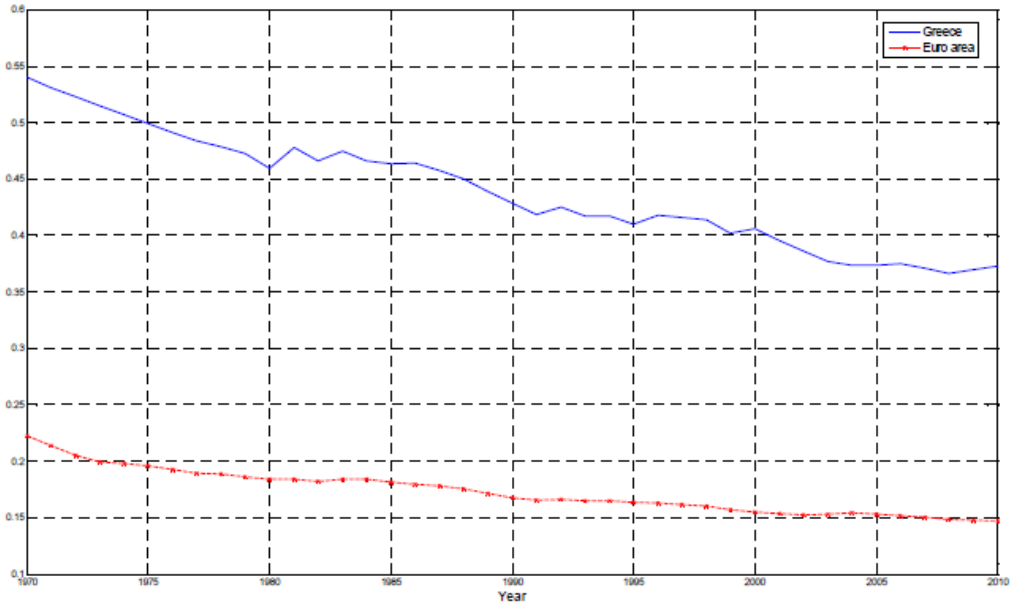
Employment in the public sector as a share of public plus private employees



Source: Kollintzas, Papageorgiou, and Vassilatos (2012)

Figure 9C

Self-employed as a share of total employment



Source: Kollintzas, Papageorgiou, and Vassilatos (2012)

What also becomes evident is the fact that the near majority of the Greek labor force claims to be self-employed. Although Kollintzas, Papageorgiou, and Vassilatos (2012) claim these workers choose to identify as self-employed to hide their true income (and thereby bypass higher taxation), their decision to do so yet again shows the inadequacies of the labor market. Rather than working in a collective environment or business that could pursue producing more competitive goods, Greek workers follow economic self-interests to ensure their own financial stability. It also along these lines that we understand why another large portion of the Greek labor force is in the public sector, which had (until the recent austerity cuts) much higher job security and compensation than the private sector. Again, while the public sector is crucial part of a country's economy, it is not normally thought of as the most innovative sector in a labor force. Consequently, the continuing small makeup of the private sector in Greece can be seen as another reason why Greek exports are not becoming competitive.

iii. Changing Regional Partnerships

While there has been a lot of change in Greece since the implementation of the euro, it is important to remember that an equal amount of change has occurred in the rest of the Eurozone (and the rest of the world for that matter). As I found in Section IV Part c, almost every other Eurozone country has a statistically significant positive euro effect. So, for instance, countries like Germany and France have increased trade with other partners in the Eurozone and rest of the world, which have reduced the amount of goods exported from Greece. Consequently, since joining the Eurozone, Greece has experienced a shift in the location of their top export partners. To elaborate, in 1996, Greece exported around 60% of their goods to the EU-15 and 12% to Southeastern Europe.[27] This proportion has become 50% and 20%, respectively, in the current day.

[27] Countries considered a part of Southeastern Europe include Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, FYR Macedonia, Greece, Hungary, Italy, Moldova, Montenegro, Romania, Serbia, Slovakia, Slovenia, and Ukraine.

Athanasoglou, Backinezos, and Georgiou (2010) credits the shift of trade partners to four factors: “First, the increasing competition from third countries encountered by Greek exports in EU-15 markets forced them to find alternative destinations. Second, the already considerable presence of Greek financial institutions in SE Europe and MME (Mediterranean-Middle Eastern) countries provided them with the knowledge of the local market environment. Third, proximity allowed easy access. Finally, these countries were growing fast.” These factors should make sense intuitively: previous importers of Greek goods can now buy the same, better quality goods closer to home with another, closer Eurozone trading partner to save money on shipping expenses. The same is true for Greece, which then restricts trade to an area made up of growing, but still developing countries in Southeastern Europe and Middle East.

