Kiel Institute for World Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)

Kiel Working Paper No. 1137

Trade Effects of Monetary Integration in Large, Mature Economies: A Primer on the European Monetary Union

by

Lúcio Vinhas de Souza

December 2002

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Trade Effects of Monetary Integration in Large, Mature Economies: A Primer on the European Monetary Union

Lúcio Vinhas de Souza

Abstract: The aim of this paper is to estimate the trade gains arising from the constitution of a currency union for a set of economically large, developed nations who create a monetary union as a deliberate economic policy action: namely, for the members of the euro area. With a 1980-2001 sample, no consistent significant trade effects from the 1999 creation of EMU are found, using dummies for the 1999-2001 period. Treating EMU not as a single event but as a part of a long-term integration process, and representing it by a series of continuous cross-country interest differentials, the evidence seems to be stronger, but it does not seem to be conditional on any single, specific exchange rate arrangement.

JEL Classification Numbers: F15, F33

Keywords: Currency Unions, EU, EMU, panel model, gravity equation.

Lúcio Vinhas de Souza, Institute for World Economics (IfW), Duesternbrooker Weg 120, 24105 Kiel, Germany, phone +49 431 8814 205, fax +49 431 8814 500, e-mail desouza@ifw.uni-kiel.de, website: http://www.uni-kiel.de/ifw/staff/desouza.htm.

The author would like to thank the comments of Erich Gundlach, Felix Hammermann, Rolf J. Langhammer, Andre Sapir and Rainer Schweickert. All the remaining mistakes are, of course, his own.

1. INTRODUCTION

It is frequently assumed in some strand of the literature that monetary integration would lead to a deepening of economic integration, as measured, for instance, by increased intra-regional trade and foreign direct investment inflows. It is somewhat intuitive, in a first instance, why this should be the case: monetary integration eliminates exchange rate risks, and, therefore the instability in real and financial flows that would be associated with it. Of course –beyond assuming that a nominal framework like the exchange rate would have significant and persistent real effects– this is a "incomplete capital markets" argument, as with complete markets, it would be possible for agents to hedge exchange rate risk perfectly. Nevertheless, the empirical evidence seems to show that this is not a world of complete and perfect markets, and that, therefore, exchange rate variability would have real effects[1]. Given the assumed interrelationship between trade and growth, the positive trade effects of a monetary union, if confirmed, are of obvious interest to policy makers worldwide, as their ultimate objective is, presumably, to maximize the welfare of their respective nations (that, for instance, is the underlying position in the seminal "Costs of Non-Europe" study: see European Commission, 1990).

The main aim of this work is to produce an additional test of the framework developed by Rose (see Rose, 2000, 2001(a), 2001(b), 2002(a), 2002(b), Rose and van Wincoop, 2001, Glick and Rose, 2002), applying it to a set of economically large and developed countries, which decided to participate in a monetary union by a deliberate policy choice, and not by a historical accident. Namely, our objective is to produce a preliminary analysis of the trade and growth effects of the early years of the EMU (European Monetary Union).

[1]Even in mature, developed economies with deep financial markets, certain classes of agents (for instance, small firms and households) face strong constraints in adequately hedging against several types of risk, due to the costs and information asymmetries involved. Even large and financially sophisticated economic agents cannot perfectly hedge against all risks (and even if such universal, perfect hedging instruments did existed, their costs would certainly be non-negligible).

2. LITERATURE REVIEW

A new branch of contributions to the literature on trade integration appeared around the mid-1990s, which presented persistently positive –in economic terms– results from the potential constitution of monetary unions. In one of the earlier and most famous result, McCallum, 1995, estimate the "home bias" on trade –i.e., the tendency of agents to trade disproportionately more within a single currency space– to be *2200%*, or 22 times more, for Canadian provinces, as compared with trade flows with neighbouring US states (which were already linked to Canada through a bilateral free trade agreement). Even after a more recent work, Anderson and van Wincoop, 2001, re-estimated this "border effect" to be a more credible 44%, for the US-Canada, and 30% for all industrialized countries, the "home bias" remains, albeit much diminished.

In a widely discussed set of results, Rose, 2000, ibid, using large panels to estimate what essentially amounted to gravity equations with a dummy representing a monetary union added, came up the conclusion –in the original results- that a monetary union would increase trade between two members by almost 300%.

Rose's original estimations were questioned due to, among other reasons, some features of its original dataset. Critics included the non-use of "zero" trade observations, the large share of missing variables -specially GDP, the low share of monetary unions on the total of observations –around 1%, the extremely low share of entry/exits from/to currency unions –0.03%, the specific features of the currency union set –very small and open, with low GDP per capita, normally with a colonial or dependent status[2], etc., i.e., it constituted a non-random draw- and sheer coding mistakes[3]. Other sources of critics were the original econometric

[2]In a case in point, the French (and Australian) overseas territories tied to their "mother countries" through monetary unions are also largely dependent from fiscal transfers from their "mother country". Therefore, the overwhelmingly large trade flows with *France* are just a counterpart of those financial flows.

[3]Among the most colorful flaws in the original dataset, it classified New Zealand, instead of the Netherlands, as a member of the European Union, it coded Belgium –a nation with three official languages- as not sharing a common language with any trade partner, it placed Lao and Burma as founding members of the ASEAN (which they weren't), it lacked codings for some regional trade agreements as CARIFTA, in the Caribbean, or ECOWAS, in West Africa.

specification (an OLS regression was used in the original work, while most critics favoured the use of fixed effects[4] or even non-parametric methods -namely, the use of matching techniques) and the set of regressors used, aiming a better control for eventual non-linearities in the data (see, among others, Alesina at al., 2002, Nitsch, 2002a, Pakko and Wall, 2001, Persson, 2001). Several other remarks were also made[5].

Those papers also performed alternative estimations with, in most cases (corrected) versions of the original Rose dataset. Among them, some came up with results that indicate negative or non-significant trade effects from a monetary union (Nitsch, 2002a, ibid, and 2002b, Pakko and Wall, 2001, ibid, Persson, 2001, ibid), while others supported Rose's results, but to different degrees (Alesina at al., 2002, ibid, Lopez-Cordova and Meissner, 2000[6], Tenreyo, 2002).

In a more recent contribution, Glick and Rose, 2001, the authors tried to address several of the previous critics. With an extended sample, now from 1948 to 1997, as opposed to the original 1970-1990 (even with this larger time sample, only 1% were currency union observations, and its specific features remained: nevertheless, the share of entry/exits substantially increased) and corrected dataset, they confirm the original results. Using a

[4]A fixed effects estimation would control for time-invariant factors (geography, language, culture, and also distance, which has the additional problem of being a rather imperfect measure of trade costs) present in the data, be they omitted or explicitly included in the regressions, as those may lead to an upward estimation bias (see Egger, 2000).

