

The Impact of Exchange Rate and Monetary Regimes on Trade Flows: Are EU Experiences Relevant for Asia?

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December, 2008

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1. Introduction

The perceived success of regional integration in Europe has inspired debate in other parts of the world about potential economic benefits of different types of integration. In Asia in particular, monetary and financial integration has received attention. What are the benefits and how large are they? Are there costs associated with increased integration in the Asian setting? What type of integration should be supported first? What policy measures contribute the most to integration? What are the political ramifications of increased economic integration? What are the necessary political conditions required to implement an integration strategy? These are some of the questions that must be raised in the debate. We take a more narrow perspective here focusing on the trade effects of monetary integration.

The implementation of the currency union in Europe (EMU) has perhaps received the most attention among the many institutional reforms that have been implemented in the EU. The reason may be that this reform was highly visible and it affected people concretely, if not necessarily in important ways. Other reforms have been numerous but less spectacular; beginning in the early 90s when reforms were introduced aimed at creating the “internal market” with the so called “four mobilities” of goods, services, labor, and capital. A great variety of discriminatory practices in markets of all kinds were removed and in some areas rules and regulation were harmonized. The legal frameworks remain very different across countries in Europe, however.

Much research has been devoted to the effects of the EMU on international trade in particular. Prior research on the effects of exchange rate regimes on trade was inconclusive. Rose (2000, 2001) found extremely large effects of currency

unions on trade, however. These results inspired a by now large body of research on trade effects of EMU. The literature is reviewed in the next section. A consensus view seems to be emerging that the EMU has led to substantial but not gigantic trade creation within the union. A number of questions remain, however, partly because trade between EMU countries and non-EM countries has expanded along with intra EMU trade.

In this paper we address two weaknesses in much of the prior literature. One is that few papers make a strong attempt to distinguish between EU effects and EMU effects. Internal market reforms from the early 90s may possibly have affected trade only slowly and cumulatively. We address this issue by trying to identify separate EU exporter effects, EU importer effects, EMU exporter effects, EMU importer effects, intra-EU effects and intra EMU effects of the integration process. In the conventional wisdom the last two should be particularly strong as a result of trade creation caused by the EU internal market and the EMU, respectively.¹ Exporter (importer) effects refer to increased exports (imports) to (from) all countries within a group as a result of the EU internal market and the EMU. We do not discuss reasons why such effects may exist but it could be the case that, for example, the EMU has contributed to a general increase in productivity in a range of export industries.

The second weakness we address in the current literature is that the EMU effect may not be a pure single currency effect but it may be caused by reduced macroeconomic uncertainty in many EMU countries as a result of changes in monetary policy institutions, procedures and targets. The creation of the EMU

¹ We refer only to trade creation effects of reforms even if increased EMU trade substitutes for trade with countries outside the EMU. The reason is that trade diversion has the connotation of a welfare loss associated with the substitution of trade with one country for trade with another. The welfare loss occurs as a result of discriminatory practices but in the case of the EMU as well as the EU most of the potentially increased internal trade would be caused by a decline in transaction and information costs.

was associated with a monetary regime shift in several dimensions for many countries. Several countries that later became members of the EMU had pre-EMU central banks with little credibility in terms of a monetary policy target, and the target shifted strongly towards low inflation with the creation of the EMU. Most current EMU members had central banks with little political independence before they joined and their transparency in policy making differed greatly. To the extent EMU effects are the result of changes in policy-making institutions, procedures and targets, the lesson from EMU might be that institutions and targets should be changed and the currency union itself could be unimportant.

We introduce variables in export equations with the objective of capturing macroeconomic uncertainty more generally, changes in monetary policy institutions and changes in targeting. Thereby we hope to identify relatively pure EMU- and EU effects on trade.

An additional motivation for this paper is that almost the whole body of literature on trade effects of the EMU is based on the conventional wisdom that a currency union with irrevocably fixed exchange rates should lead to trade creation as a result of reduced exchange rate uncertainty, reduced transactions costs in trade and improved information in prices in different countries. There are strong reasons to be skeptical about the importance of these factors. In particular, the commonly made argument that reduced exchange rate uncertainty increases firms' willingness to trade and to invest in export- and import oriented projects is not generally valid. The fixing of exchange rates can actually increase the risk exporting firms are exposed to when taking a larger perspective on macroeconomic risk factors.

To expand on the argument we distinguish between risk on financial contracts and risk associated with export oriented projects. Exchange risk in the traditional

sense refers mainly to uncertainty about the domestic currency value of contractual commitments in foreign currency. In well-functioning markets for foreign exchange firms can cover or hedge this type of exchange rate risk in forward and money markets at very low costs.

Non-contractual exchange rate exposure exists when firms have invested in export projects without having any price and quantity commitments for the time horizon of the projects. This type of exposure is not easily hedged in financial markets and it can actually be reduced by increasing the flexibility of exchange rates. One reason is that exchange rate changes in response to changes in the demand for export products can dampen the effects on export revenues and quantities of the original shock.

Consider uncertainty about labor costs developments in different countries. Under irrevocably fixed exchange rates a country with relatively large increases in unit labor costs will become less competitive in world markets. Uncertainty about relative unit labor costs does not necessarily lessen within a currency union. Exchange rate flexibility may reduce this type of uncertainty to the extent it substitutes for wage rigidity and, thereby, increase the willingness of a firm to concentrate production to fewer countries. Thereby, international trade would expand.

Considering macroeconomic risk over the lifetime of projects it is necessary to consider that the exchange rate is only one variable among many that adjust in response to macroeconomic shocks on the demand and the cost sides. Fixing an exchange rate reduces exchange rate risk, by definition, but it does not change the fact that there is uncertainty about macroeconomic conditions. If changes in, for example aggregate demand are not allowed to affect exchange rates, interest rates

the price level or other variables may change more instead.² For this reason we consider monetary regime characteristics that may influence the level of general macroeconomic uncertainty in the regressions below.

In order to draw policy conclusions from results with respect to the impact of exchange rate regimes on trade it is necessary to consider that factor mobility and trade in goods are substitutes. An increase in trade may occur at the expense of foreign direct investments or vice versa. To draw welfare implications of observations that trade is expanding or declining it is necessary to consider why trade volumes are changing and the extent to which factor mobility substitutes for trade.

In the following we continue in Section 2 with a review of the literature on trade effects of exchange rate regimes and the EMU. In Section 3 we provide an overview of the existing data on trade-flows, and monetary regimes and their characteristics. The empirical methodology is described in Section 4. Results are presented in Section 5. Conclusions and implications follow in Section 6.

2. Literature review on trade effect of the EMU

Until the publication of Rose (2000), the effect of using a common currency on trade had been thought to be equivalent to the effect of reducing exchange rate volatility to zero, which was found to be either negligible or ambiguous across studies. Rose's results indicated that the trade effect of adopting the same currency is more profound than that of completely eliminating exchange rate volatility among separate currencies. In his paper, due to unavailability of the trade data of the EMU countries at the time of study, Rose applied panel regression to the cross section data of major countries such as

² See e.g. Oxelheim and Wihlborg (2008)

Australia, France, the U.K. and the U.S. and their dependencies, territories, overseas departments, colonies as well as some other currency areas³. His sample covered 186 countries during 1970 – 90. The estimated coefficient of currency dummy is 1.21, implying 3.35 ($\sim e^{1.21}$) times of trade values among countries using the same currency as much as those using separate currencies.

The finding of Rose (2000) has stimulated work in this area, mainly because a 200% increase in trade seems too large to be true in reality. With an attempt to bring down such trade effect to a plausible range, subsequent works have tried alternative samples, specifications, and methodologies. Most frequently critique on Rose's original work is his observations⁴ which are extremely small and do not represent most of real world economies. Persson (2001) hypothesized the non-random selection problem where countries that participated in currency unions are systematically different from those which do not. For example, member countries in the currency unions more often share languages, borders, or colonizers. Persson applied matching technique⁵ to the data and was able to reduce the effect to 13% - 66%. However, when Rose (2001) used the same technique on expanded the data set, the estimated coefficients became 1.37, even larger than the original estimate. His results were confirmed by the fixed effect panel regression which, in his view, is a simple straightforward approach that also compares countries of similar characteristics (before and after joining currency unions) as in the matching technique.

³ He admitted, when describing his data, that most of the countries are small or poor so any extrapolation of his results to EMU may be inappropriate (p.15).

⁴ According to de Souza (2002), many flaws were in the original data set. For example, New Zealand, instead of Netherland, was classified as a member of the EU and Belgium was coded as not sharing a common language with any trade partner.

⁵ The approach assigns countries with similar propensity scores (here, probability of using a common currency based upon the trade determinant variables) to the same group. For more details, please see Persson (2001) and reference therein.