VI. Conclusion

This paper finds that Greece is the Eurozone’s biggest loser in terms of the size of the euro effect. It also argues that the poor performance of Greek bilateral trade was due to the lack of competitiveness of Greek exports. Moreover, Greece’s adoption of the euro appears to have aggravated the decline in the trade with intra-Eurozone and inter-Eurozone partners. While there is a lot for Greeks to be disappointed in their situation, they must remember that there are ways to get better. As the Global Competitiveness Report notes, “Greece has a number of strengths on which it can build, including a reasonably well educated workforce that is adept at adopting new technologies for productivity enhancements. With the correct growth-enhancing reforms, there is every reason to believe that Greece will improve its competitiveness in the coming years.” Athanasoglou, Backinezos, and Georgiou (2010) support this call for reforms, claiming that “policies that support innovation, variety and quality and create a suitable environment through investment in research and development are necessary, especially in sectors where Greece already has a comparative advantage and substantial competitive power.” And finally, it is also worth noting that Greece is not alone in their struggle. For instance, during

the ongoing debt crisis, Germany (among other Eurozone countries) pledged its support in ensuring Greece's turnaround to positive growth.[28] These growing political ties with neighbors in Europe, and all other relationships created during the process, will be the invaluable longest lasting consequences from the adoption of the euro.

[28] http://www.bloomberg.com/news/2012-10-05/merkel-to-visit-greece-for-first-time-since-crisis-outbreak.html

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VIII. Appendix

a. Data/Variables

All following data is found for the years 1992-2011.

Trade: Exports and imports are measured in terms of millions of US dollars and found on the IMF's DOTS database. To create the bilateral trade dataset, I download imports and exports from all countries (with every country as its partner). Appending all of these datasets together, I run a simple average all reported imports and exports reported for a specific country pair for a certain year. This average becomes my measure of bilateral trade (referred to as T in the regressions).

There is a minor difference between my dataset of bilateral trade and the ones used in other euro effect papers, which is: most other papers on this topic use the country "Belgium-Luxembourg" to describe trade for both Belgium and Luxembourg.[29] Since I could not find any economic indicator data specific to the country "Belgium-Luxembourg," I replaced any instance that had "Belgium-Luxembourg" as one of the pairs with Belgium (since I have complete data economic indicator data for Belgium), and then exclude Luxembourg from my sample altogether. My reasoning to do so was that Luxembourg is such a small economy that any bilateral trade with them would be negligible to the final analysis.

Real GDP/Real GDP per Capita: These are denoted as Y and y, respectively, in the regressions. Real GDP data is taken from the World Bank's database, World Development Indicators (WDI), using the "GDP (constant 2000 US$)" dataset. I then create a real GDP per capita dataset by dividing real GDP by reported population ("Population, Total", which can also be found in the WTO's WDI).

Real Effective Exchange Rate (REER):This variable is the index of real exchange rate with base year 2005, calculated as the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. This means that an increase in the REER is an appreciation of the specific country's currency. Data can be found on the World Bank's World Development Indicators database, and is listed as "Real effective exchange rate index (2005=100)."

My method of quantifying the value of a currency is different than what appears in Micco, Stein, and Ordonez (2003). In their paper, the authors the ration of real GDP (in US$) to nominal GDP (in US$) as their statistic on real exchange rates because of the following rational:

> "Since Real GDP = Nom GDP (in domestic currency) / GDP deflator, and Nominal GDP in dollars = Nominal GDP (in domestic currency) / Nominal exchange rate, the ratio between the two is the nominal exchange rate / GDP deflator, which we use as our index of the real exchange rate. If we multiplied this index by the US GDP deflator we would obtain the bilateral Real Exchange Rate vis-à-vis the US."

One could see their calculation being more focused towards bilateral trade whereas the REER is more multilateral. Consequently, their estimates of the effect of a country's real exchange rate are always negative, whereas mine are always positive. Regardless of which measure, my estimates of the BothEZ and OneEZ terms only inflate around 1% when I use the real exchange rate rather than REER, so I would feel equally comfortable with using either in my paper. All that will happen is there is an unusual sign on one of the nuisance coefficients.

[29] This is likely the result of how trade data was collected, for before 1999, the IMF refers to both Belgium and Luxembourg as the single country, "Belgium-Luxembourg."

Free Trade Agreements (FTAs): This is a dummy variable that indicates whether the trading pair of countries is a part of a free trade agreement. For this I find the data on the World Trade Organization's database.

It is worth mentioning that most papers site Frankel (1997) as their main source; however, when considering the selected sample of countries in this analysis, this list is essentially made up of 4 different FTAs: the European Free Trade Association (EFTA), the Central European Free Trade Agreement (CEFTA), the North American Free Trade Agreement (NAFTA), and the Australia New Zealand Closer Economic Relations Trade Agreement (ANZCERTA). Besides the fact that this fairly outdated, this list also grossly underestimates the actual number of FTAs during the 1990s and 2000s. That is why I use the WTO statistics database, which lists every FTA (in force and inactive) and to my tally has around 51 FTAs during these two decades during the sample. All told, this could be why my values and significance are somewhat different than previous papers, but by and large the more important results stay constant in significance.

EU (European Union): This is the dummy variable that indicates whether a country is in the European Union at a certain time t.

EUtrend: Calculated as EU*year.

BothEZ: A dummy variable indicating whether the trading partners are both in the Eurozone at time t.

OneEZ: A dummy variable indicating whether only one of the trading partners is in the Eurozone at time t.