[5]For instance, the positive conclusion concerning trade implies that integration will lead to the increase in intra-industry trade, thereby *reducing the likelihood of country-specific shock,* which are stronger in the inter-industry specification*s*. If currency union-induced trade integration leads to industry specialization, and, therefore, to the increase of inter-industry trade, the likelihood of industry-specific shocks becoming country-specific ones rises, therefore lowering the co-movements of output and prices among the regions in a currency union, which will lead to *increased trade reducing the potential gains from a currency union*. As a remark, the observed outcome in longer established federal currency unions, like the Federal Republic of Brazil, The Commonwealth of Canada or the United States of America, is a much greater degree of regional specialization than in the member states of the European Union, which is offset by, among other things, a substantial degree of labor movement and a federal transfers system.

[6]Rather interestingly, this work performs estimations for the "gold standard" age (1870-1910, perhaps the first period of true "globalization"), and come up with the conclusion that currency unions traded about twice more than non-currency unions, and that nations on the gold standard trade around 60 per cent more than countries outside it. Its sample has a very limited country coverage (only 28, with yearly data, and just 13 with a full sample), and is dominated by high income nations: the UK and its dominions are around 10% of the whole sample. Currency unions are common, around 10% of the total observations (as a curiosity, Canada is coded as being in a currency union with both the US, the UK and Dominions, as the currencies of those areas were all legal tender in Canada during the XIX$^{th.}$ century). Some peculiarities of their results: a silver-standard regime has the highest estimated coefficient of trade increase, while exchange rate volatility has *positive* effects on trade.

pooled OLS, they find now that a currency union almost *quadruples* trade, while using fixed effects estimations this increase falls to roughly a doubling of trade.

Taken together, the lack of robustness of those results would seem to indicate the fragility of Rose's initial estimations, as they would apparently be highly dependent on the dataset, the sample, the regressors or the econometric technique used. Nevertheless, even if one accepts that the empirical observation of positive trade effects of a monetary union is robust, there is still the fundamental question of *what* drives such substantial outcomes.

As the obvious candidate, one could assume that the costs associated with having an independent currency could come from the trade costs arising from *exchange rate volatility*, albeit, to produce effects like the ones estimated by Rose, volatility would either have to be truly very substantial[7] (and persistent) or highly non-linear, in the sense that even minor levels of instability would have geometrically negative effects on trade.

Several works done during the 1980s and 1990s come to the conclusion that the effects of exchange rate volatility on intra EU trade where marginal[8]. Recent works, for instance, in Péridy, 2002, find significant effects from exchange rate instability for G7 countries' trade, but differentiated by sector: primary, assumed homogeneous goods show negative significant effects, while industrialized goods –assumed as imperfect substitutes, i.e., with significant non-price effects on competitiveness– show *positive and significant* effects. Nowak-Lehmann, 2002, who estimates the effects of macro instability on MERCOSUR[9] exports, finds that the *real* exchange rate instability affects *negatively and significantly* the exports of all MERCOSUR members to the EU[10]. Those results would imply that developed countries

[7]Additionally, one must not forget that the international monetary system was based on fixed but adjustable exchange rates from the late 1940s until the early 1970s.

[8]Albeit *misalignment*, a different concept, implying a persistent departure for a equilibrium exchange rate level, had –as one might intuitively expect- substantial effects on trade: for a very good literature review, see Sekkat, 1998.

[9]The regional free trade association of Argentina, Brazil, Paraguay and Uruguay: Bolivia and Chile are also associate members.

[10]With the exception of the trade flows of the Federal Republic of Brazil, MERCOSUR's largest member and exporter: building on the results of Péridy, 2002, ibid, this is perhaps due to the fact that Brazil's exports have the highest share of industrialized goods amongst MERCUSOR exports.

(mostly exporters of differentiated industrialized goods) would gain little from monetary integration-induced reduction in exchange rate volatility.

On the other hand, an environment of increased global economic integration, like the current one, may rise the potential costs associated with national currencies. The post-colonial worldwide rise in the number of countries (from 76 countries in 1947 to 194 in 2002) saw a similar expansion in national currencies (65 in 1947, 159 in 2002)[11]. If one assumes a positive relationship between number of countries and trade flows[12], that could also lead to a (geometric) increase in the – trade-related– costs of an independent currency (see Alesina and Barro, 2002). Alesina and Barro, 2002, ibid, also propose that the creation of a currency union has potential *conditional* beneficial effects, not only due to trade, but also to expectations, stabilization and credibility gains[13] (*conditional* on the degree of co-movements of output between the units that form a currency union –which, on its turn, *may be* related to the degree of trade integration– and on the adequate use of the exchange rate instrument).

3. EXCHANGE RATE INSTABILITY IN THE EUROPEAN UNION

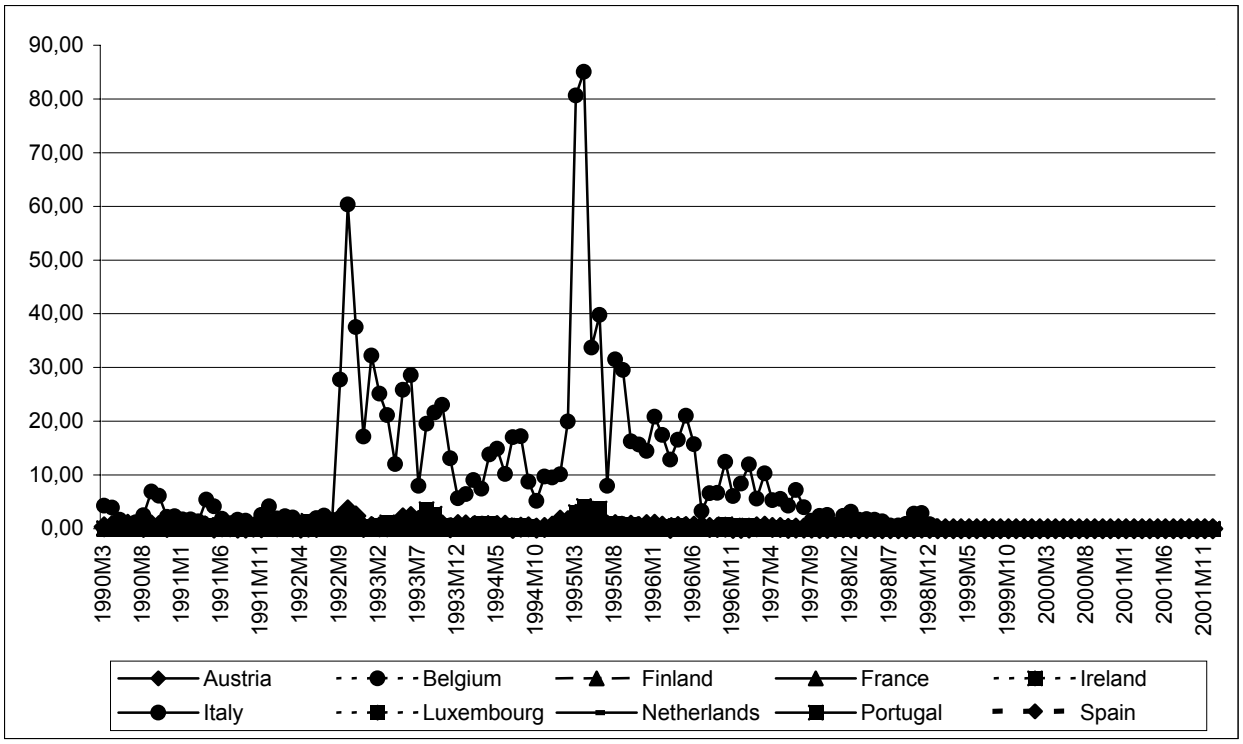
This paper plans to address some of the above mentioned shortcomings of Rose's estimations by using a sample of *economically large, developed countries, which participate in a monetary union as a deliberate policy choice, and not as a results of a "historical accident[14]"*: namely, the EU member states that engaged in EMU.