Critiques also question an asymmetry effect on trade from joining and leaving currency unions since Rose's data set cover both currency union formations and dissolutions. Nitsch (2005) tested this point by sorting out the latter from the sample and found that the trade effect was 1.29 or 263% increase in trade in the cross section specification. However, such effect vanished completely when country-pair fixed effects were added into the model. Indeed, opinions on the issue of data coverage are very much controversial. While Micco *et al.* (2003) preferred the trade effect of 9% - 16% from broader sample of 22 industrial countries to that of 4% -26% from smaller sample of 15 EU countries, Baldwin (2006) deemed their narrower data group as the cleanest controlled group because of homogeneity of the European countries and ongoing trade integrations among non-EMU countries that were not controlled for in the model. Frankle, as a discussant of Baldwin's paper, defended Rose by arguing that 'many of these responses in effect throw out most of the data in the name of addressing the ... issues of endogeneity or country size. ... there is little information gained in reducing the data set sharply and then noticing the loss in statistical significance.'

Not only do the sizes of the EMU dummy variable vary substantially, the timing of its effect is not agreeable among studies. Micco *et al.* (2003) interacted the EMU dummy with time dummies from 1992 - 2002, and found jumps in coefficients in 1998 and 2001 with the trade effect around 7% - 10%. Their explanation was that the prospect of the EMU did not become clear until 1998 when the European Commission published the convergence report and the European Central Bank was established. These structural breaks in 1998 and 2001 are confirmed by Flam and Nordström (2003) which did interaction effect during 1990 - 2002. Baldwin (2006) raised the interesting point that implementation of

the Single Market in 1993 was delayed especially by the ‘ins’ (EMU zone), therefore, the ‘Rose effect’ dummy may also pick up the lagged effect of such measures which showed up after 1998. However, when the data range was extended back further to 1980 – 2005, Gomes *et al.* (2006) found that the EMU showed its effect on intra EMU trade as early as 1988! After all, separating mixed effects of the Single Market program and anticipation effect of the EMU may not be an easy task. Among those studies that compared the trade effect of the EMU with that of other agreements, Berger and Nitsch (2005)’s results showed that the effect of the EMU on trade intensity became 31% while the combined effect of long-term integration and of EU membership was 81%. This conclusion is consistent with that of Gomes *et al.* (2006) which found that the dummy variables of the FTA and EU have higher estimated coefficients (0.108 and 0.278 respectively) compared to that of the EMU (0.210 or 23% in trade increase).

A variety of methodologies have been employed to find the effect of the EMU. Faruqee (2004) indicated the presence of unit roots in the panel data which, if OLS is applied, would lead to biased point estimates and non-standard t-statistics. Hence, he estimated the gravity model using dynamic OLS (DOLS) and obtained the intra-EMU trade effect of 7% -8%. Another work on dynamic specification is by Nardis and Vicarelli (2003). Lagged values of trade were added into the model to account for the persistence effect of trade due to sunk costs invested by exporters in setting up distribution and service networks and intangible factors such as policy, history, geography, and culture. By estimating the first difference version of the gravity model using the Hansen two-step GMM, They reported the trade increment induced by the adoption of the EMU of 6.3% in the complete sample and only 2.6% in the exclusive EMU country sample.

Those who suspected that the model specification resulted in implausible magnitudes of the currency union coefficient suggested many possibilities such as omitted variables, reverse causality, and non-linearity. According to the OCA criteria, countries that engaged in a high volume of trade may find it more attractive to use a common currency, leading to the endogeneity bias between dependent and independent variables. Some studies kept the data range short to circumvent the problem (Micco *et al.* (2003), Nardis and Vicarelli (2003) p.5)⁶. Micco *et al.* (2003) also addressed this issue by including county-pair fixed effect dummies to pick up unobservable time-invariant characteristics that impact trade between country-pair such as a history of conflict. The estimated coefficient of currency area dummy is 5.5% - 7.6%. Barr *et al.* (2003) argued that potential endogeneity may still be a problem even with the presence of fixed effects due to the exclusion of the variable that jointly predicts the decision to join EMU and higher trade. To get around this problem, they used output co-movement and price co-movement as instrumental variables and cautiously explained that *future* increases in trade do not have an effect on co-movement. The resulting estimate of currency union dummy is 0.21 or 23% increase in trade following the creation of EMU.

The omitted variable that most seriously affects the coefficient of the EMU is the time trend. Most of the time the inclusion of the time trend reduces the trade effect considerably. Berger and Nitsch (2005) reported the effect of the creation of the EMU on trade intensity that became statistically insignificantly different from zero when a simple linear trend is added to the model. Similarly, Bun and Klaassen (2006) found that estimates of the effect of the EMU and the currency

⁶ This poses the trade off of difficulty in separating the effect of the euro from that of other forms of integration, which is identified when the sample is extended back in time.

unions across different sample lengths became stable and consistent when they included country-pair trend effect in the regression. More specifically, trade increase was only 2-3% in the EMU and 25% in other currency unions in general. Indeed, these estimates did not vary much with the moving of the starting years up or ending years down. Other omitted variable suggested is an index for relative factor endowment by Nardis and Vicarelli (2003). As captured by the absolute value of the difference in per capita incomes, it is expected to have a positive sign indicating inter-industry trade if sample includes a mix of developed and developing countries. In their sample, the estimated coefficient showed the predominance of intra-industry trade.

Many explanations for the trade enhancement effect of a currency union, more specifically the EMU, have been offered. In addition to the positive externality of a common currency as a medium of exchange, the border effect due to home bias is ameliorated. One possible reason would be an institutional commitment to permanent integration and exchange rate regime. In his gravity model, De Souza (2002) replace the traditional EMU dummy with a variable representing credibility measured by the differentials of money market rates between EMU participating countries. The coefficient of this variable was significantly negative and robust across different methodologies, implying trade-enhancing effect of interest rate conversion. This will be a subject of our interest and our study will explore the comparative trade effect of the monetary policy characteristics with alternative proxy variables.

3. A glance at the data

Our sample comprises 23 industrialized and 40 emerging market economies from 1990-2005 (see Appendix Table A1). To analyze the impacts of EU/EMU

on the bilateral exports, we group the observations into three groups, which are: 1) the member countries of EMU, 2) the EU countries that are not the EMU members (EU/nonEMU), and 3) the non EU countries (nonEU). EU should actually be thought of as EES (EU 15 plus Norway and Iceland). All EU countries become EU/nonEMU countries in 1992. In 1999, 11 EU countries switched to become EMU; Greece become EMU in 2001; therefore, the countries using the euro currency represent about one fifth of countries in the sample (12 out of 63 countries). Those classified as EU/NonEMU countries since 1992 are those explicitly in the EU and remain outside the euro zone which are Denmark, Sweden and the U.K., plus Iceland and Norway that participate in the Internal Market as members of the European Economic Area. In 2004, 10 countries in Eastern Europe become EU/nonEMU. The nonEU group includes six developed countries, eight Asian countries, 13 Central and Eastern European countries, and 19 emerging countries.

From the three groups of exporting countries and three groups of importing countries, we can analyze the difference of bilateral exports among nine pairs of countries, which are: 1) EMU exports to EMU, 2) EMU exports to EU/Non-EMU, 3) EMU exports to non EU, 4) EU/NonEMU exports to EMU, 5) EU/nonEMU exports to EU/Non EMU, 6) EU/NonEMU exports to non EU, 7) Non EU exports to EMU, 8) Non EU exports to EU/non EMU, and 9) Non EU exports to Non EU.

Figure 1 shows the distribution of exports according to the country groups of our interests— the EMU, the EU/nonEMU, and the nonEU groups. Coincidentally, the exports to the EMU countries plunged before picked up every time before the introduction of an agreement such as the Single Market program in 1987, the European Union in 1992, the beginning of the virtual Euro in 1999

and the use of the tangible Euro notes and coins in 2001. In contrast, the exports to the EU/nonEMU EU countries did not show such ups and downs and were quite stable through time. However, exports to the nonEU countries from the EMU countries increased steadily over time and jumped after 2001 while those from the non-EMU EU countries track the movements of exports to the EMU countries. The exports from the nonEU group were mainly dominated by the intra-group exports due to the highest share of exports to (nonEU) industrial countries by (nonEU) industrial countries themselves, emerging countries, and Asian countries.