EMU2: A dummy variable indicating whether the trading partners are *or will be* in the Eurozone. For example, EMU2=1 for Greece-Germany in 1995, even though the euro did not exist.

EMU1: A dummy variable indicating whether only one of the trading partners is *or will be* in the Eurozone. For example, EMU1=1 for Greece-Switzerland in 1995, even though the euro did not exist.

b. *List of Countries in Samples*

Sample		Important Dates	
MSO	Updated MSO	EU Country (Year of Affiliation)	Eurozone (Year Adopted euro)
Australia	Australia		
Austria	Austria	1995	1999
Belgium	Belgium	1952	1999
Canada	Canada		
Denmark	Denmark	1973	
Finland	Finland	1995	1999
France	France	1952	1999
Germany	Germany	1952	1999
Greece	Greece	1981	2001
Iceland	Iceland		
Ireland	Ireland	1973	1999
Italy	Italy	1952	1999
Japan	Japan		
New Zealand	New Zealand		
Netherlands	Netherlands	1952	1999
Norway	Norway		
Portugal	Portugal	1986	1999
Spain	Spain	1986	1999
Sweden	Sweden	1995	
Switzerland	Switzerland		
United Kingdom	United Kingdom	1973	
United States	United States		
	Cyprus	2004	2008
	Estonia	2004	2011
	Malta	2004	2008
	Slovakia	2004	2009
	Slovenia	2004	2007

c. List of Free Trade Agreements

For the end date, "Present" means that the free trade agreement is still active.

FTA	Status	Start Date	End Date
ASEAN - Australia - New Zealand	In Force	2010	Present
ASEAN – India	In Force	2010	Present
ASEAN – Japan	In Force	2008	Present
ASEAN - Korea, Republic of	In Force	2009	Present
ASEAN Free Trade Area (AFTA)	In Force	1992	Present
Australia – Chile	In Force	2009	Present
Australia - New Zealand (ANZCERTA)	In Force	1983	Present
Australia - Papua New Guinea (PATCRA)	In Force	1977	Present
Canada – Chile	In Force	1997	Present
Canada – Colombia	In Force	2011	Present
Canada - Costa Rica	In Force	2002	Present
Canada – Israel	In Force	1997	Present
Canada – Peru	In Force	2009	Present
Canada - US Free Trade Agreement (CUSFTA)	Inactive	1989	1994
Central European Free Trade Agreement (CEFTA)	Inactive	1993	2004
Central European Free Trade Agreement (CEFTA) - Accession of Slovenia	Inactive	1996	2004
Central European Free Trade Agreement (CEFTA) 2006	In Force	2007	Present
China - New Zealand	In Force	2008	Present
EC - Czech and Slovak Federal Republic Interim Agreement	Inactive	1992	1995
EC - Estonia Agreement	Inactive	1995	2004
EC - Finland Agreement	Inactive	1974	1994
EC - Greece Additional Protocol	Inactive	1975	1981
EC - Poland Europe Agreement	Inactive	1994	2004
EC - Poland Interim Agreement of 1991	Inactive	1992	1994
EC - Portugal Agreement of 1972	Inactive	1973	1976
E+A27C - Portugal Interim Agreement	Inactive	1976	1986
EC - Slovak Republic Europe Agreement	Inactive	1995	2004

EC - Slovenia Cooperation Agreement	Inactive	1993	1997
EC - Slovenia Interim Agreement	Inactive	1997	2004
EC - Spain Agreement of 1970	Inactive	1970	1986
EC - Sweden Agreement	Inactive	1973	1995
EFTA - Estonia Free Trade Agreement	Inactive	1996	2004
EFTA - Slovak Republic Agreement	Inactive	1992	2004
EFTA – Slovenia	Inactive	1995	2004
EFTA - Spain Agreement	Inactive	1980	1986
EFTA accession of Iceland	In Force	1970	Present
Estonia - Norway Free Trade Agreement	Inactive	1992	1996
Estonia - Sweden Free Trade Agreement	Inactive	1992	1995
Estonia - Switzerland Free Trade Agreement	Inactive	1993	1996
EU – Iceland	In Force	1973	Present
EU – Norway	In Force	1973	Present
EU - Switzerland – Liechtenstein	In Force	1973	Present
European Free Trade Association (EFTA)	In Force	1960	Present
Finland - Estonia Protocol	Inactive	1992	1995
Finland - German Democratic Republic Agreement	Inactive	1975	1989
Finland-European Free Trade Association (FINEFTA)	Inactive	1961	1986
Ireland - United Kingdom Free Trade Area	Inactive	1966	1973
Japan – Switzerland	In Force	2009	Present
North American Free Trade Agreement (NAFTA)	In Force	1994	Present
Slovak Republic - Slovenia Free Trade Agreement	Inactive	1994	1995
Slovenia – Estonia	Inactive	1997	2004

