The Contribution of Intra-Regional and Extra-Regional Trade to Growth: Evidence from the European Union

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Abstract: This paper discusses the different impacts on economic growth of intraregional and extra-regional trade in 13 European Union countries on the basis of cross-country time-series regressions. In addition to the basic influences of investment and population growth, the results confirm the importance of trade openness for growth. More importantly, they show that intraregional and extra-regional trade have had different impacts on growth in the 13 EU countries, with extra-regional trade having had a higher marginal effect on output growth per capita.

Keywords: Regional Integration; Trade Patterns; Economic Growth of Open Economies.
JEL classification: F13; F43; C33

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Abstract: This paper discusses the different impacts on economic growth of intraregional and extra-regional trade in 13 European Union countries on the basis of cross-country time-series regressions. In addition to the basic influences of investment and population growth, the results confirm the importance of trade openness for growth. More importantly, they show that intraregional and extra-regional trade have had different impacts on growth in the 13 EU countries, with extra-regional trade having had a higher marginal effect on output growth per capita.

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I. INTRODUCTION

Multilateral trade negotiations between countries in the World Trade Organization that began as part of the Doha round in 2001, reached a stalemate in July 2006. The collapse in global trade talks was accompanied with a renewed emphasis on regional trade integration: the European Union is looking to strengthen trading relations with countries in Asia; India is in the process of signing trade agreements with Japan and the European union; and Asian countries such as China, Japan and South Korea are discussing a regional free trade area with Southeast Asia (New York Times, July 26, 2006). This new wave of regionalism comes at a time when the concern over the proliferation of regional trade agreements (RTAs) is already high. While increased openness (albeit regional) has positive effects on growth in per capita income (Grossman and Helpman, 1991; Sala-i-Martin and Barro, 1997), the preferential nature of RTAs may actually impede the global process of trade liberalization Bhagwati (1992), or even reduce global welfare through inefficient trade flows that divert, rather than create, trade (Frankel *et al.*, 1995; Venables, 2003).

In general, the economic objectives both global trade liberalization and RTAs are to reduce barriers to trade between countries and spur economic growth. A natural question that therefore arises with respect to the proliferation of RTAs is whether trade among member countries (intraregional trade) contributes more to output growth than trade with nonmember countries (extra-regional trade). In previous literature the evidence on the effects of integration on growth are mixed. For example, studies of the European Union show that regional integration and its effects on trade and growth have been positive in some analyses (Italianer, 1994; Henrekson *et al*., 1997), while in others, EU membership appears insignificant in explaining GDP growth rates (Landau, 1995; Vamvakidis, 1999; Vanhoudt, 1999).

In empirical studies of the effects of regional integration on growth, membership in an RTA is usually quantified using dummy variables (Deardorff and Stern, 2002). This is a possible limitation since such variables do not capture dynamic effects and by construction imply that trade has the same effect across members regardless of trade partners involved. To the best of our knowledge, no studies have been done that explicitly compare the differential impacts of intra-regional and extra-regional trade on the growth rates of GDP in RTA member countries.

The objective of this paper, therefore, is to analyze the composition of trade within an RTA and investigate whether intraregional trade spurs higher output growth compared to extra-regional trade. We use data from the European Union comprising the first 15 member states (EU15).[1] As members of one of the oldest and most established RTAs, these countries emerge as a natural choice for the investigation of how trade patterns affect economic growth for two reasons. First, the longevity of the trade agreement between EU member countries allows us to use a relatively long span in our sample (1980 – 2003). Second, trade and economic data are readily available and consistently reported for member states in terms of both measurement and frequency.

We begin our analysis with a series of Granger causality tests which help us establish a minimum condition for causality in the trade-growth relationship for EU countries. We find that trade variables Granger-cause growth in all EU countries except Finland and the United Kingdom. Next, we estimate the marginal effects of intraregional and extra-regional trade on economic growth in the EU using a standard growth model with trade intensities as our focus variables. Our empirical results suggest that intraregional trade has had a lesser impact on output

[1] The empirical estimation includes 13 countries in the sample: Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and United Kingdom. Belgium and Luxembourg are excluded because comparable data on trade is available only for the period 2000 – 2003. This period is very short relative to the 1980 – 2003 study period.

growth than extra-regional trade by almost 30 percent, holding all other factors constant. These results are robust to the exclusion of Finland and the United Kingdom as well as Ireland which is an outlier in terms of both trade and growth. Previous literature suggests several explanations for the significantly lower contribution of intraregional trade to output growth per capita. First, the gains from participating in an RTA may be limited by the size of the market (Alcalá and Ciccone, 2003; Johansson, 2001). Second, if trade contributes to economic growth through the transmission of knowledge capital, then extra-regional trade is more likely to contribute to growth due to the greater diversity of trading partners (Grossman and Helpman, 1991).