4. Empirical Methodology

We estimate the effects of monetary policy regimes and characteristics on exports using both the panel data and cross-section models. For the panel data model, we use a country-pair and year- fixed effects as follows:

$$\begin{aligned} \text{Log}(\text{Export})_{12,t} = & \alpha + \beta_1 \text{Log}(\text{GDP})_{1,t} + \beta_2 \text{Log}(\text{GDP})_{2,t} + \beta_3 \text{Log}(\text{POP})_{1,t} + \beta_4 \\ & \text{Log}(\text{POP})_{2,t} + \beta_5 \text{RER}_{1,t} + \beta_6 \text{RER}_{2,t} + \beta_7 \text{RTA}_{12,t} + \gamma_j \\ & \text{EU/EMU}_{j,12,t} + \theta_k \text{Monetary Regimes}_{k,12,t} + v_{12} + \mu_t + \varepsilon_{12,t} \end{aligned}$$

The dependent variable is the logarithm of the real value (in US dollar) of bilateral exports from an exporting country (with subscript 1) to an importing country (with subscribe 2) at year t . The exports data are from the IMF Direction of Trade Statistics. GDP is the real GDP (in US dollar) and POP is the total population. RTA is a dummy of one if two countries belong to the same Regional Trade Arrangement (see Appendix Table A2). EU/EMU are eight country pair dummies that were described in the previous section (i.e. 1. EMU to EMU, 2. EMU to EU/Non-EMU...8. Non EU to EU/non EMU). We omit the dummy that captures the exports from NonEU to NonEU countries to avoid the perfect multi-

collinearity; therefore, the impacts of these eight dummies are compared with the exports between a pair of NonEU countries. By grouping the country pairs into these categories, we can formulate the coefficients of these dummies into different combinations to capture the EU and EMU exporter and import effects, EU internal market effect, and common currency effect (see the next section). *Monetary Regimes* are different aspects of monetary policy regimes and characteristics, which will be described in details below. v_{ij} denotes the unobserved characteristics of a country pair, μ_t denotes the unobservable time effects, and ε_{ijt} is an error term.

A large number of studies in the trade literature employs the pooled cross-section time-series regressions which control for time-invariant factors that are specific to each pair of countries (such as distance, common border, common language, etc) in testing the extended gravity model. According to Anderson and van Wincoop (2002), Micco et al (2003) and Carrère (2006), the estimates from the pooled regressions may still be biased due to the difficulty in controlling for all unobservable factors. For instance, Anderson and van Wincoop (2003) argue that the standard gravity model might have been misspecified since it ignores a multilateral resistance or remoteness term. Other unobservable factors that are ignored and may explain bilateral trade include, for example, initial endowments, geography, social capital, and the pressure from neighbor countries. These mentioned studies suggest that including country-pair and year fixed effects dummies can correct this misspecification of estimates. The country-pair dummies will capture overall time-invariant unobserved factors that are specific to a country pair, and the year dummies will control for short-term cyclical effects.

Regarding the monetary regimes data, we use the monetary variables from three sources. The descriptions of these variables are summarized in the Appendix Table A3.

1. The monetary policy regimes data from the IMF's Classification of Exchange Rate Arrangements and Monetary Policy Frameworks, which is available from 1999. IMF classifies monetary policy frameworks into five groups: exchange rate anchor, monetary aggregate anchor, inflation targeting framework, IMF-supported or other monetary program, and other frameworks (such as the conduct of monetary policy that has no explicitly stated nominal anchor). According to the IMF data, the countries in the Euro Area are counted with the last group. However, in our empirical analysis the member countries of EMU are treated as inflation target countries and a separate group (i.e. the EMU group). Specifically, all EMU countries are assigned an EMU dummy of one for both the inflation targeting and EMU dummies from the year of 1999 in the regression analysis.

2. The survey for the key characteristics of monetary policy framework by the Centre for Central Banking Studies, Bank of England (in Mahadeva and Sterne, 2000). The survey was conducted in 1999 and the data is available for more than 100 countries. We use three variables from the survey: Central bank independence, accountability, and transparency.

3. The quantitative economic variables which capture the outcome of the conduct of the monetary policy. The two variables are the interest rate and exchange rate volatility, which are calculated from the coefficient of variation of the monthly short-term market interest rates and nominal exchange rate of national currency relative to U.S. dollars, respectively.

In Table 1, we tabulate the IMF's monetary policy regimes data for each of our three country groups. Each column tells the number of countries in EMU, nonEMU/EU, and nonEU adopting such regime. However, due to regime switches, the total number of countries in all columns is greater than the number of all countries in the sample. In the other words, summing horizontally the number of countries in each group across monetary regimes (as shown in the second column to the last) and comparing it to the number of countries in the sample indicate the extent to which countries are multiple-counted, i.e. switching frequency. For example, in the case of EMU countries, the difference between the last two columns is due to the late entry of Greece into the EMU. For the nonEU group, the number counted from all regimes is almost twice as much as the number of countries belonging to this group, implying that most countries change their monetary regime at least once. In fact, most developed countries in this group such as Japan, the U.S., the U.K., Australia and New Zealand adopting the same monetary regime throughout the period and some developing countries switched the regimes more than twice.⁷

The nature of monetary regimes has implication on the compatible exchange rate regimes, an indirect channel through which the monetary policy has effect on trade. More specifically, our data shows that countries that follow inflation targeting and monetary aggregate regimes tend to have more flexible exchange rate policy such as crawling band, managed float with no pre-announced path for exchange rate, and independent float. Exchange rate anchor regime, as its definition, involves more rigid exchange rate policy such as

⁷ Argentina was under the IMF program from 1999 – 2001, and used exchange rate anchor in 2002 before returned to the IMF program again during 2003 – 2005, targeted monetary aggregate in 2006 and ended up with exchange rate anchor in 2007. Equally actively, Romania was classified as 'other' regime in 1999 and underwent the IMF program during 2000 – 2001, experimented exchange rate anchor for 3 years, switched to 'other' in 2005 and finally used inflation targeting.

arrangements with no separate legal tender, pegged exchange rates within horizontal bands, crawling pegs, and other conventional fixed peg arrangements. The remaining two regimes, IMF supported and ‘other’, have countries that practice a variety of exchange rate regimes from exchange rate arrangements with no separate legal tender, managed float, and independent float.

5. Empirical Results

Tables 2-5 and Appendix table A4 present the results of the empirical analysis of bilateral exports. In Table 2 the independent variables are GDP of the exporter (1) and the importer (2), the population of each of the countries in each pair, the real exchange rate relative to the dollar of the two countries in each pair and a trade agreement dummy RTA in addition to the eight dummies showing which group the exporter (1) and the importer belongs to. The time-series cross-section model includes country-pair and year fixed effects. In this, as well as the following table there are regressions for the periods 1999-2005 and 1990-2005 and there is a sample of countries, IND, including only industrialized countries and a sample, ALL, including all the industrialized and the emerging market economies in Appendix table A1.

Table 3 shows the results of regressions with the same variables as in Table 2 but the EMU dummy is specific for each year. In other words we analyze how EMU effects have changed from year to year after the formation in 1999. In columns denoted panel the year specific EMU coefficients are obtained in one panel fixed effect regression as in the previous table. In columns denoted cross-section the results for the EMU coefficients are obtained in separate cross section regressions for each year. The non-EMU coefficients in these columns are averages for all the annual cross section regressions.

In Table 4 we add monetary regime variables and central bank characteristics as independent variables to the country group dummies.⁸ Since we have data characterizing these variables only for the period 1999-2005, indirect proxies for these characteristics must be used in the 1990-2005 regressions. Specifically, annual exchange rate volatilities and interest rate volatilities are assumed to depend to a large extent on the monetary regime and central bank behavior. We have calculated annual data for these volatilities and introduced them in the regressions. The results are observed in Columns (5) and (6) for IND-countries and All countries, respectively. The introduction of country specific regime dummies implies that country-pair fixed effects cannot be included. The different columns for ALL countries 1999-2005 are based on regressions using different methods and number of observation for purposes of comparison as discussed below.

Finally in Table 5 we use the results in the above tables to calculate EMU- and EU exporter effects, EMU- and EU importer effects, intra EU effects and intra EMU effects. We focus on this table in the analysis of EU and EMU effects in order to explain the meaning and implications of these effects in greater detail. However some general observations can be made with reference to tables 2-4 to begin with.

Table 2 shows that exporter and importer GDPs, populations and real exchange rates are significant as is the trade agreement dummy, RTA. The 8 dummies for country groupings are generally significant as well with few exceptions for dummies including countries outside the EU. The dummies show trade effects of the exporters or importers belonging to the EU or the EMU relative to the benchmark case when both exporters and importers are outside the

⁸ In Appendix table A4 the dummies are time specific as in Table 3.

EU as well as the European Economic Area (EEA). Members of the EEA are considered EU members since they are part of the internal market.

A comparison of the coefficients for the dummies in the regressions for ALL countries for different time periods indicate that the results do not depend strongly on whether the time period is 1990-2005 or 1999-2005.

The results are very sensitive to what countries are included in the regressions, however. The EMU to EMU dummy, as well as several of the other dummies including the EMU or EU as exporter or importer, is significant and positive in the IND regression but significant and negative in the ALL country regressions. It is possible that the trade shifts in the period after 1999 between EU and other industrialized countries differed from the trade shifts between EU countries and emerging market economies. By including monetary regime variables below we ask whether these different shifts can be explained by monetary regime characteristics. We will see that the general answer to this question is negative.