d. Regression Tables

Table 1A

VARIABLES	MSO: 1992-2002 Log(T)	MSO: 1992-2011 Log(T)	Updated MSO Log(T)
BothEZ	0.0961***	0.129***	0.107***
	(0.0317)	(0.0353)	(0.0346)
GDP	1.166**	0.701**	-0.552
	(0.469)	(0.318)	(0.357)
GDP per Capita	-0.0285	0.0827	1.605***
	(0.529)	(0.362)	(0.379)
FTA	0.109***	0.0859	0.0732
	(0.0280)	(0.111)	(0.105)
EU	-2.897	-3.269	6.242
	(10.06)	(7.475)	(7.333)
EUtrend	0.00147	0.00165	-0.00304
	(0.00505)	(0.00375)	(0.00367)
REER Country 1	0.00117*	0.00400***	0.00746***
	(0.000626)	(0.000892)	(0.000925)
REER Country 2	0.00199***	0.00411***	0.00896***
	(0.000722)	(0.000868)	(0.000949)
Constant	-40.68***	-18.84*	15.41
	(14.68)	(10.20)	(11.77)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes
R-squared	0.601	0.788	0.698
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1B

VARIABLES	MSO: 1992-2002 Log(T)	MSO: 1992-2011 Log(T)	Updated MSO Log(T)
BothEZ	0.175***	0.223***	0.146***
	(0.0373)	(0.0457)	(0.0449)
OneEZ	0.0947***	0.115***	0.0442
	(0.0250)	(0.0365)	(0.0310)
GDP	1.525***	0.822***	-0.540
	(0.452)	(0.315)	(0.359)
GDP per Capita	-0.479	-0.0966	1.566***
	(0.508)	(0.362)	(0.385)
FTA	0.120***	0.114	0.0849
	(0.0275)	(0.111)	(0.104)
EU	-1.019	-1.210	7.205
	(9.991)	(7.578)	(7.327)
EUtrend	0.000529	0.000618	-0.00353
	(0.00501)	(0.00380)	(0.00366)
REER Country 1	0.00140**	0.00388***	0.00751***
	(0.000623)	(0.000900)	(0.000923)
REER Country 2	0.00210***	0.00411***	0.00902***
	(0.000707)	(0.000857)	(0.000946)
Constant	-50.75***	-21.69**	15.53
	(14.20)	(10.05)	(11.74)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes
R-squared	0.607	0.791	0.699
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2A

VARIABLES	MSO: 1992-2002 Log(T)	MSO: 1992-2011 Log(T)	Updated MSO Log(T)
GDP	1.110**	0.654**	-0.576
	(0.470)	(0.320)	(0.358)
GDP per Capita	0.0482	0.161	1.659***
	(0.531)	(0.365)	(0.377)
FTA	0.114***	0.0904	0.0802
	(0.0282)	(0.111)	(0.105)
EU	-2.887	1.024	11.82
	(11.24)	(8.619)	(8.602)
EUtrend	0.00146	-0.000499	-0.00584
	(0.00564)	(0.00432)	(0.00430)
REER Country 1	0.00107*	0.00390***	0.00732***
	(0.000638)	(0.000914)	(0.000965)
REER Country 2	0.00190***	0.00400***	0.00876***
	(0.000729)	(0.000891)	(0.000978)
EMU2-1993	-0.0242	-0.0285	
	(0.0170)	(0.0179)	
EMU2-1994	0.0124	0.00381	
	(0.0231)	(0.0245)	
EMU2-1995	0.0416	0.0297	0.00225
	(0.0293)	(0.0319)	(0.0285)
EMU2-1996	0.0218	0.0101	-0.00748
	(0.0322)	(0.0335)	(0.0313)
EMU2-1997	-0.0749*	-0.0998**	-0.0959**
	(0.0417)	(0.0506)	(0.0442)
EMU2-1998	-0.0207	-0.0431	-0.0590
	(0.0427)	(0.0520)	(0.0478)
EMU2-1999	0.0868**	0.0735*	0.0106
	(0.0401)	(0.0421)	(0.0456)
EMU2-2000	0.0602	0.0643	0.0600
	(0.0469)	(0.0476)	(0.0481)
EMU2-2001	0.0798	0.0752	0.111**
	(0.0484)	(0.0475)	(0.0548)
EMU2-2002	0.102*	0.0969*	0.0902
	(0.0547)	(0.0500)	(0.0575)
EMU2-2003		0.154***	0.0750
		(0.0514)	(0.0571)
EMU2-2004		0.158***	0.0718
		(0.0551)	(0.0600)
EMU2-2005		0.136**	0.0907
		(0.0576)	(0.0644)
EMU2-2006		0.129**	0.0896
		(0.0603)	(0.0693)
EMU2-2007		0.146**	0.136*
		(0.0638)	(0.0720)
EMU2-2008		0.124*	0.0880

		(0.0654)	(0.0733)
EMU2-2009		0.165**	0.125*
		(0.0665)	(0.0752)
EMU2-2010		0.170**	0.208***
		(0.0721)	(0.0767)
EMU2-2011		0.142*	0.163**
		(0.0765)	(0.0782)
Constant	-39.18***	-17.90*	15.65
	(14.72)	(10.26)	(11.86)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes
R-squared	0.604	0.790	0.700
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2B