It is beyond the scope of this paper to tell the story of the long and winding road towards the European Common Currency, from the 1970 "Werner Report", to the 1972 "Monetary

[11]The share currency/country ratio fell from a stable 85% during most of this period, to 78% in 2002. This fall was mostly due to one single event: the physical introduction of the Euro in that year.
[12]One can argue that small countries are only economically viable in an environment of open trade and capital flows. Nevertheless, as there might be strong positive externalities linked to the provision of certain public goods -like a currency- and given that such goods may have economies of scale in their provision, small national units may remain viably independent while externalizing the provision of such a public good (see Alesina at al, 2002).
[13]*Conditional* on the degree of co-movements of output between the units that form a currency union –which, on its turn, *may be* related to the degree of trade integration– and on the adequate use of the exchange rate instrument.
[14]For instance, the reason why a territory like, say, Guadeloupe is in a monetary union with France is not related to any perceived eventual welfare-increasing effects this arrangement. As a matter of fact, is not even related to any regime choice at all.

Snake", to the 1979 "European Monetary System" and the Exchange Rate Mechanism (ERM), to the 1989 "Delors Report": for this, see, among others, de Grauwe, 2002. As the physical introduction of the Euro happened only in January 2002, the data series available for this period are inadequately short for any real estimations. On the other hand, one may use the period after the announcement of the final irreversible convergence rates into the Euro basket of the 11 participating members states as effectively marking the beginning of the European currency union (i.e., from January 1999 onwards).

Graph 1: Standard Deviation of EMU Currencies

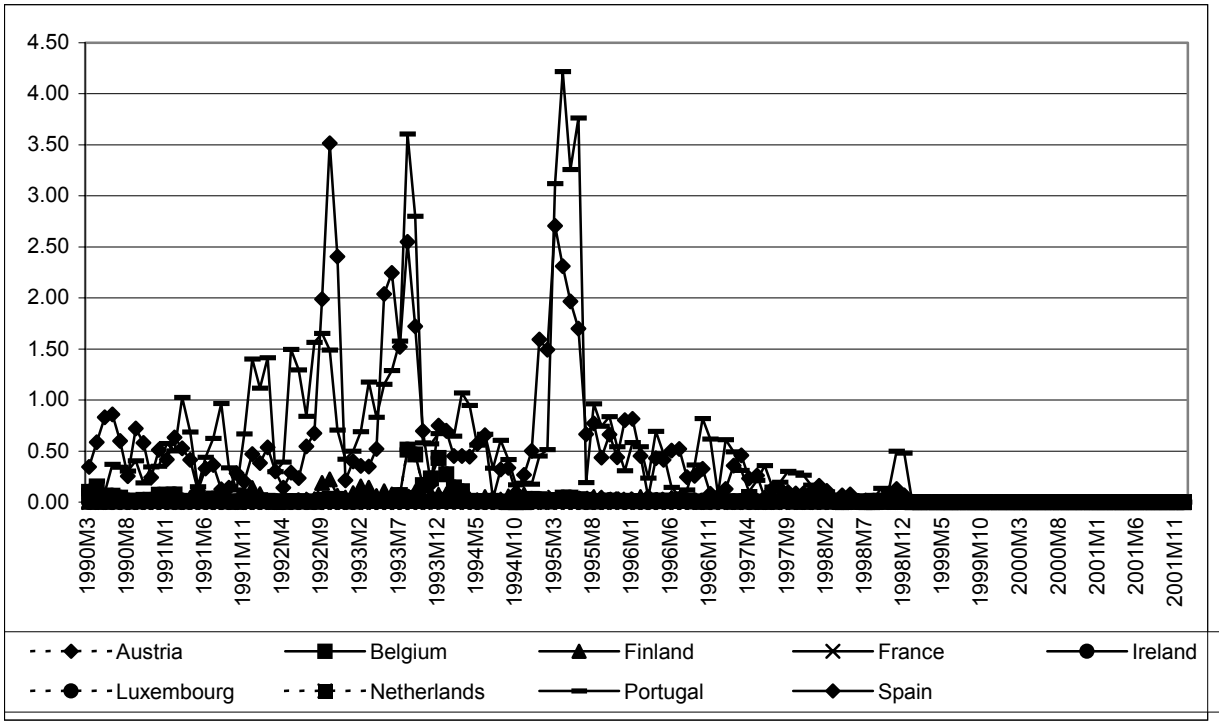


Source: IMF/IFS, computations by the author.

If the main factor behind the -assumed- increase in trade generated by a monetary union is related to the elimination of costs arising from exchange rate instability, a brief study of the participating member-states' exchange rates will support the validity of the use of the period after the announcement of the final conversion rates as a proxy for EMU. Therefore, below I show a rolling three-month standard deviation series of the future Euro members' average monthly exchange rates towards the old anchor of the system, the German Mark, from 1990:03 to 2001:11 (see Graph 1 above).

As one may observe, all movements in the graph above are dwarfed by the variability of one currency, the Italian Lira, from roughly the first attacks that ultimately lead to the collapse of the ERM I, in September 1992, until the second half of 1997. To better isolate individual movements, I present now the same graph without the Lira (see Graph 2 below).

Graph 2: Standard Deviation of EMU Currencies, minus Italy



Source: IMF/IFS, computations by the author.

Again, one may observe that movements in the Graph are dominated by only two series (the Portuguese Escudo and the Spanish Peseta, but with a maximum scale around 20 times smaller than the one show by the Italian Lira). One may also observe that all the other currencies show a variation effectively close to zero[15] (with minor spikes from the Finnish Markka and, peculiarly, the Luxembourg's Franc), that already from early 1997 it had fallen

[15]The ERM is a framework through which (non-EMU) EU member states link their national currencies, by the means of a set of fluctuation bands (currently set at ± 15%). It provided a framework for the control of the bilateral variation of those currencies towards the German Mark since 1979, and it was considered to be a rather effective framework, until the waves of attacks in 1992-93 led to its re-design. The only member state currently in it is Denmark, but the arrangement is planned to be used as *the* Euro area "ante chamber" for the new member states, after 2004. The bands are set around a central parity –which is changeable after agreement, with intervention at the margin by the ESCB (European System of Central Banks) to support this central parity. Beyond the ERM, some European monetary authorities had a policy that effectively amounted to a targeting of a DEM exchange rate, in some cases years prior to their entry into the EU (as was the situation with Austria and Finland, for instance).

to 0.5 for even the Italian, Portuguese and Spanish currencies, getting progressively closer to zero as 1998 progressed and, on January 1999, the variation duly falls to zero and remains there. Therefore, the period 1999-2001 will be used as an approximation of EMU on the estimations in the next section[16].