The negative coefficient for the EMU to EMU dummy for ALL countries implies that we must put a question mark for the commonly observed result that the EMU has been trade creating.

Turning to Table 3 we intend to analyze how EMU and EU effects have developed over time after the creation of the currency union. It is commonly thought that the trade creating effects of the EMU should develop only slowly over time since it takes time to invest in new production capacity.⁹ None of the regressions for ALL countries show a consistent pattern for the year dummies for country groups including EMU and EU countries. The panel analysis for IND countries reveal a clear positive trend for the EMU to EMU dummy, however,

⁹ A common observation in the literature on trade effects of exchange rate changes is that it takes one to three years before the trade effects become substantial.

and the annual coefficients are significant. The annual coefficients from the cross-section analyses for each of the years 1999-2005 show the opposite result. The EMU to EMU effect is weakening going from strongly positive and significant in 1999 to small and insignificant in 2005. The latter result would indicate that something happened in 1999 and 2000, in particular, affecting the trade pattern of the EMU countries. Since the effects are not sustained the EMU cannot explain these temporary trade effects. The time patterns for other dummies are less clear in terms of sign as well as significance. Thus, the panel results are consistent with EMU effects on trade but the cross-section results are not.

In Table 4 indicators of monetary regimes and central banks are introduced. Since our data set includes regime characteristics for the period after 1999, all regressions with these characteristics in Columns (1)-(4) refer to the period 1999-2005. Column (4) includes Central bank characteristics as well. Since the latter characteristics do not change over time country pair dummies cannot be included in the column (4) regression. In order to evaluate the importance of not including such dummies column (3) shows the regression with regimes only without country pair dummies while these dummies are included in the column (2) regression. The Column (1) regression has the same specification as the Column (2) regression but the number of observations is the maximum we can use when central banks characteristics are not included. The results indicate that the results do not depend strongly on the number of observations.

A comparison between Columns (2) and (3) show that the absence of country pair dummies affect the results strongly. Many EMU and EU group dummies change sign and level of significance. Comparing Column (3) without central bank characteristics with Column (4) including these characteristics we can observe that the EMU to EMU dummy changes from negative insignificant to

positive and significant when the dummies are introduced. The signs of the coefficient is opposite to the coefficients in the regressions with country pair fixed effects in columns (1) and (2), however.

The last two columns in Table 4 refer to the longer period 1990-2005 and they substitute exchange rate and interest rate volatility for monetary regimes. We can observe that the different signs for the EMU to EMU coefficient in regressions with IND countries and ALL countries remain. In comparison with the ALL country regressions with monetary regimes for the period 1999-2005 in columns (1) and (2) the coefficients for dummies including the EMU as exporting are smaller and less significant while the coefficients EU/non-EMU as exporter are larger and more significant.

Table 5 uses the results of the previous table to isolate exporter and importer effects of being a member of a particular group, and to isolate effects on pairwise trade among EMU members and pairwise trade among EU members. The conventional hypothesis with respect to effects of the EMU is that reduced costs of intra EMU trade should have particularly strong trade creation effects on intra-EMU trade.

As shown in Table 5 the EU exporter effect is defined by the dummy for exports from non EMU members of the EU to non-EU countries. Such an effect could exist if, for example, membership in the EU has made exporting firms more competitive in the world as a whole.

The EMU exporter effect is the additional effect on exports to the world as a whole (non EU) of being a member in the EMU as well as the EU. The table indicates that both the EMU and the EU exporter effects is positive in the IND sample while the results in the ALL sample are ambiguous.

The EU importer effect is represented by the coefficient for the dummy for exports from Non-EU to EU/non-EMU while the EMU importer effects is the coefficients for exports from Non-EU to EMU minus the part of this coefficient that is represented by the EU importer effect. Negative importer effects could be explained by increased competitiveness of the import competing industries in the EU and the EMU or increased import barriers. In Table 5 the importer effects are positive for the EU but negative for the EMU in the IND regressions indicating that the EU has reduced barriers to import from other industrialized countries have been reduced. The EMU on the other hand seems to have created a barrier to other IND countries. The results in the ALL regressions are ambiguous in this case as well.

The EU internal market effect refers to intra EU trade creation defined as the increase in intra EU trade minus the increase in exports from EU countries to all countries and increase in imports of EU countries from all countries. The internal market should have had particularly strong effects on intra EU trade. This hypothesis is confirmed in regressions for IND countries but the effect is again ambiguous in the ALL country regressions.

Finally, the EMU effects refers to the increase in intra-EMU trade minus the part of this trade explained by intra-EU effects, exporter effects of the EU and the EMU and importer effects of the EU and the EMU. Table 5 shows that contrary to the conventional hypothesis the EMU effects is consistently negative in IND as well as ALL country regressions. The magnitudes vary, however, indicating that monetary regime effects and central bank behavior affect explain parts of the observed intra EMU effects.

6. Concluding Remarks

The lessons for Asia from the EU experience are not easily drawn. Our findings indicate that the EU has contributed to increased exports as well as imports and intra EU trade. The EMU on the other hand seems to have contributed to exports in general, served as a barrier to imports in general and reduced intra EMU trade. With the exception of the intra EMU result the results are ambiguous when the analysis covers emerging markets as well as industrialized countries. Another result is that a part of the effects usually interpreted as a currency union effects can be explained by changes in monetary regimes and central bank behavior.

INCOMPLETE

Appendix:

Table A1: List of Countries

Industrialized Countries (IND)			Emerging Markets (EMG)			
EMU	EU/NonEMU	Other IND	East/Se Asia	CEEs	Other EMG	
Austria	Denmark	Canada	China	Czech Republic	Bulgaria	Israel
Belgium	Iceland	Japan	Hong Kong	Estonia	Croatia	Jordan
Finland	Norway	Australia	Indonesia	Hungary	Romania	Russia
France	Sweden	New Zealand	Korea	Lithuania	India	Argentina
Germany	United Kingdom	Switzerland	Malaysia	Malta	Pakistan	Brazil
Greece		United States	Philippines	Poland	Sri Lanka	Chile
Ireland			Singapore	Slovenia	Morocco	Colombia
Italy			Thailand	Slovak Republic	Nigeria	Ecuador
Luxembourg				Ukraine	South Africa	Mexico
Netherlands					Turkey	Paraguay
Portugal					Egypt	Peru
Spain						Venezuela

Table A2: Regional Trade Agreements (RTA)

ASEAN-Association of South East Asia (1992)	Indonesia, Malaysia, the Philippines, Singapore, Thailand
CAN-Andean Community (1998)	Colombia, Ecuador, Peru, Venezuela
EU-European Union (1992)	Austria (1995), Belgium, Denmark, Finland (1995), France, Germany, Greece (1981), Ireland, Italy, Luxemburg, Netherlands, Portugal (1986), Spain (1986), Sweden (1995), UK.
EU-European Union (2004)	Czech Republic, Estonia, Hungary, Lithuania, Malta, Poland, Slovak Republic, Slovenia, Ukraine
MERCOSUR-Southern Common Market (1991)	Argentina, Brazil, Paraguay, Uruguay
NAFTA-North American Free Trade Agreement (1994)	Canada, Mexico, U.S.
CER-Closer Economic Relation (1983)	Australia and New Zealand
SAPTA-South Asian Preferential Trade Agreement (1995)	India, Sri Lanka, Pakistan

Table A3: Data Descriptions and Sources

Variable	Descriptions	Sources
Log of real exports	The logarithm of the real value (in US dollar) of bilateral exports (the nominal values of bilateral exports are adjusted to the real values using the U.S. Consumer Price Index (2000=100)).	Bilateral exports are from The IMF Direction of Trade Statistics; U.S. CPI is from the World Development Indicator (WDI), 2007
Log of Real GDP	The log of the real GDP	WDI, 2007
Log of Population	The log of the total population	WDI, 2007
RTA dummy	A dummy of one if a pair of countries belong to the same regional trade arrangement (see Appendix Table A3).	Rose (2004) and updated using the information from the WTO website (http://www.wto.org/english/tratop_e/region_e/region_e.htm)
Adjusted RER	The real exchange rate (RER) is the nominal exchange rate relative to U.S. dollars (1995=100) adjusted by the relative consumer price index (1995=100). For the cross-section comparison purpose, each RER observation is divided by the mean value of RER for each country during 1990-2005. The Adjusted RER for EMU countries is separately calculated using 2000 as the base year.	Authors' calculation; the nominal exchange rate is from WDI, 2007.
Exchange Rate Anchor	A dummy of one in the years that a country uses the exchange rate (ER) anchor as a monetary policy framework. Under ER anchor, the ER serves as the nominal anchor or intermediate target of monetary policy and monetary authority stands ready to buy or sell foreign exchange to maintain the exchange rate at its pre-announced level or range. Exchange rate regimes with no separate legal tender, currency board arrangements, fixed pegs with and without bands, and crawling pegs with and without bands are covered under the ER anchor regime.	IMF's Classification of Exchange Rate Arrangements and Monetary Policy Frameworks
Money Anchor	A dummy of one in the years that a country uses the monetary aggregate anchor as a monetary policy framework. Under this framework, the targeted monetary aggregate serves as the nominal anchor or intermediate target of monetary policy. The monetary authority uses its instruments to achieve a target growth rate for a	IMF's Classification of Exchange Rate Arrangements and Monetary Policy Frameworks