VARIABLES	MSO:1992-2002 Log(T)	MSO:1992-2011 Log(T)	Updated MSO Log(T)
GDP	1.156**	0.668**	-0.560
	(0.469)	(0.320)	(0.356)
GDP per Capita	-0.0155	0.139	1.627***
	(0.529)	(0.365)	(0.376)
FTA	0.109***	0.0896	0.0792
	(0.0280)	(0.111)	(0.106)
EU	-2.366	1.049	10.55
	(10.34)	(8.400)	(7.766)
EUtrend	0.00120	-0.000513	-0.00519
	(0.00518)	(0.00421)	(0.00388)
REER Country 1	0.00115*	0.00391***	0.00738***
	(0.000627)	(0.000911)	(0.000947)
REER Country 2	0.00197***	0.00400***	0.00887***
	(0.000724)	(0.000887)	(0.000971)
BothEZ-1999	0.104***	0.0878***	0.0754**
	(0.0249)	(0.0248)	(0.0302)
BothEZ-2000	0.0789**	0.0775**	0.0664**
	(0.0330)	(0.0314)	(0.0336)
BothEZ-2001	0.0902**	0.0921***	0.0228
	(0.0360)	(0.0333)	(0.0341)
BothEZ-2002	0.112**	0.114***	0.0622*
	(0.0442)	(0.0387)	(0.0377)
BothEZ-2003		0.171***	0.131***
		(0.0382)	(0.0365)
BothEZ-2004		0.175***	0.178***
		(0.0433)	(0.0382)
BothEZ-2005		0.153***	0.162***
		(0.0465)	(0.0396)
BothEZ-2006		0.146***	0.0984**
		(0.0487)	(0.0417)
BothEZ-2007		0.163***	0.118***
		(0.0528)	(0.0420)
BothEZ-2008		0.141**	0.0709
		(0.0552)	(0.0523)
BothEZ-2009		0.182***	0.110**
		(0.0574)	(0.0532)
BothEZ-2010		0.187***	0.194***
		(0.0630)	(0.0571)
BothEZ-2011		0.159**	0.149***
		(0.0677)	(0.0555)
Constant	-40.38***	-18.16*	15.44
	(14.67)	(10.25)	(11.79)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes

Time Effects	Yes	Yes	Yes
R-squared	0.601	0.789	0.699
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2C

VARIABLES	MSO:1992-2002 Log(T)	MSO:1992-2011 Log(T)	Updated MSO Log(T)
GDP	1.519***	0.767**	-0.553
	(0.451)	(0.320)	(0.360)
GDP per Capita	-0.471	-0.00709	1.586***
	(0.508)	(0.366)	(0.383)
FTA	0.120***	0.113	0.0673
	(0.0276)	(0.112)	(0.106)
EU	0.360	5.001	12.13
	(10.31)	(8.751)	(7.938)
EUtrend	-0.000162	-0.00249	-0.00598
	(0.00517)	(0.00439)	(0.00397)
REER Country 1	0.00136**	0.00375***	0.00753***
	(0.000625)	(0.000935)	(0.000963)
REER Country 2	0.00203***	0.00402***	0.00905***
	(0.000708)	(0.000885)	(0.000982)
BothEZ-1999	0.163***	0.128***	0.0955**
	(0.0283)	(0.0286)	(0.0474)
BothEZ-2000	0.138***	0.121***	0.104**
	(0.0418)	(0.0407)	(0.0453)
BothEZ-2001	0.187***	0.181***	0.0444
	(0.0447)	(0.0424)	(0.0499)
BothEZ-2002	0.223***	0.217***	0.116**
	(0.0530)	(0.0484)	(0.0528)
BothEZ-2003		0.314***	0.197***
		(0.0499)	(0.0562)
BothEZ-2004		0.327***	0.266***
		(0.0586)	(0.0573)
BothEZ-2005		0.289***	0.241***
		(0.0673)	(0.0592)
BothEZ-2006		0.276***	0.142**
		(0.0692)	(0.0635)
BothEZ-2007		0.294***	0.168***
		(0.0708)	(0.0592)
BothEZ-2008		0.223***	0.0726
		(0.0758)	(0.0684)
BothEZ-2009		0.274***	0.113
		(0.0826)	(0.0740)
BothEZ-2010		0.288***	0.226***
		(0.0861)	(0.0742)
BothEZ-2011		0.271***	0.195**
		(0.0944)	(0.0785)
OneEZ-1999	0.0735***	0.0489**	0.0227
	(0.0211)	(0.0228)	(0.0444)
OneEZ-2000	0.0680**	0.0525	0.0495
	(0.0310)	(0.0321)	(0.0377)
OneEZ-2001	0.115***	0.112***	0.0200