4. DATA AND ESTIMATIONS

I will use yearly data, from 1980 until 2001, to estimate the rather traditional, reduced form, "gravity equation"[17] given by

$$T_{ij,t} = C + D_{ij,t} + Y_{ij,t} + EU_{i,t} + EMU_{i,t} + TREND + \varepsilon_{i,t}$$

where:

-C is the constant term;

-T stands for bilateral total trade[18] –defined as imports plus exports- between countries *i* and *j* in time *t* ; Data in USD (Source: IMF/DOTS and Eurostat's Comext)[19];

-D stands for distance in kilometres (Source: the geodesic distances matrix kindly provided by the Centre d'Etudes Prospectives et d'Informations Internationales, CEPII);

-Y stands for the joint "GDP mass" of the countries $i+j$, $i \neq j$, in each specific trade pair; data in USD (Source: WB/WDI, expanded with IMF data for 2001);

-EU is a dummy that assumes the value 1, when the country is a EU member in that year (there are three EU Enlargement events in this sample: Greece's 1982 entry, Portugal and Spain's 1986 and Austria, Finland and Sweden's 1995);

-EMU is a dummy that assumes the value 1 for the EMU member states in 1999-2001;

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[16]As Greece only became a member of the ERM-II in 2001, and only entered into the final convergence rate parallel with the physical introduction of the currency in 2002, it is not included as an EMU member.

[17]Considered to be one of the most successful and robust estimated relationships in macroeconomics, albeit one with non-obvious theoretical underpinnings.

[18]Zero-trade observations were recovered by replacing them by an arbitrarily small value (namely, 0.1 USD), after Tenreyro, 2002.

[19]Trade data for Belgium and Luxembourg is available only jointly, with the exception of the 1999-2001 period: their individual data for those three years was added, as to be homogeneous with the rest of the sample.

-TREND is a linear time trend term, to control for the observed "secular" tendency towards an increase in international trade (on the other hand, to assess the distortions caused by the "catch-all" properties of such a variable, the same equation will also be estimated without it);

-ε is the residual term.

All series (but, obviously, the dummies) are in natural logs. Our dataset has 59.554 observations[20]. The model above is *deliberately parsimonious*, as to capture the effects of the variables of interest to this work. Trade is supposed to vary positively with GDP size, and negatively with distance (as this is used as a proxy for trading costs). Our priors are that EU, EMU and TREND all shall have positive signs.

Before any regression analysis, I will show below a simple correlation table between our variables: our priors seem to be confirmed here (even for D, whose coefficient is –0.0044).

Table 1: Correlations for the Full Sample (1980-2001)

	T	D	Y	EU	EMU	TREND
T	1.00					
D	0.00	1.00				
Y	0.38	-0.04	1.00			
EU	0.07	-0.23	0.09	1.00		
EMU	0.06	-0.06	0.05	0.30	1.00	
TREND	0.51	0.00	0.15	0.05	0.11	1.00

Below I show the results of our estimations for the full sample (1980-2001), for regressions with and without the TREND term. The coefficient of main interest for us, EMU, is in bold and italic. I perform a OLS (heteroskedasticity-consistent) estimation with a common constant term, weighted by the residuals' variance, an estimation with fixed effects (FE, where each data cross section or individual –i.e., each trading pair- is estimated with specific constant terms, capturing the time changes within individuals), a estimation with a between estimator (BE, capturing the cross-sectional information reflected in the changes

[20]As a side remark, this author always wondered why the papers of the "gravity equation" type *always* make a point of mentioning the size of their datasets. After building one himself, this author understands why: it is not only to dispel doubts about the statistical significance of the estimations, but mostly, given that this a *truly* tiresome and labor consuming task, that they want to make it clear to their readers.

between cross sections, like jumping from a non-EU, or non-EMU, to a EU or EMU state) and a random effects estimation (RE, effectively a matrix weighted sum of BE and FE).

Table 2: Regressions for the Full Sample (1980-2001)

Variable	Coeffs. (OLS)	Coeffs. (OLS)	Coeffs. (RE)	Coeffs. (RE)	Coeffs. (BE)	Coeffs. (BE)	Coeffs. (FE)	Coeffs. (FE)
C	-41.86* (0.27)	-47.55* (0.26)	-38.17* (1.41)	-111.52* (1.46)	-44.65* (1.93)	-44.65* (1.92))	-27.59* (1.53)	-163.80* (1.61)
D	-0.35* (0.02)	-0.33* (0.02)	0.09 (0.09)	0.40* (0.10)	0.09 (0.10)	0.09 (0.10)	dropped	dropped
Y	1.73* (0.01)	2.09* (0.01)	1.35* (0.05)	4.29* (0.05)	1.82* (0.07)	1.82* (0.07)	0.97* (0.06)	6.43* (0.06)
EU	1.12* (0.07)	1.31* (0.07)	0.94* (0.19)	3.03* (0.22)	1.69* (0.51)	1.69* (0.50)	1.00* (0.21)	4.21* (0.26)
EMU	***-0.66* (0.21)***	***2.24* (0.21)***	***0.01 (0.23)***	***2.90* (0.30)***	***-13.45* (3.76)***	***-13.45* (3.76)***	***0.17 (0.24)***	***1.56* (0.29)***
TREND	0.39* (0.00)		0.50* (0.00)		dropped		0.51* (0.00)	
R^2	0.61	0.40	0.35	0.14	0.22	0.11	0.33	0.14
F-statistic	18797.83	9705.00	47261	9469.99	193.3	193.30	11668.4	3959.12

*, 1% significance, **, 5%, ***, 10%.

The R^2s are somewhat low for this type of regressions, but this is to be expected, given the parsimonious nature of our set of regressors. Most of the regressors have the expected signs and significance, with the exception of distance, which is non-significant in four regressions, and collinear with the constant term (and, therefore, dropped) in two of them. Concentrating on the EU and EMU dummies, EU is consistently significant in all regressions, with a positive sign and point estimates of a credible scale. EMU, on the other hand, is either positive non-significant or negative significant (and in one regressions, with a truly enormous negative coefficient: if this one where correct, a currency union in Europe would be associated with a reduction of trade to, effectively, *zero*).

As concerning the regressions without the variable TREND, the R^2 falls considerably for all of them, as one would expect from the secular growth of trade from GDP observed in the post war period. This is parallel to a substantial increase of the coefficients D, Y and EU size and variance, but the signs of the point estimates remain the same. The biggest change is observed in EMU, which, by dropping the TREND variable, is now not only consistently

positive significant in most regressions (bar BE), but shows a clear reduction the variability of the coefficient. All taken together, these are possible indications that some of the "catch-all" features of the time dummy are now captured by the remaining regressors, specially the EMU variable.

In principle, RE should provide the more adequate estimates of the EU and EMU coefficients, as during that sample one would observe significant between and within effects (and this is confirmed by Hausmann test of RE versus FE, where RE is always preferred in all specifications tried). The results of this specification would point either to a effectively zero and non-significant effect of EMU on total intra-Euro area trade flows (with the TREND variable) or to a strong positive one (the specification without the TREND variable).