	monetary aggregate, such as reserve money, M1, or M2.	
IT	A dummy of one in the years that a country uses the inflation targeting (IT) framework. Under IT, the monetary authority announces medium-term numerical targets for inflation, which is the intermediate target of monetary policy, and commits to use its instruments to achieve the announced target.	IMF's Classification of Exchange Rate Arrangements and Monetary Policy Frameworks
IMF	A dummy of one in the years that a country uses the monetary and exchange rate policies that are guided and supported by the International Monetary Fund (IMF).	IMF's Classification of Exchange Rate Arrangements and Monetary Policy Frameworks
Other (MP regime)	A dummy of one in the years that a country uses other monetary policy framework. According to IMF, this includes a country that has no explicitly stated nominal anchor but rather monitors various indicators in conducting monetary policy, or there is no relevant information available for the country.	IMF's Classification of Exchange Rate Arrangements and Monetary Policy Frameworks
CB Independence	The extent of central bank independence. The value ranges from 0-100 and is the weighted total of the five survey questions: 1) Statutory objectives focus on price stability? 2) Target independence? 3) Instrument independence? 4) Central bank financing government deficit? 5) Term of office of Governor.	Mahadeva and Sterne, 2000
CB Accountability	The extent of central bank accountability. The value ranges from 0-100 and is the weighted total of the four survey questions: 1) Numerical target published? 2) Government role in setting any target? 3) Procedures when target missed/changed? 4) Procedures for government to override?	Mahadeva and Sterne, 2000
Transparency	The extent of central bank independence. The value ranges from 0-100 and is the weighted total of the five survey questions	Mahadeva and Sterne, 2000
Interest Rate Volatility	The annual data of the coefficient variation of the monthly short-term market interest rates.	Short-term market rate is from International Financial Statistics (IFS)
Exchange Rate Volatility	The annual data of the coefficient variation of the monthly nominal exchange rate (the national currency relative to US\$).	IFS

Table A4: The EMU, EU, and Monetary Regime Effects (Cross-Section Regressions)

	ALL99	ALL00	ALL01	ALL02	ALL03	ALL04	ALL05
Log of Real GDP1	0.902** (0.000)	0.952** (0.000)	0.960** (0.000)	0.943** (0.000)	1.056** (0.000)	1.058** (0.000)	0.991** (0.000)
Log of Real GDP2	0.815** (0.000)	0.842** (0.000)	0.817** (0.000)	0.864** (0.000)	0.936** (0.000)	0.998** (0.000)	0.938** (0.000)
Log of Population1	-0.135** (0.000)	-0.154** (0.000)	-0.175** (0.000)	-0.170** (0.000)	-0.193** (0.000)	-0.105** (0.001)	-0.055* (0.085)
Log of Population2	-0.071** (0.040)	-0.094** (0.005)	-0.107** (0.003)	-0.118** (0.001)	-0.145** (0.000)	-0.110** (0.001)	-0.083** (0.008)
RTA Dummy	1.933** (0.000)	1.668** (0.000)	1.601** (0.000)	1.874** (0.000)	2.189** (0.000)	1.348** (0.000)	1.253** (0.000)
Adjusted RER1	1.560** (0.000)	1.288** (0.000)	0.851** (0.000)	-0.573** (0.001)	-0.847** (0.003)	-0.342 (0.241)	-0.428 (0.113)
Adjusted RER2	-0.274 (0.375)	-0.178 (0.516)	-0.359 (0.131)	-1.588** (0.000)	-0.714** (0.011)	-0.365 (0.174)	-0.494** (0.042)
Money1	-0.379** (0.001)	0.218 (0.123)	-0.643** (0.001)	-0.097 (0.420)	-0.570** (0.000)	-0.381** (0.016)	-0.824** (0.000)
IT1	-0.325** (0.008)	-0.620** (0.000)	-0.890** (0.000)	-0.119 (0.262)	-0.821** (0.000)	-0.587** (0.000)	-0.609** (0.000)
IMF1	-0.397** (0.003)	-0.257** (0.029)	-0.160 (0.177)	0.663** (0.000)	-0.442 (0.142)	-0.470* (0.088)	-0.606** (0.011)
Other1	-0.120 (0.343)	-0.552** (0.000)	-0.382** (0.011)	-0.036 (0.807)	-0.473** (0.000)	-0.320** (0.016)	-0.289** (0.018)
Money2	-0.638** (0.000)	-0.300* (0.059)	-0.538** (0.001)	-0.379** (0.001)	-0.582** (0.000)	-0.605** (0.000)	-0.632** (0.000)
IT2	-0.405** (0.001)	-0.529** (0.000)	-0.681** (0.000)	-0.160 (0.137)	-0.766** (0.000)	-0.630** (0.000)	-0.425** (0.000)
IMF2	-0.589** (0.000)	-0.423** (0.000)	-0.327** (0.003)	0.366** (0.025)	-1.712** (0.000)	-1.616** (0.000)	-1.397** (0.000)
Other2	-0.301** (0.016)	-0.325** (0.013)	-0.242 (0.124)	-0.017 (0.909)	-0.293** (0.019)	-0.319** (0.013)	-0.079 (0.505)
EMU1 to EMU2	0.340 (0.212)	0.659** (0.046)	0.752** (0.021)	-0.266 (0.427)	-0.250 (0.342)	0.343 (0.104)	0.405* (0.053)
EMU1 to EU/nonEMU2	-0.079 (0.784)	0.174 (0.621)	0.735** (0.042)	-0.014 (0.971)	-0.184 (0.546)	0.325* (0.099)	0.395** (0.044)
EMU1 to NonEU2	0.881** (0.000)	0.842** (0.000)	0.866** (0.000)	0.513** (0.000)	0.611** (0.000)	0.186* (0.092)	0.184* (0.082)
EU/nonEMU1 to EMU2	-0.391 (0.128)	-0.101 (0.731)	0.656** (0.013)	0.055 (0.838)	0.149 (0.544)	0.300* (0.096)	0.341* (0.060)
EU/nonEMU1 to EU/nonEMU2	-0.495 (0.271)	-0.203 (0.674)	1.443** (0.006)	1.096** (0.037)	1.101** (0.040)	0.937** (0.000)	0.919** (0.000)
EU/nonEMU1 to NonEU2	-0.727** (0.000)	-0.716** (0.000)	-0.286** (0.011)	-0.416** (0.000)	-0.318** (0.007)	-0.428** (0.000)	-0.451** (0.000)
NonEU1 to EMU2	0.433** (0.001)	0.584** (0.000)	0.637** (0.000)	0.285** (0.019)	0.453** (0.000)	-0.040 (0.750)	0.068 (0.563)
NonEU1 to EU/nonEMU2	-0.067 (0.673)	0.130 (0.412)	0.581** (0.001)	0.492** (0.007)	0.457** (0.011)	-0.480** (0.000)	-0.383** (0.001)
CB Independence2	-0.002 (0.517)	0.003 (0.299)	0.007** (0.023)	0.004 (0.140)	-0.005 (0.106)	-0.007** (0.031)	-0.005 (0.111)
CB Accountability2	-0.007** (0.000)	-0.007** (0.000)	-0.005** (0.000)	-0.006** (0.000)	-0.009** (0.000)	-0.009** (0.000)	-0.009** (0.000)
Transparency2	0.015** (0.000)	0.017** (0.000)	0.017** (0.000)	0.012** (0.000)	0.012** (0.000)	0.010** (0.000)	0.010** (0.000)
CB Independence2	-0.006** (0.036)	-0.005* (0.095)	-0.004 (0.184)	-0.004 (0.178)	-0.007** (0.038)	-0.013** (0.000)	-0.014** (0.000)
CB Accountability2	-0.009** (0.000)	-0.008** (0.000)	-0.006** (0.000)	-0.007** (0.000)	-0.006** (0.000)	-0.007** (0.000)	-0.007** (0.000)
Transparency2	0.007** (0.000)	0.007** (0.000)	0.007** (0.001)	0.002 (0.268)	0.003 (0.172)	0.002 (0.204)	0.004* (0.064)
Constant	-36.306** (0.000)	-38.149** (0.000)	-36.998** (0.000)	-34.339** (0.000)	-37.031** (0.000)	-40.860** (0.000)	-38.884** (0.000)
N	2539	2534	2538	2538	2538	2538	2538
F	288.407	262.231	237.449	250.451	259.422	284.345	279.238
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000
r2	0.688	0.676	0.664	0.668	0.683	0.715	0.717