	(0.0323)	(0.0322)	(0.0456)
OneEZ-2002	0.134***	0.130***	0.0702
	(0.0344)	(0.0347)	(0.0430)
OneEZ-2003		0.186***	0.0903*
		(0.0373)	(0.0471)
OneEZ-2004		0.197***	0.126***
		(0.0443)	(0.0464)
OneEZ-2005		0.172***	0.111**
		(0.0535)	(0.0496)
OneEZ-2006		0.160***	0.0543
		(0.0535)	(0.0547)
OneEZ-2007		0.158***	0.0631
		(0.0532)	(0.0498)
OneEZ-2008		0.0828	-0.0172
		(0.0577)	(0.0480)
OneEZ-2009		0.0930	-0.0168
		(0.0630)	(0.0539)
OneEZ-2010		0.105	0.0196
		(0.0645)	(0.0568)
OneEZ-2011		0.118*	0.0372
		(0.0707)	(0.0632)
Constant	-50.55***	-20.51**	15.85
	(14.16)	(10.20)	(11.85)
Observations	2,541	4,620	5,400
Country Pair Fixed Effects	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes
R-squared	0.609	0.794	0.701
Number of Fixed Effects	252	252	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3 Part 1

VARIABLES	Austria Log(T)	Belgium Log(T)	Cyprus Log(T)	Estonia Log(T)	Finland Log(T)
BothEZ*t*X	-8.08e-06	0.000257***	0.000209***		-0.000107**
	(3.48e-05)	(5.51e-05)	(7.73e-05)		(4.18e-05)
BothEZ*t*NotX	7.45e-05***	5.20e-05**	4.58e-05**	7.29e-05***	8.76e-05***
	(2.39e-05)	(2.27e-05)	(2.13e-05)	(2.24e-05)	(2.34e-05)
OneEZ*t*X	2.99e-05	0.000182***	2.86e-05		-4.84e-05
	(2.06e-05)	(3.13e-05)	(4.39e-05)		(4.22e-05)
OneEZ*t*NotX	2.00e-05	1.53e-05	1.93e-05	2.20e-05	2.47e-05
	(1.58e-05)	(1.56e-05)	(1.65e-05)	(1.55e-05)	(1.56e-05)
GDP	-0.533	-0.507	-0.819**	-0.540	-0.600*
	(0.358)	(0.356)	(0.347)	(0.358)	(0.356)
GDP per Capita	1.563***	1.571***	1.889***	1.567***	1.684***
	(0.384)	(0.383)	(0.359)	(0.385)	(0.380)
FTA	0.0847	0.0833	0.0998	0.0850	0.0891
	(0.104)	(0.105)	(0.101)	(0.104)	(0.104)
EU	7.239	7.211	6.814	7.257	8.246
	(7.313)	(7.193)	(7.448)	(7.329)	(7.345)
EUtrend	-0.00354	-0.00353	-0.00335	-0.00355	-0.00405
	(0.00366)	(0.00360)	(0.00372)	(0.00366)	(0.00367)
REER Country 1	0.00752***	0.00745***	0.00763***	0.00751***	0.00724***
	(0.000923)	(0.000925)	(0.000930)	(0.000923)	(0.000900)
REER Country 2	0.00903***	0.00896***	0.00909***	0.00902***	0.00869***
	(0.000948)	(0.000942)	(0.000939)	(0.000946)	(0.000946)
Year	0.0251***	0.0243***	0.0281***	0.0253***	0.0247***
	(0.00644)	(0.00635)	(0.00646)	(0.00645)	(0.00643)
Constant	-34.76***	-34.78***	-32.33***	-34.95***	-32.87***
	(6.931)	(6.889)	(6.809)	(6.927)	(6.819)
Observations	5,400	5,400	5,400	5,400	5,400
Country Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes
R-squared	0.699	0.705	0.702	0.699	0.700
Number of Fixed Effects	324	324	324	324	324

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3 Part 2

VARIABLES	Finland Log(T)	France Log(T)	Germany Log(T)	Greece Log(T)
BothEZ*t*X	-0.000107**	-2.06e-05	1.99e-06	-0.000125***
	(4.18e-05)	(3.93e-05)	(2.79e-05)	(3.85e-05)
BothEZ*t*NotX	-8.76e-05***	-7.65e-05***	-7.27e-05***	-9.12e-05***
	(2.34e-05)	(2.43e-05)	(2.40e-05)	(2.33e-05)
OneEZ*t*X	-4.84e-05	3.83e-05	5.49e-05***	-9.64e-05***
	(4.22e-05)	(3.19e-05)	(2.00e-05)	(2.95e-05)
OneEZ*t*NotX	2.47e-05	1.94e-05	1.80e-05	3.24e-05**
	(1.56e-05)	(1.58e-05)	(1.58e-05)	(1.58e-05)
GDP	-0.600*	-0.541	-0.505	-0.606*
	(0.356)	(0.360)	(0.362)	(0.357)
GDP per Capita	1.684***	1.575***	1.551***	1.690***
	(0.380)	(0.390)	(0.386)	(0.384)
FTA	0.0891	0.0851	0.0833	0.0910
	(0.104)	(0.104)	(0.105)	(0.104)
EU	8.246	7.293	7.106	6.840
	(7.345)	(7.362)	(7.289)	(7.174)
EUtrend	-0.00405	-0.00357	-0.00348	-0.00335
	(0.00367)	(0.00368)	(0.00364)	(0.00359)
REER Country 1	0.00724***	0.00752***	0.00753***	0.00749***
	(0.000900)	(0.000926)	(0.000925)	(0.000908)
REER Country 2	0.00869***	0.00902***	0.00909***	0.00893***
	(0.000946)	(0.000947)	(0.000945)	(0.000933)
Year	0.0247***	0.0251***	0.0241***	0.0243***
	(0.00643)	(0.00642)	(0.00654)	(0.00646)
Constant	-32.87***	-34.55***	-34.09***	-31.89***
	(6.819)	(7.030)	(6.940)	(6.921)
Observations	5,400	5,400	5,400	5,400
Country Pair Fixed Effects	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes
R-squared	0.700	0.699	0.699	0.702
Number of Fixed Effects	324	324	324	324