To concentrate on the period immediately after and immediately before the announcement of the final fixing of rates, I re-run the same regressions above for the period 1995-2001 (with this short sample, one must remember that that the *only* between cross section event is the 1999-2001 constitution of EMU, so the within -FE- variance effect should dominate the between -BE- one). Before that, I again present a correlation table. Noteworthy are the increase in the negative coefficient of distance, the effectively zero coefficient of EMU, and the high correlation EMU/EU (the highest non-diagonal value in the table).

Table 3: Correlations for the Short Sample (1995-2001)

	T	D	Y	EU	EMU	TREND
T	1					
D	-0.20	1.00				
Y	0.43	-0.04	1.00			
EU	0.05	-0.26	0.07	1.00		
EMU	0.00	-0.11	0.06	0.47	1.00	
TREND	0.02	0.00	0.24	0.00	0.13	1.00

The regressions' results are show on Table 4 below. The coefficients now have a great variance towards the "priors" stated in the beginning of this section (with, again, the exception of distance, which now is significantly negative throughout): GDP is negative in

one of the TREND regressions (but positive in all regressions without the TREND term), as is the TREND term in most of them.

Concentrating on the EU and EMU dummies, EU now varies between being non-significant, significantly negative and significantly positive, while EMU is either significantly negative (in five regressions) or significantly positive in the others (and here there are no differences in the behaviour of this variable between regressions with or without a TREND term). Not only the signs and significance, but also the scale of the coefficients varies considerably. Nevertheless, if one assumes RE to be the preferred specification, it indicates a somewhat small positive effect from EMU membership (and only borderline significant, in the case of the estimation without the TREND term).

Table 4: Regressions for the Short Sample (1995-2001)

Variable	Coeffs. (OLS)	Coeffs. (OLS)	Coeffs. (RE)	Coeffs. (RE)	Coeffs. (BE)	Coeffs. (BE)	Coeffs. (FE)[21]	Coeffs. (FE)
C	-23.56* (0.07)	-23.76* (0.09)	-12.72* (1.59)	1.94 (1.22)	-30.46* (2.00)	-30.46* (2.00)	6.30*** (3.62)	-81.34* (1.39)
D	-1.08* (0.00)	-1.10* (0.01)	-1.13* (0.1)	-1.16* (0.10)	-1.108* (0.10)	-1.10* (0.10)	dropped	dropped
Y	1.74* (0.00)	1.61* (0.00)	1.29* (0.06)	0.64 (0.03)	1.86* (0.07)	1.85* (0.07)	-0.37** (0.15)	3.41* (0.05)
EU	-0.31* (0.03)	-0.18* (0.03)	-0.50 (0.32)	-0.26 (0.32)	0.71*** (0.45)	0.71 (0.45)	5.32* (0.37)	5.40* (0.38)
EMU	***-0.48* (0.05)***	***-1.11* (0.05)***	***0.46* (0.11)***	***0.27*** (0.11)***	***-5.15* (1.31)***	***-5.15* (1.31)***	***-0.51* (0.19))***	***-0.15 (0.19)***
TREND	-0.21* (0.00)		-0.14* (0.01)		dropped		0.61* (0.02)	
R^2	0.98	0.97	0.22	0.17	0.21	0.21	0.22	0.19
F-statistic	220169.5	135253.5	762.08	551.55	225.70	225.70	1346.58	1513.74

*, 1% significance, **, 5%, ***, 10%.

5. ANALYSIS OF THE FIRST RESULTS AND FURTHER ESTIMATIONS

The results from the estimations in the previous section seem to indicate the lack of a robust relationship between the European monetary union and trade. Possible explanations for this are a) the period corresponding to the fixing of the exchange rates just do not adequately

[21]This fixed effects estimation is for a 1994-2001 sample, as with the 1995-2001, the EU term became collinear with EMU and was dropped. In that regression, EMU became positive and significant (which would explain the small positive EMU coefficient in RE, and the lack of significance of the EU dummy), but, presumably, this happened because the term was capturing some of the effects arising from sheer EU membership.

proxy for the introduction of a monetary union b) forward-looking agents anticipated and discounted the increase in trade associated with EU and EMU membership and c) trade just did not increase, even with the credible, expected constitution of the European common currency, perhaps due to cyclical factors. Considering those hypotheses in turn:

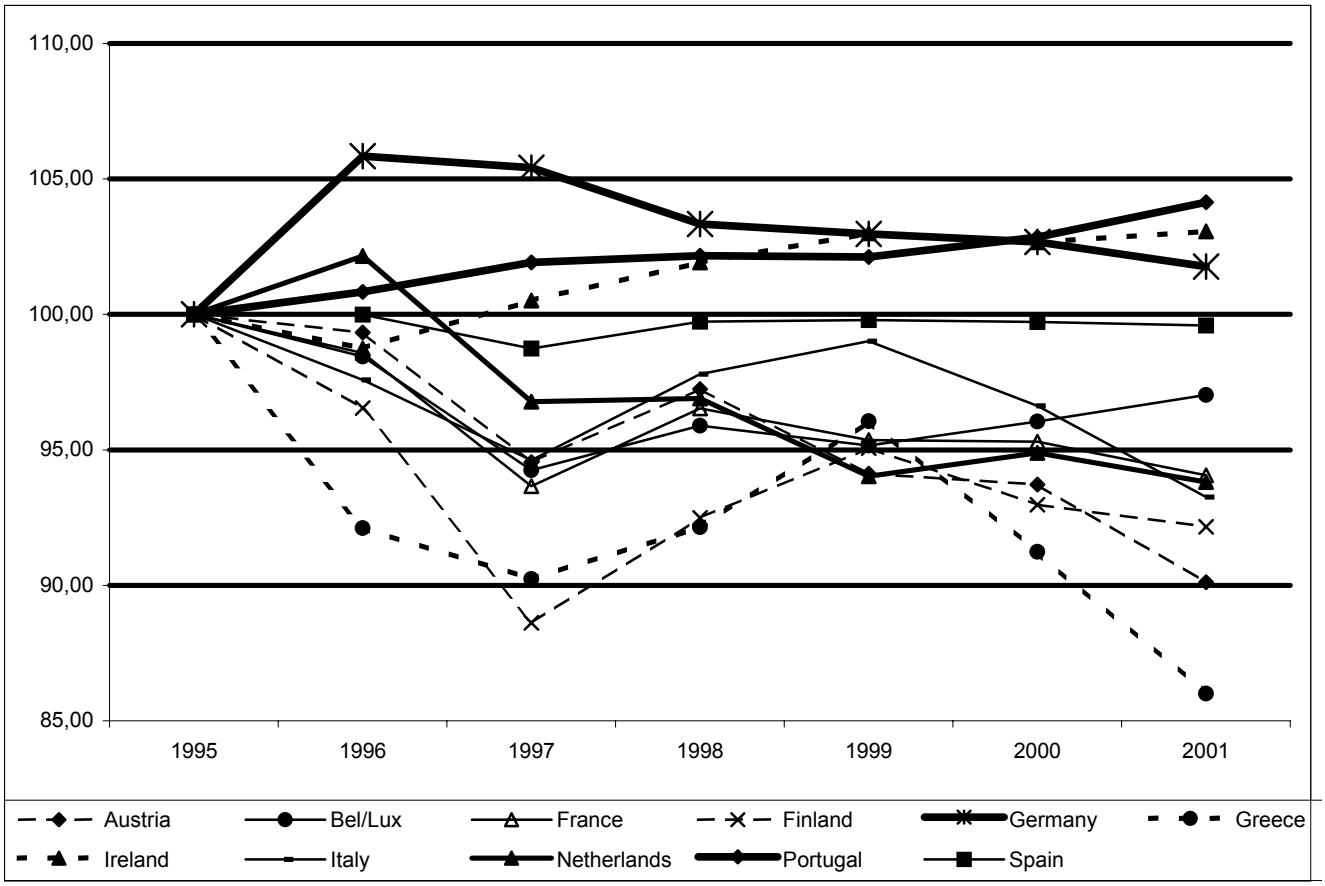
a) Agents could have doubts that the Euro would be really introduced in 2002. On the other hand, as indicated before, several of the member states that did indeed formed the Euro area in 2002 were already committed to an effective targeting of the German Mark long before EMU, and, in some cases, long before EU entry, and would certainly have continued to apply a similar policy even in the case of the non-constitution or collapse of the Euro area. Therefore, one should expect that markets would apply *reasonable* probabilities more to the eventual final size of the Euro area, than to its existence, in one shape or another;