* p<0.1, ** p<0.05

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Figure 1 the distribution of export of each group with other groups

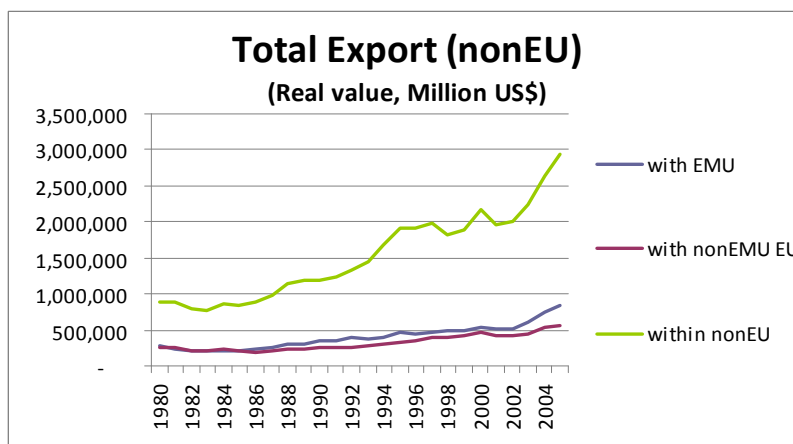
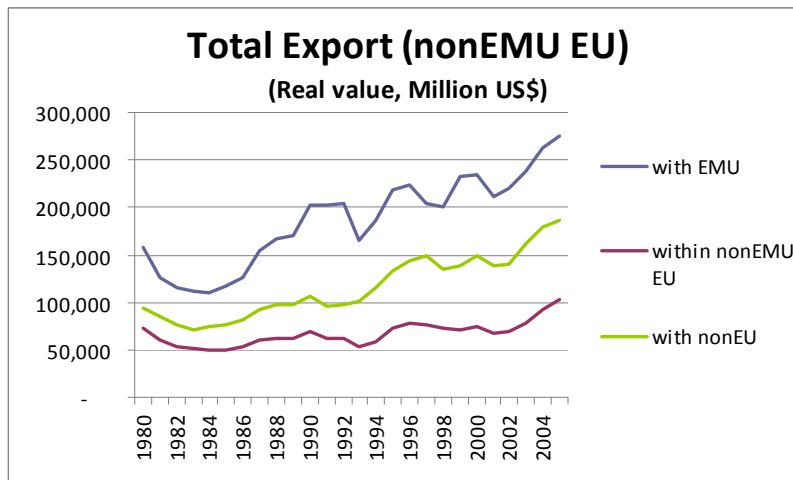
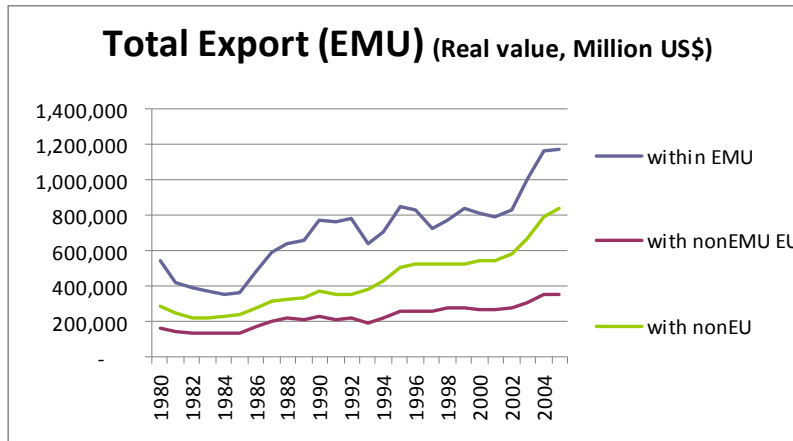


Table 1 classification of monetary regimes during 1999 – 2005

	IMF-supported	Inflation targeting	Monetary aggregate anchor	ER anchor	Other + euro area	Sum of number of countries in all regimes	Number of countries in sample
EMU	0	0	0	1	12	13	12
EU/nonEMU	0	4	0	2	1	7	5
nonEU	19	19	15	20	12	85	46
total	19	23	15	23	25	105	63

Table 2 The EMU and EU Effects (country and time fixed effects)

Country Coverage	(1) IND	(2) ALL	(3) ALL
Period Coverage	1990-2005	1990-2005	1999-2005
Log of Real GDP1	0.882** (0.000)	1.177** (0.000)	0.966** (0.000)
Log of Real GDP2	1.092** (0.000)	1.148** (0.000)	1.586** (0.000)
Log of Population1	-0.256 (0.377)	-1.200** (0.000)	-1.631** (0.000)
Log of Population2	0.786** (0.008)	-0.801** (0.000)	-1.292** (0.000)
RTA	0.098** (0.000)	0.105** (0.000)	0.053 (0.229)
Adjusted RER1	-0.119** (0.021)	-0.011 (0.465)	0.121** (0.000)
Adjusted RER2	-0.383** (0.000)	-0.397** (0.000)	-0.510** (0.000)
EMU1 to EMU2	0.106** (0.002)	-0.274** (0.000)	-0.407** (0.000)
EMU1 to EU/nonEMU2	0.113** (0.004)	-0.196** (0.000)	-0.273** (0.000)
EMU1 to NonEU2	0.126** (0.000)	-0.094** (0.000)	-0.150** (0.005)
EU/nonEMU1 to EMU2	0.088** (0.013)	-0.146** (0.000)	-0.205** (0.004)
EU/nonEMU1 to EU/nonEMU2	0.070** (0.011)	-0.017 (0.537)	-0.060 (0.198)
EU/nonEMU1 to NonEU2	0.021 (0.382)	-0.015 (0.320)	0.046** (0.031)
NonEU1 to EMU2	-0.017 (0.612)	-0.102** (0.000)	-0.220** (0.000)
NonEU1 to EU/nonEMU2	0.003 (0.923)	-0.043** (0.010)	-0.030 (0.159)
Constant	-53.346** (0.000)	-20.942** (0.000)	-11.211** (0.022)
No. of Observations	7276	55417	27230
No. of Country Pairs	506	3893	3893
F-Statistics	117.553	563.348	390.558
Prob > F-Statistics	0.000	0.000	0.000
Within R-Square	0.344	0.247	0.260
Country Pair Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes

The dependent variable is the log of real exports. The numbers in parentheses are p-values of the estimate with robust standard errors. *, ** indicate the significance levels of 10% and 5%, respectively. 1 stands for an exporting country and 2 for an

importing country. For the sample, IND = industrialized countries and ALL = industrialized countries plus emerging markets.