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 Part 3

VARIABLES	Ireland Log(T)	Italy Log(T)	Malta Log(T)	Netherlands Log(T)
BothEZ*t*X	-0.000121**	-3.48e-05	4.24e-06	9.23e-05***
	(5.03e-05)	(3.04e-05)	(9.98e-05)	(3.35e-05)
BothEZ*t*NotX	8.54e-05***	7.89e-05***	7.24e-05***	6.00e-05**
	(2.40e-05)	(2.43e-05)	(2.18e-05)	(2.38e-05)
OneEZ*t*X	-5.18e-05	-2.59e-05	-2.99e-07	0.000100***
	(4.86e-05)	(2.47e-05)	(6.78e-05)	(3.66e-05)
OneEZ*t*NotX	2.40e-05	2.47e-05	2.21e-05	1.44e-05
	(1.57e-05)	(1.58e-05)	(1.71e-05)	(1.56e-05)
GDP	-0.328	-0.560	-0.540	-0.531
	(0.380)	(0.358)	(0.352)	(0.356)
GDP per Capita	1.492***	1.551***	1.567***	1.577***
	(0.386)	(0.385)	(0.373)	(0.382)
FTA	0.0818	0.0856	0.0852	0.0832
	(0.109)	(0.104)	(0.104)	(0.104)
EU	4.487	7.088	7.199	8.088
	(7.163)	(7.335)	(7.390)	(7.236)
EUtrend	-0.00217	-0.00347	-0.00352	-0.00396
	(0.00358)	(0.00367)	(0.00370)	(0.00362)
REER Country 1	0.00709***	0.00761***	0.00751***	0.00755***
	(0.000921)	(0.000926)	(0.000923)	(0.000919)
REER Country 2	0.00876***	0.00916***	0.00902***	0.00898***
	(0.000932)	(0.000953)	(0.000949)	(0.000939)
Year	0.0182**	0.0266***	0.0253***	0.0246***
	(0.00711)	(0.00654)	(0.00649)	(0.00639)
Constant	-30.19***	-36.24***	-34.91***	-34.12***
	(6.719)	(7.028)	(6.942)	(6.882)
Observations	5,400	5,400	5,400	5,400
Country Pair Fixed Effects	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes
R-squared	0.700	0.699	0.699	0.701
Number of Fixed Effects	324	324	324	324

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 Part 4

VARIABLES	Portugal Log(T)	Slovakia Log(T)	Slovenia Log(T)	Spain Log(T)
BothEZ*t*X	-6.30e-05*	0.000135**		4.62e-05
	(3.71e-05)	(6.66e-05)		(2.97e-05)
BothEZ*t*NotX	8.18e-05***	6.65e-05***	7.29e-05***	6.68e-05***
	(2.33e-05)	(2.33e-05)	(2.24e-05)	(2.44e-05)
OneEZ*t*X	-0.000123***	0.000140***		4.75e-05
	(2.68e-05)	(3.59e-05)		(3.13e-05)
OneEZ*t*NotX	3.16e-05**	8.17e-06	2.20e-05	1.84e-05
	(1.57e-05)	(1.64e-05)	(1.55e-05)	(1.58e-05)
GDP	-0.572	-0.269	-0.540	-0.598
	(0.356)	(0.369)	(0.358)	(0.373)
GDP per Capita	1.550***	1.191***	1.567***	1.629***
	(0.386)	(0.405)	(0.385)	(0.400)
FTA	0.0867	0.0828	0.0850	0.0854
	(0.104)	(0.109)	(0.104)	(0.103)
EU	6.636	3.488	7.257	8.259
	(7.131)	(7.225)	(7.329)	(7.315)
EUtrend	-0.00324	-0.00168	-0.00355	-0.00405
	(0.00357)	(0.00361)	(0.00366)	(0.00366)
REER Country 1	0.00771***	0.00667***	0.00751***	0.00745***
	(0.000912)	(0.000906)	(0.000923)	(0.000910)
REER Country 2	0.00926***	0.00808***	0.00902***	0.00903***
	(0.000938)	(0.000957)	(0.000946)	(0.000944)
Year	0.0272***	0.0254***	0.0253***	0.0260***
	(0.00627)	(0.00637)	(0.00645)	(0.00658)
Constant	-36.79***	-41.60***	-34.95***	-34.60***
	(6.891)	(7.258)	(6.927)	(6.906)
Observations	5,400	5,400	5,400	5,400
Country Pair Fixed Effects	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes
R-squared	0.701	0.702	0.699	0.699
Number of Fixed Effects	324	324	324	324