b) As EU integration is a rather long, phased-in process (for instance, the negotiations for the 1986 Iberian Accession lasted for almost *10 years*: see Vinhas de Souza, 1996), and therefore its effects are anticipated and discounted by forward-looking agents, all the trade (and other) gains from monetary union could have been *realized before EMU (or even EU) entry*, which would explain the results of the EMU dummy. This "convergence from outside" is actually one of the *standard features* of the successive expansion waves of the EU[22] (see Vinhas de Souza, 1996, ibid).

c) In Graph 3 below I present Euro area intra trade flows during 1995-2001.

[22]And this feature is also duly present in the *current* EU Enlargement wave: See Vinhas de Souza, 2002(a), were this author estimates that Euroization (a proxy for EMU entry) would bring only marginal gains for Estonia, and Vinhas de Souza 2002(b). See also Fidrmuc and Korhonen, 2002 and Fidrmuc, 2002.

Graph 3: Intra Euro area Trade (% of total trade), 1995-2001



Source: Eurostats' COMEXT, computations by the author.

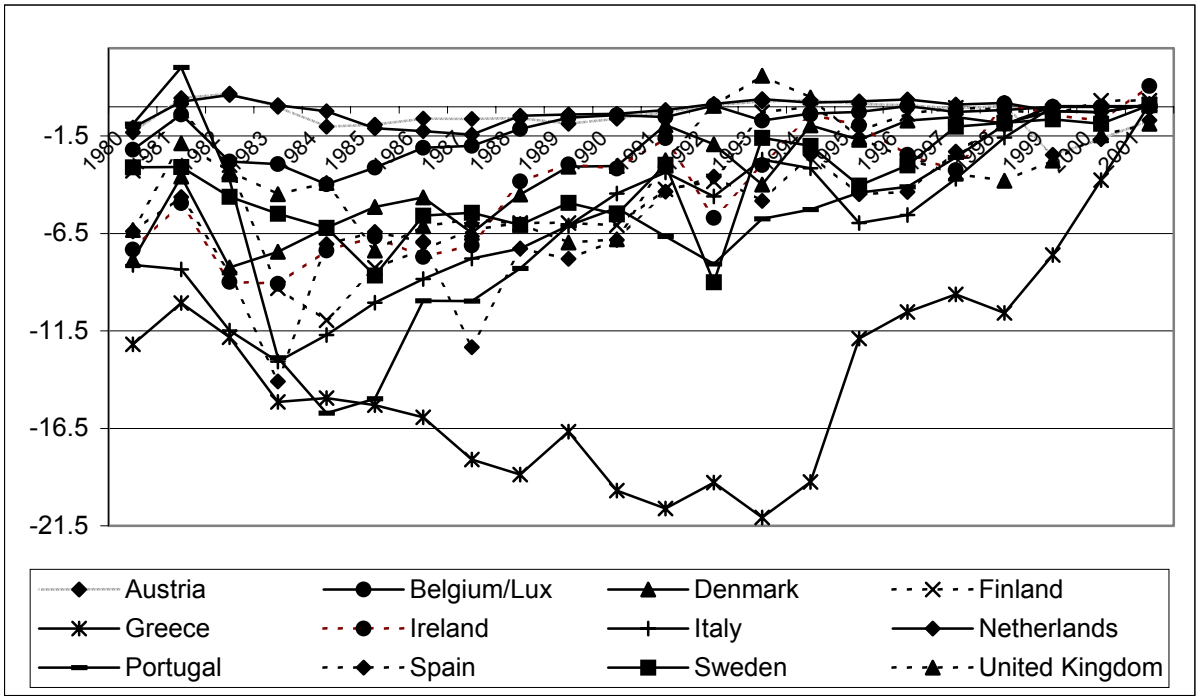
As one may see in Graph 3 above, for most of the Euro area member states (the only exceptions are Germany, Ireland and Portugal), intra-Euro area trade has been falling, as share of total trade, since the mid-1990s, and this trend was not reversed by the creation of the common monetary area: on average, the Euro area traded 56.85% of its total trade with itself in 1995, while by 2001 this share was at 54.75%. On the other hand, certain non-EU markets saw a substantial relative increase in their Euro area trade share (like the US, and some emerging markets, like China), albeit from rather low values. Here, one must remember that the Euro area had lower growth than the EU between 1994 and 1997, grew at its average between 1998 and 2000, and again grew less than the EU in 2001 (and it is forecasted to repeat this performance again in 2002), while the US had an average growth of 3.8 during 1994-2000 (falling to 0.3 in 2001), and China recorded a 1994-2001 average growth of 8.95%

(IMF data). Also, the Euro undervaluation may have played a role in those results, as since 1995, the Real Effective Exchange Rate of the Euro area (IMF data) fell from an index of 1995=100 to 82.26 (in CPI terms) or 74.70 (in real unit labour costs).

To attempt a more formal test of hypotheses a) and b) outlined above, the same regressions as before were re-run, now including two new variables. First, one alternative variable to represent EMU (NEW EMU) was created, generated by the absolute value of the cross-differential of *money market* (or equivalent) interest rates between EMU participating countries. To account for the "front loading" effects from monetary integration, this continuous variable was calculated for the whole sample (for the non EMU sample, it was arbitrarily set at constant value, equivalent to twice the highest value observed in the EMU members set). The assumption is that the gradual emergence of a *de facto* EMU will be approximated by a reduction in the cross-differential towards zero (i.e., the variable is expected to have a negative sign).