Table 3 EMU and EU Effects over Time

Country Coverage Period Coverage Method	(1) IND 1990-2005 Panel	(2) IND 1990-2005 Cross-Section	(3) ALL 1990-2005 Panel	(4) ALL 1999-2005 Panel	(5) ALL 1999-2005 Cross-Section
Log of Real GDP1	0.897** (0.000)	2.234** (0.000)	1.186** (0.000)	0.826** (0.000)	1.027** (0.000)
Log of Real GDP2	1.048** (0.000)	1.180** (0.000)	1.147** (0.000)	1.560** (0.000)	0.845** (0.000)
Log of Population1	-0.316 (0.295)	-1.365** (0.000)	-1.317** (0.000)	-1.921** (0.000)	-0.177** (0.000)
Log of Population2	1.149** (0.000)	-0.349* (0.086)	-0.817** (0.000)	-1.313** (0.000)	-0.078** (0.047)
RTA Dummy	0.096** (0.000)	1.234** (0.000)	0.100** (0.000)	0.036 (0.412)	1.876** (0.000)
Adjusted RER1	-0.109** (0.038)	-0.245 (0.140)	-0.008 (0.569)	0.113** (0.000)	0.270** (0.000)
Adjusted RER2	-0.382** (0.000)	-1.797** (0.045)	-0.394** (0.000)	-0.526** (0.000)	-0.806 (0.122)
EMU1 to EMU2_99	0.027 (0.566)	2.029** (0.000)	-0.205** (0.002)	-0.141 (0.237)	0.187 (0.322)
EMU1 to EMU2_00	0.046 (0.438)	1.392** (0.000)	-0.082 (0.289)	-0.074 (0.216)	-0.062 (0.768)
EMU1 to EMU2_01	0.118** (0.043)	1.269** (0.000)	-0.106 (0.156)	-0.083 (0.155)	-0.129 (0.537)
EMU1 to EMU2_02	0.040 (0.497)	0.568* (0.091)	-0.138* (0.064)	-0.117** (0.043)	-0.288 (0.191)
EMU1 to EMU2_03	0.161** (0.006)	-0.239 (0.532)	-0.010 (0.895)	0.010 (0.866)	-0.553** (0.010)
EMU1 to EMU2_04	0.189** (0.001)	0.193 (0.595)	-0.055 (0.466)	-0.039 (0.509)	0.283 (0.114)
EMU1 to EMU2_05	0.140** (0.017)	0.193 (0.595)	-0.137* (0.069)	-0.124** (0.038)	0.283 (0.114)
EMU1 to EU/nonEMU2_99	0.094* (0.092)	1.269** (0.000)	-0.106 (0.259)	0.033 (0.755)	-0.199 (0.338)
EMU1 to EU/nonEMU2_00	0.010 (0.892)	0.819** (0.016)	-0.117 (0.334)	-0.108 (0.248)	-0.473** (0.040)
EMU1 to EU/nonEMU2_01	0.057 (0.452)	0.868** (0.013)	-0.173 (0.177)	-0.137 (0.175)	-0.351 (0.163)
EMU1 to EU/nonEMU2_02	0.007 (0.927)	0.541 (0.124)	-0.187 (0.144)	-0.157 (0.120)	-0.402 (0.124)
EMU1 to EU/nonEMU2_03	0.098 (0.198)	0.133 (0.722)	-0.097 (0.449)	-0.070 (0.490)	-0.690** (0.007)
EMU1 to EU/nonEMU2_04	0.086 (0.262)	0.251 (0.493)	-0.052 (0.616)	-0.169* (0.058)	0.056 (0.752)
EMU1 to EU/nonEMU2_05	0.073 (0.341)	0.251 (0.493)	-0.103 (0.320)	-0.239** (0.008)	0.056 (0.752)
EMU1 to NonEU2_99	0.103** (0.015)	1.037** (0.000)	-0.025 (0.437)	0.011 (0.861)	0.656** (0.000)
EMU1 to NonEU2_00	0.020 (0.731)	0.666** (0.000)	-0.036 (0.347)	-0.042 (0.157)	0.385** (0.000)
EMU1 to NonEU2_01	0.088 (0.117)	0.637** (0.001)	-0.054 (0.154)	-0.053* (0.069)	0.313** (0.000)
EMU1 to NonEU2_02	0.023 (0.675)	0.314* (0.095)	-0.044 (0.244)	-0.041 (0.158)	0.338** (0.000)
EMU1 to NonEU2_03	0.075	-0.133	-0.006	-0.002	0.231**

	(0.179)	(0.556)	(0.880)	(0.940)	(0.002)
EMU1 to NonEU2_04	0.075	0.011	-0.077*	-0.059*	0.062
	(0.178)	(0.960)	(0.058)	(0.070)	(0.457)

Table 3 Cont.

	(1)	(2)	(3)	(4)	(5)
EMU1 to NonEU2_05	0.032	0.011	-0.117**	-0.118**	0.062
	(0.570)	(0.960)	(0.004)	(0.000)	(0.457)
EU/nonEMU1 to EMU2_99	0.036	0.839**	-0.152*	0.010	-0.400*
	(0.479)	(0.022)	(0.052)	(0.915)	(0.061)
EU/nonEMU1 to EMU2_00	0.105	0.492	-0.016	-0.006	-0.466**
	(0.112)	(0.113)	(0.874)	(0.941)	(0.041)
EU/nonEMU1 to EMU2_01	0.114*	0.494	-0.104	-0.119	-0.097
	(0.086)	(0.106)	(0.307)	(0.136)	(0.643)
EU/nonEMU1 to EMU2_02	0.081	0.192	-0.088	-0.105	-0.002
	(0.225)	(0.534)	(0.388)	(0.188)	(0.993)
EU/nonEMU1 to EMU2_03	0.076	-0.345	-0.090	-0.110	-0.269
	(0.253)	(0.295)	(0.378)	(0.170)	(0.198)
EU/nonEMU1 to EMU2_04	0.086	-0.073	0.003	-0.206**	0.187
	(0.196)	(0.819)	(0.974)	(0.005)	(0.233)
EU/nonEMU1 to EMU2_05	0.075	-0.073	0.016	-0.187**	0.187
	(0.262)	(0.819)	(0.858)	(0.011)	(0.233)
NonEU1 to EMU2_99	-0.054	0.249	-0.057*	-0.146**	0.355**
	(0.285)	(0.427)	(0.086)	(0.028)	(0.000)
NonEU1 to EMU2_00	0.064	-0.107	-0.027	-0.004	0.282**
	(0.331)	(0.638)	(0.482)	(0.893)	(0.002)
NonEU1 to EMU2_01	0.116*	-0.145	-0.076**	-0.050*	0.287**
	(0.075)	(0.524)	(0.047)	(0.099)	(0.001)
NonEU1 to EMU2_02	-0.028	-0.561**	-0.064*	-0.043	0.249**
	(0.660)	(0.021)	(0.096)	(0.153)	(0.003)
NonEU1 to EMU2_03	0.009	-1.058**	-0.085**	-0.066**	0.120
	(0.894)	(0.000)	(0.028)	(0.030)	(0.173)
NonEU1 to EMU2_04	0.127**	-0.735**	-0.156**	-0.097**	-0.209**
	(0.050)	(0.003)	(0.000)	(0.004)	(0.031)
NonEU1 to EMU2_05	0.135**	-0.735**	-0.038	0.038	-0.209**
	(0.038)	(0.003)	(0.355)	(0.262)	(0.031)
EU/nonEMU1 to EU/nonEMU2_99	0.083**	0.744**	0.009	0.142	-0.033
	(0.004)	(0.038)	(0.795)	(0.247)	(0.929)
EU/nonEMU1 to EU/nonEMU2_00	0.115	0.626*	-0.112	-0.000	-0.086
	(0.123)	(0.088)	(0.396)	(1.000)	(0.822)
EU/nonEMU1 to EU/nonEMU2_01	0.122	1.206**	-0.221	-0.107	0.912**
	(0.173)	(0.001)	(0.192)	(0.510)	(0.016)
EU/nonEMU1 to EU/nonEMU2_02	0.105	1.276**	-0.198	-0.088	1.127**
	(0.241)	(0.001)	(0.244)	(0.588)	(0.004)
EU/nonEMU1 to EU/nonEMU2_03	0.113	1.159**	-0.196	-0.091	0.909**
	(0.212)	(0.003)	(0.249)	(0.577)	(0.032)
EU/nonEMU1 to EU/nonEMU2_04	0.109	1.147**	-0.067	-0.171	0.836**
	(0.231)	(0.005)	(0.254)	(0.156)	(0.000)
EU/nonEMU1 to EU/nonEMU2_05	0.111	1.147**	-0.127**	-0.242**	0.836**
	(0.226)	(0.005)	(0.031)	(0.045)	(0.000)
EU/nonEMU1 to NonEU2_99	0.043	0.183	0.051**	0.208**	-0.349**
	(0.107)	(0.319)	(0.003)	(0.000)	(0.000)
EU/nonEMU1 to NonEU2_00	0.028	0.094	-0.102**	-0.039	-0.446**
	(0.554)	(0.628)	(0.002)	(0.244)	(0.000)
EU/nonEMU1 to NonEU2_01	-0.001	0.138	-0.167**	-0.095**	-0.321**
	(0.979)	(0.472)	(0.000)	(0.006)	(0.000)
EU/nonEMU1 to NonEU2_02	-0.088*	0.092	-0.193**	-0.122**	-0.186**
	(0.059)	(0.624)	(0.000)	(0.000)	(0.021)
EU/nonEMU1 to NonEU2_03	-0.070	0.018	-0.181**	-0.112**	-0.230**
	(0.135)	(0.923)	(0.000)	(0.001)	(0.005)

EU/nonEMU1 to NonEU2_04	-0.057 (0.228)	0.101 (0.602)	-0.181** (0.000)	-0.212** (0.000)	-0.208** (0.010)
EU/nonEMU1 to NonEU2_05	-0.079* (0.096)	0.101 (0.602)	-0.163** (0.000)	-0.203** (0.000)	-0.208** (0.010)

Table 3 Cont.