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4

VARIABLES	Greece 1994-2011 Log(T)	Greece 1994-2007 Log(T)
GDP	-0.679*	-1.128**
	(0.359)	(0.458)
GDP per Capita	1.784***	2.241***
	(0.387)	(0.516)
FTA	0.0703	-0.157***
	(0.105)	(0.0527)
EU	12.32	20.59**
	(7.683)	(9.651)
EUtrend	-0.00609	-0.0102**
	(0.00384)	(0.00483)
REER Country 1	0.00763***	0.00751***
	(0.000944)	(0.00114)
REER Country 2	0.00901***	0.00852***
	(0.000970)	(0.00105)
BothEZ-2001-GRE	-0.167***	-0.175***
	(0.0503)	(0.0484)
BothEZ-2002-GRE	-0.187***	-0.197***
	(0.0629)	(0.0654)
BothEZ-2003-GRE	-0.113*	-0.125**
	(0.0578)	(0.0590)
BothEZ-2004-GRE	-0.165***	-0.178***
	(0.0618)	(0.0653)
BothEZ-2005-GRE	-0.236***	-0.251***
	(0.0645)	(0.0695)
BothEZ-2006-GRE	-0.218***	-0.235***
	(0.0640)	(0.0688)
BothEZ-2007-GRE	-0.168**	-0.186**
	(0.0729)	(0.0787)
BothEZ-2008-GRE	-0.194*	
	(0.113)	
BothEZ-2009-GRE	-0.224*	
	(0.115)	
BothEZ-2010-GRE	-0.316***	
	(0.0946)	
BothEZ-2011-GRE	-0.200*	
	(0.110)	
OneEZ-2001-GRE	0.0322	0.0411
	(0.0825)	(0.0758)
OneEZ-2002-GRE	-0.109*	-0.102
	(0.0605)	(0.0627)
OneEZ-2003-GRE	-0.125	-0.119
	(0.0813)	(0.0888)
OneEZ-2004-GRE	-0.156	-0.153
	(0.0987)	(0.108)
OneEZ-2005-GRE	-0.319***	-0.317**

	(0.116)	(0.129)
OneEZ-2006-GRE	-0.361***	-0.361**
	(0.127)	(0.140)
OneEZ-2007-GRE	-0.306**	-0.307**
	(0.129)	(0.143)
OneEZ-2008-GRE	-0.258***	
	(0.0949)	
OneEZ-2009-GRE	-0.318***	
	(0.0928)	
OneEZ-2010-GRE	-0.406***	
	(0.0962)	
OneEZ-2011-GRE	-0.486***	
	(0.108)	
BothEZ-1999-NGRE	0.136***	0.129***
	(0.0475)	(0.0413)
BothEZ-2000-NGRE	0.144***	0.137***
	(0.0455)	(0.0473)
BothEZ-2001-NGRE	0.0725	0.0696
	(0.0519)	(0.0595)
BothEZ-2002-NGRE	0.148***	0.148**
	(0.0550)	(0.0627)
BothEZ-2003-NGRE	0.216***	0.221***
	(0.0582)	(0.0652)
BothEZ-2004-NGRE	0.293***	0.295***
	(0.0593)	(0.0739)
BothEZ-2005-NGRE	0.283***	0.285***
	(0.0604)	(0.0784)
BothEZ-2006-NGRE	0.180***	0.184**
	(0.0648)	(0.0813)
BothEZ-2007-NGRE	0.196***	0.202**
	(0.0610)	(0.0853)
BothEZ-2008-NGRE	0.107	
	(0.0715)	
BothEZ-2009-NGRE	0.145*	
	(0.0762)	
BothEZ-2010-NGRE	0.271***	
	(0.0761)	
BothEZ-2011-NGRE	0.223***	
	(0.0784)	
OneEZ-1999-NGRE	0.0445	0.0358
	(0.0447)	(0.0366)
OneEZ-2000-NGRE	0.0708*	0.0615
	(0.0373)	(0.0376)
OneEZ-2001-NGRE	0.0133	0.00475
	(0.0468)	(0.0509)
OneEZ-2002-NGRE	0.0764*	0.0681
	(0.0443)	(0.0526)
OneEZ-2003-NGRE	0.0980**	0.0904*
	(0.0478)	(0.0539)
OneEZ-2004-NGRE	0.139***	0.135**

	(0.0461)	(0.0602)
OneEZ-2005-NGRE	0.139***	0.133**
	(0.0491)	(0.0638)
OneEZ-2006-NGRE	0.0857	0.0804
	(0.0543)	(0.0669)
OneEZ-2007-NGRE	0.0892*	0.0836
	(0.0496)	(0.0669)
OneEZ-2008-NGRE	0.00355	
	(0.0486)	
OneEZ-2009-NGRE	0.00388	
	(0.0552)	
OneEZ-2010-NGRE	0.0467	
	(0.0582)	
OneEZ-2011-NGRE	0.0696	
	(0.0641)	
Constant	18.50	33.10**
	(11.85)	(14.35)
Observations	5,400	4,200
Country Pair Fixed Effects	Yes	
Time Effects	Yes	
Number of Fixed Effects	324	324
R-squared	0.707	0.658

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1