A general view of the behaviour of those series is provided at Graph 4 below, which plots the cross-differential of all EU member states to the German money market rates:

Graph 4: Cross EU-Germany Money Market Interest Rate Differentials (1980-2001)



Source: IMF/IFS, computations by the author.

I must caution that this variable is an imperfect proxy for monetary union, as it does not explicitly considers different institutional status of EU, ERM and EMU membership. As one may see, the overall trajectory of the series, and since mid-1980s, is towards a general reduction of the differential, being Greece the only consistent exception until the late 1990s (the temporary spikes related to the ERM-I collapse are somewhat masked by the yearly averaging). For several of the EU member states, the differential was already on a scale of fractions of a percentage point long before EMU, and by 2001 this was the case for all EMU members, and, one must also note, also for the non-EMU EU members (Denmark and Greece –this last a future EMU member- within the ERM-II framework and Sweden, a country with a floating currency *cum* domestic inflation targeting), with only the United Kingdom, among all EU member states, showing a (negative) differential closer to one percentage point[23]. This may indicate that the *de facto* EMU membership to be proxied by that this variable aims to

[23]Peculiarly, also Ireland showed a 1.07 yearly average differential in its money market rates towards the German ones in 2001. This should be due to the series used by the IMF as a money market rate for Ireland (a fixed one month rate) and to the strongly different cyclical positions of Ireland and Germany in that year.

capture can be reproduced even by credible, sustainable *domestic* policies without a common currency framework.

Secondly, a variable was added to represent cyclical extra-EU exchange rate instability (the variable USD), namely, a series with the "synthetic" Euro exchange rate towards the USD (source: DATASTREAM), also for the whole sample. There are no priors as to the sign of this variable (as a departure from a equilibrium exchange rate in either direction could lead to a increase of extra-Euro area share in total trade, either by the increase of exports to third markets, or by the increase of imports from them).

I will start again by presenting a correlation table of our expanded variable set. As one may see in Table 5 below, the correlation of NEW EMU with trade is indeed negative, but has half the value of the old EMU dummy. USD has a small positive coefficient (as the trend of that variable in the sample is, roughly speaking, downwards. That would imply a positive relationship between an *appreciation* of the Euro and extra-Euro area total trade, as imports are more affected than exports. Noteworthy is also a negative correlation of USD with NEW EMU close to unity.

Table 5: New Correlations for the Full Sample (1980-2001)

	T	D	Y	EU	EMU	NEW EMU	USD	TREND
T	1.00							
D	0.00	1.00						
Y	0.38	-0.04	1.00					
EU	0.07	-0.23	0.09	1.00				
EMU	0.06	-0.06	0.05	0.3	1.00			
NEW EMU	-0.03	0.2	-0.05	-0.15	-0.05	1.00		
USD	0.02	-0.19	0.04	0.14	0.04	-0.94	1.00	
TREND	0.51	0	0.15	0.05	0.11	-0.01	0.00	1.00

In Table 6 below, I show the results of our new regressions for the full sample. Most of the regressors have, one more time, the expected signs and significance, with, again, the exception of distance. Concentrating on the EU and EMU dummies, EU is consistently positive and significant in most regressions (bar one of the OLS and both the BE regressions),

but the estimates show a substantial variance of the coefficient. The NEW EMU variable is also consistently negative significant (bar, again, in BE), with somewhat small coefficients. USD tends to be negative significant only on the regressions without the TREND term.

Table 6: Expanded Regressions for the Full Sample (1980-2001)

Variable	Coeffs. (OLS)	Coeffs. (OLS)	Coeffs. (RE)	Coeffs. (RE)	Coeffs. (BE)	Coeffs. (BE)	Coeffs. (FE)	Coeffs. (FE)
C	-38.46* (030)	-42.03* (0.62)	-36.16* (1.52)	-109.12* (1.61)	-42.89* (7.71)	-42.89* (7.71)	-23.41* (1.82)	-155.12* (2.02)
D	-0.14* (0.02)	-0.15* (0.02)	0.14 (0.09)	0.45* (0.10)	0.11 (0.10)	0.11 (0.10)	dropped	dropped
Y	1.70* (0.01)	2.06* (0.01)	1.34* (0.04)	4.33* (0.05)	1.82* (0.07)	1.82* (0.07)	0.97* (0.06)	6.46* (0.06)
EU	-0.04 (0.07)	0.25* (0.07)	0.90* (0.18)	3.46* (0.21)	0.44 (0.38)	0.44 (0.38)	1.02* (0.21)	4.46* (0.25)
NEW EMU	*-0.15* (0.01)*	*-0.21* (0.02)*	*-0.08* (0.02)*	*-0.13* (0.02)*	*-0.07 (0.25)*	*-0.07 (0.25)*	*-0.14* (0.03)*	*-0.31* (0.04)*
USD	0.48* (0.12)	-1.36* (0.43)	-0.35 (0.31)	-1.78* (0.39)	-0.89 (5.72)	-0.89 (5.72)	-0.21 (0.32)	-0.94** (0.39)
TREND	0.39* (0.00)		0.50* (0.00)		dropped		0.51* (0.00)	
R^2	0.64	0.41	0.35	0.14	0.14	0.14	0.33	0.14
F-statistic	17541.37	8285.75	47292.10	9401.16	151.68	151.68	9341.23	2979.36

*, 1% significance, **, 5%, ***, 10%.

For the short sample, I start again by showing the correlations of the regressors set. Noteworthy are, one more time, the essentially zero correlation of the old EMU dummy, the increased value for NEW EMU, the reduction to virtually zero of the coefficient for TREND, and the now even closer to unity negative correlation between USD and NEW EMU.

Table 7: New Correlations for the Full Sample (1980-2001)

	T	D	Y	EU	EMU	NEW EMU	USD	TREND
T	1.00							
D	-0.20	1.00						
Y	0.43	-0.04	1.00					
EU	0.05	-0.26	0.07	1.00				
EMU	0.00	-0.11	0.06	0.47	1.00			
NEW EMU	-0.07	0.2	-0.05	-0.16	-0.09	1.00		
USD	0.07	-0.2	0.04	0.16	0.07	-0.97	1.00	
TREND	0.02	0.00	0.24	0.00	0.13	0.00	-0.02	1.00

The regressions' results are shown on Table 8 below. D and G behave consistently as expected, bar on one of the FE regressions (where D was again dropped due to collinearity).

Concentrating on the EU and NEW EMU variables, EU is significant positive with rather high coefficients only in the FE regressions, while NEW EMU is now significantly negative with a rather stable point estimate in most of them (bar the BE and FE ones). USD is significant in only four, with substantial changes in scale and sign.