	(1)	(2)	(3)	(4)	(5)
NonEU1 to EU/nonEMU2_99	0.015 (0.619)	-0.212 (0.421)	-0.042** (0.037)	-0.022 (0.638)	0.110 (0.350)
NonEU1 to EU/nonEMU2_00	0.115 (0.104)	-0.295 (0.240)	0.056 (0.223)	0.073 (0.119)	0.116 (0.330)
NonEU1 to EU/nonEMU2_01	0.071 (0.356)	-0.223 (0.437)	-0.037 (0.473)	-0.004 (0.940)	0.217 (0.101)
NonEU1 to EU/nonEMU2_02	-0.070 (0.367)	-0.283 (0.284)	-0.035 (0.503)	-0.010 (0.847)	0.265** (0.041)
NonEU1 to EU/nonEMU2_03	-0.006 (0.940)	-0.330 (0.211)	-0.071 (0.172)	-0.050 (0.339)	0.130 (0.311)
NonEU1 to EU/nonEMU2_04	0.018 (0.816)	-0.380 (0.144)	-0.049 (0.173)	-0.076 (0.120)	-0.501** (0.000)
NonEU1 to EU/nonEMU2_05	0.043 (0.583)	-0.380 (0.144)	0.036 (0.325)	0.010 (0.846)	-0.501** (0.000)
Constant	-57.565** (0.000)	-54.679** (0.000)	-18.928** (0.000)	-1.807 (0.733)	-38.728** (0.000)
No. of Observations	7276	506/regression	55417	27230	3890/regression
F-Statistics	46.525	138.69	219.053	121.240	707.612
Prob > F-Statistics	0.000	0.000	0.000	0.000	0.000
Within R-Square	0.352	0.785	0.249	0.264	0.664
Country Pair Dummy	Yes	-	Yes	Yes	-
Year Dummy	Yes	-	Yes	Yes	-

Table 4 The EMU, EU and Monetary Regimes Effects (Panel Regressions)

Country Coverage	(1) ALL	(2) ALL	(3) ALL	(4) ALL	(5) IND	(6) ALL
Period Coverage	1999-2005	1999-2005	1999-2005	1999-2005	1990-2005	1990-2005
Log of Real GDP1	0.958** (0.000)	1.016** (0.000)	1.021** (0.000)	0.919** (0.000)	0.671** (0.000)	1.082** (0.000)
Log of Real GDP2	1.602** (0.000)	1.590** (0.000)	0.884** (0.000)	0.863** (0.000)	0.959** (0.000)	1.228** (0.000)
Log of Population1	-1.689** (0.000)	-1.924** (0.000)	-0.167** (0.000)	-0.108** (0.000)	0.195 (0.563)	-0.488** (0.000)
Log of Population2	-1.233** (0.000)	-1.610** (0.000)	-0.092** (0.001)	-0.086** (0.004)	0.968** (0.004)	-0.481** (0.000)
RTA	0.041 (0.358)	0.047 (0.299)	1.546** (0.000)	1.547** (0.000)	0.113** (0.000)	0.103** (0.000)
Adjusted RER1	0.106** (0.000)	0.130** (0.000)	-0.009 (0.948)	-0.054 (0.681)	-0.148** (0.008)	-0.032* (0.086)
Adjusted RER2	-0.509** (0.000)	-0.506** (0.000)	-0.696** (0.000)	-0.816** (0.000)	-0.407** (0.000)	-0.389** (0.000)
EMU1 to EMU2	-0.445** (0.000)	-0.515** (0.000)	0.205 (0.356)	0.460** (0.037)	0.113** (0.004)	-0.137** (0.002)
EMU1 to EU/nonEMU2	-0.324** (0.000)	-0.379** (0.000)	0.057 (0.788)	0.286 (0.165)	0.154** (0.000)	-0.128** (0.004)
EMU1 to NonEU2	-0.214** (0.000)	-0.229** (0.000)	0.439** (0.000)	0.647** (0.000)	0.144** (0.000)	-0.034 (0.121)
EU/nonEMU1 to EMU2	-0.175** (0.015)	-0.144* (0.066)	0.239 (0.207)	0.208 (0.271)	0.130** (0.001)	-0.024 (0.547)
EU/nonEMU1 to EU/nonEMU2	-0.046 (0.320)	-0.066 (0.173)	0.657** (0.001)	0.610** (0.002)	0.093** (0.004)	0.064** (0.034)
EU/nonEMU1 to NonEU2	0.050** (0.018)	0.065** (0.009)	-0.325** (0.000)	-0.464** (0.000)	0.041 (0.131)	0.067** (0.000)
NonEU1 to EMU2	-0.204** (0.000)	-0.169** (0.007)	0.314** (0.001)	0.355** (0.001)	0.012 (0.755)	-0.025 (0.282)
NonEU1 to EU/nonEMU2	-0.032 (0.137)	-0.033 (0.195)	-0.185* (0.060)	-0.160* (0.099)	0.023 (0.497)	0.022 (0.235)
Money1	0.030* (0.087)	0.045** (0.021)	-0.283** (0.001)	-0.338** (0.000)		
IT1	0.067** (0.000)	0.098** (0.000)	-0.283** (0.000)	-0.423** (0.000)		
IMF1	0.039** (0.016)	0.052** (0.005)	-0.239** (0.004)	-0.239** (0.004)		
Other1	0.132** (0.000)	0.161** (0.000)	0.020 (0.839)	-0.130 (0.194)		
Money2	-0.021 (0.225)	-0.016 (0.414)	-0.356** (0.000)	-0.471** (0.000)		
IT2	-0.021 (0.220)	-0.035* (0.077)	-0.334** (0.000)	-0.419** (0.000)		
IMF2	0.011 (0.488)	0.017 (0.348)	-0.390** (0.000)	-0.441** (0.000)		
Other2	0.014 (0.500)	-0.019 (0.395)	-0.007 (0.948)	-0.148 (0.127)		

Table 4 Cont.

	(1)	(2)	(3)	(4)	(5)	(6)
CB Independence1				-0.001 (0.806)		
CB Accountability1				-0.007** (0.000)		
Transparency1				0.014** (0.000)		
CB Independence2				-0.008** (0.001)		
CB Accountability2				-0.007** (0.000)		
Transparency2				0.006** (0.001)		
Interest Rate Volatility1					-0.072* (0.051)	0.029 (0.141)
Interest Rate Volatility2					-0.068* (0.063)	0.008 (0.702)
Nominal ER Volatility1					-0.505* (0.087)	0.172** (0.000)
Nominal ER Volatility2					0.063 (0.831)	-0.265** (0.000)
Constant	-11.461** (0.022)	-2.292 (0.717)	-38.776** (0.000)	-35.972** (0.000)	-55.146** (0.000)	-37.751** (0.000)
No. of Observations	27230	17763	17763	17763	6137	44308
No. of Country Pairs						
F-Statistics	285.293	208.062	312.452	283.205	89.442	348.119
Prob > F-Statistics	0.000	0.000	0.000	0.000	0.000	0.000
Within R-Square	0.262	0.284	0.662	0.676	0.345	0.221
Country Pair Dummy	Yes	No	Yes	No	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes

The dependent variable is the log of real exports. The numbers in parentheses are p-values of the estimate with robust standard errors. *, ** indicate the significance levels of 10% and 5%, respectively. 1 stands for an exporting country and 2 for an importing country. For the sample, IND = industrialized countries and ALL = industrialized countries plus emerging markets.

Table 5. EMU effects, EU effects, Exporter and Importer effects

IND1. Table 4, Column (5) 90=05 ALL 1. Table 4, Column (6), 90-05, with Exch and Int. rate volatility, (C and T fixed effects)

IND 2. Table 2, Column (1) 90-05 ALL 2. Table 2, Column (2), 90-05, only, GDP, POP., RER, RTA (C and T fixed effects)

ALL 3. Table 4, Column (4), 99-05, with Regime and Central bank indicators (T fixed effects)

	IND		ALL	
	Coefficient	Effect on Exports [#]	Coefficient	Effect on Exports [#]
<u>Define I.</u> EU exporter effect = coefficient for EU–NonEMU to NonEU2	1. .04 2. .021	9.6%	1. .067 2. -.015 3. -.46	16.7%
<u>Define II.</u> EMU exporter effect = EMU1 to NonEU2 minus EU exporter effect (I)	1. .154-.04=.114 2. .126-.021=.105		1. -.195 2. -.079 3. 1.11	
<u>Define III.</u> EU importer effect = NonEU1 to EU/nonEMU2	1. .023 2. .003	5.4%	1. .022 2. -.043 3. -.16	5.2%
<u>Define IV.</u> EMU importer effect = NonEU1 to EMU2 minus EU importer effect (III)	1. .012-.023 = -.011 2. -.017-.003=-.014		1. -.047 (not sign.) 2. -.059 3. .51	
<u>Define V.</u> EU internal market effect = EU/nonEMU1 to EU/nonEMU2 minus EU exporter effect (I) minus EU importer effect (III)	1. .093-.04-.01 = .04 2. .07-.021-.003=.05	9.6%	1. -.025 2. .041 3. 1.22	12.2%
<u>Define VI.</u> Common currency effect = EMU1 to EMU2 minus EMU exporter effect (II) minus EU exporter effect (I) minus EMU importer effect (IV) minus EU importer effect (III) minus Internal market effect (V)	1. .113-.114-.04-0 - 0-.04 = -.08 2. .106-.105-.021-.014-.003-.05= -.04	-	1. -.09 2. -.037 3. -1.75	

Note: 1 stands for an exporting country and 2 for an importing country. #Effect on Exports = $(10^{\text{coefficient}} - 1) \times 100$; this effect is compared to the export effect of NonEU1