Table 8: Expanded Regressions for the Short Sample (1995-2001)

Variable	Coeffs. (OLS)	Coeffs. (OLS)	Coeffs. (RE)	Coeffs. (RE)	Coeffs. (BE)	Coeffs. (BE)	Coeffs. (FE)	Coeffs. (FE)
C	-20.32* (0.13)	-21.91* (0.12)	-11.32* (1.66)	2.93** (1.32)	-37.95* (9.48)	-37.95* (9.48)	7.17*** (3.77)	-80.45* (1.72)
D	-1.02* (0.00)	-1.03* (0.01)	-1.12* (0.10)	-1.14* (0.10)	-1.10* (0.10)	-1.10* (0.10)	dropped	dropped
Y	1.71* (0.00)	1.57* (0.00)	1.28* (0.06)	0.64* (0.03)	1.85* (0.07)	1.85* (0.07)	-0.36** (0.15)	3.41* (0.05)
EU	-1.39* (0.03)	-1.45* (0.03)	-0.40 (0.32)	-0.23 (0.02)	-0.60*** (0.32)	-0.60*** (0.32)	5.24* (0.37)	5.38* (0.38)
NEW EMU	***-0.10* (0.00)***	***-0.05* (0.00)***	***-0.04* (0.02)***	***-0.04** (0.42)***	***0.25 (0.31)***	***0.25 (0.31)***	***-0.04 (0.03)***	***-0.03 (0.03)***
USD	1.45* (0.09)	2.95* (0.05)	-0.86** (0.42)	-0.51 (1.32)	6.91 (7.89)	6.91 (7.89)	1.40*** (0.82)	0.95 (0.83)
TREND	-0.20* (0.00)		-0.13* (0.01)		dropped	dropped	0.60 (0.02)	
R^2	0.98	0.97	0.22	0.17	0.22	0.22	0.02	0.19
F-statistic	189274.00	125166.8	749.94	549.35	176.80	176.80	1076.32	1135.69

*, 1% significance, **, 5%, ***, 10%.

Again, assuming RE as the preferred specification, a reduction of interest rates cross differential (now, with a half to a third of the point estimate of the one in the whole sample) would be associated with an increase in trade.

To assess to which degree such a reduction was conditional on EMU participation, the same analysis was reproduced with differential money market interest rates series for the whole set of EU member states (variable FULL EU) and for the non-Euro area EU member states (variable NON EMU). Non EU members were trade in the same way as in the NEW EMU variable. The results are show below. Given the similarity of the estimates for the other coefficients[24], I present below only the point estimates for those two variables (see Tables 9 and 10).

[24]The only noteworthy differences are the larger coefficients for the EU dummy, negative and significant, but on the OLS regressions *only*, for all samples, with and without TREND, and the larger point estimate for the USD variable, but *only* in the NON EMU, OLS full sample regressions.

Table 9: Expanded Regressions for the Full Sample (1980-2001)

Variable	Coeffs. (OLS)	Coeffs. (OLS) NO TREND	Coeffs. (RE)	Coeffs. (RE) NO TREND	Coeffs. (BE)	Coeffs. (BE) NO TREND	Coeffs. (FE)	Coeffs. (FE) NO TREND
FULL EU	*-0.23**	*-0.24**	*-0.07**	*-0.08**	*0.05***	*0.05***	*-0.24**	
	(0.00)	*((0.00)*	*(0.01)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.02)*	*-0.37* (0.03)*
NON EMU	*-0.22**	*-0.22**	*-0.05**	*-0.03****	*0.05***		*-0.27**	*-0.32**
	(0.00)	*(0.00)*	*(0.02)*	*(0.01)*	*(0.02)*	*0.05** (0.02)*	*(0.04)*	*(0.04)*

*, 1% significance, **, 5%, ***, 10%.

Table 10: Expanded Regressions for the Short Sample (1995-2001)

Variable	Coeffs. (OLS)	Coeffs. (OLS) NO TREND	Coeffs. (RE)	Coeffs. (RE) NO TREND	Coeffs. (BE)	Coeffs. (BE) NO TREND	Coeffs. (FE)	Coeffs. (FE) NO TREND
Variable	Coeffs. (OLS)	Coeffs. (OLS)	Coeffs. (RE)	Coeffs. (RE)	Coeffs. (BE)	Coeffs. (BE)	Coeffs. (FE)	Coeffs. (FE)
FULL EU	*-0.21**	*-0.22**	*-0.04**	*-0.3**	*-0.01*	*-0.01*	*-0.08**	
	(0.00)	*(0.00)*	*(0.01)*	*(0.01)*	*(0.02)*	*(0.02)*	*(0.03)*	*-0.09* (0.03)*
NON EMU	*-0.21**	*-0.22**	*-0.02****	*-0.02*	*-0.01*	*-0.01*	*-0.13**	*-0.14**
	(0.00)	*(0.00)*	*(0.01)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.04)*	*(0.04)*

*, 1% significance, **, 5%, ***, 10%.

As one may see, a reduction of the differential is significantly related to an increase in trade in all the series, regardless of EMU participation (bar the NON EMU, no TREND short sample, using the preferred RE specification). Using RE as our benchmark regression, even the degree of the reduction is comparable to the one observed in the EMU sub-set, specially for the longer sample. In the shorter sample, the same is observed, but to a lesser degree: here, the RE coefficients are again negative for the non-EMU members, but are not always significant (or are borderline significant) and are smaller than the ones in the EMU set.

One may use those results as an indication that trade enhancing effects are not conditional on any exchange rate arrangement *per se*, but on the credibility of the arrangement: a floater can perform as well as one in a fixed arrangement or a monetary union, as long as it is perceived as sustainable (a result similar to the one in Sapir and Sekkat, 1995, who analyze the intra-EU trade effects of the ERM).

The assessment of the regressions' outcomes seems to show that a credible exchange rate mechanism can widely substitute for a institutionalized monetary union. Yet, it is necessary

that credibility is reflected in the continuous decline of the risk premium in the money market interest rates of the members of the mechanism.

On the other hand, one has also to consider that the completion of the European single market, as a process parallel to the stability of the "anchor currency" model, may have also influenced trade in a positive way, as it diminishes the likelihood of country-specific shocks, and thus also contributed to the decline of country specific risk premium.

6. CONCLUSIONS

While stressing the preliminary nature of the estimations in this paper, our conclusion here is that, according to the results of our deliberately parsimonious model, there are no robust signs that the constitution of the Euro area *per se* in 1999, proxied by the use of a dummy, has, so far, resulted in any significant increases in intra-Euro area trade[25]. If one instead accepts that the reduction of interest rate differentials is an adequate proxy for EMU as a long term process, those results probably come about because of the anticipated (and discounted) nature of the European integration process, where monetary integration was a posterior stage of a lengthy, phased method of real integration (know as "Coronation" theory in Germany), more than due to structural or cyclical Euro area weaknesses. Nevertheless, there are some indications –not always robust- that a comparable degree of trade-enhancing interest rate conversion was also observed on non-EMU members of the EU, implying that those gains are not conditional on a specific arrangement.

Finally, the previous results can be used as a cautionary note to policy makers, not only in the EU members states (current and future), but in other regions of the globe, neither to underestimate the timeframe, nor to overestimate the potential economic gains from any individual component of a regional integration processes (see Graham and Rajan, 2002 and Baer at al., 2002).

[25]One may compare those results with the ones from Rose and van Wincoop, 2001, ibid, which estimated intra-Euro area trade increases of 59% from the constitution of the monetary union.

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