The remainder of the paper is organized as follows. Section II provides on overview of the proliferation of RTAs and reviews theoretical considerations related to trade and economic growth. Section III describes the data. Section IV presents the research methodology. Results of the empirical estimation are discussed in section V. In section VI we provide concluding remarks.

II. BACKGROUND

A. Regional Trade Agreements: Overview

The growth of regional trade agreements emerges as one of the major international relations developments of recent years. In the period 1948-1994, the General Agreement on Trade and Tariffs (GATT) received 124 notifications of RTAs (relating to trade in goods). During the 1990s, RTAs played an increasingly important role in the global trading system. They have often provided opportunities for more comprehensive dismantling of trade barriers and greater harmonization of rules governing trade than can be accomplished under multilateral negotiations. This is particularly true of the EU and the North American Free Trade Agreement

(NAFTA), both of which developed important precedents for multilateral negotiations and other regional arrangements (World Bank, 2004).

The surge in RTAs has continued unabated since the early 1990s. As Figure 1 shows, there are 211 RTAs currently in force (as of September 2006). Of these, 184 agreements have been notified since the creation of the World Trade Organization (WTO) in 1995 and the vast majority of WTO members are party to one or more RTAs (Crawford and Fiorentino, 2005). Consistent with this surge in RTAs, global trade flows remain less dense than regional trading ties, even for countries operating without substantial trade barriers (Chortareas and Pelagidis, 2004). For the EU in particular, intraregional goods trade volumes have consistently exceeded extra-regional trade over the past decade (see Figure 2) which in part reflects the extent to which trade barriers have been reduced.

While regional trade liberalization is a major objective of RTAs, their structure can vary significantly. At their simplest, RTAs merely remove tariffs on intraregional trade in goods, but many go beyond that to cover nontariff barriers and to extend liberalization to trade and investment. RTAs with more advanced structures have the objective of economic union, and they involve the construction of shared executive, judicial, and legislative institutions. Formally, there are four basic types of trade arrangements (Radelet, 1997). Free (or preferential) trade areas, such as NAFTA, allow member countries to reduce or eliminate trade barriers between each other, while maintaining barriers for non-member countries. Customs unions, such as the Southern African Customs Union (SACU) [2], allow member countries to reduce or eliminate barriers to trade between each other and adopt a common external tariff towards non-member countries. Common markets, such as MERCOSUR[3], allow members to expand the basic customs

[2] Members of SACU include South Africa, Botswana, Lesotho, Namibia, and Swaziland.
[3] Members of MERCOSUR include Argentina, Bolivia, Brazil, Chile, Paraguay, and Uruguay.

union by reducing the barriers to the movement of factors of production (labor and capital). Finally, economic and/or monetary unions such as the EU, allow member countries to harmonize national economic and monetary policies and exchange rate regimes.

B. Trade and Growth

The trade-theoretic literature discusses several channels through which trade can affect economic growth. First, trade is a vehicle through which technological innovations and knowledge are transmitted between trading partners (Grossman and Helpman, 1991, and Sala-i-Martin and Barro, 1997). Second, higher trade openness also increases competition in the local market which in turn increases productive efficiency and economic growth (Vickers and Yarrow, 1991; Wacziarg, 2001). Finally, countries that can access larger markets through trade can also benefit economically. For example, Alcalá and Ciccone (2003) trade mattered more for growth where domestic markets were smaller suggesting that countries with small domestic markets benefit more from trade openness. Further, by increasing the size of the market, trade openness allows economies to better capture the potential benefits of increasing returns to scale (Ades and Glaeser, 1999).

Trade liberalization may also contribute to growth by create incentives for governments to adopt less distortionary domestic policies and more disciplined management of the macro economy. For instance, Bassanini *et al.* (2001) discuss links between policy settings, institutions and economic growth in OECD countries on the basis of cross-country time-series regressions. Their results confirm that in addition to capital accumulation, the macroeconomic environment, R&D activity, and well developed financial markets, trade openness significantly contributes to growth. More importantly they find that an increase in trade exposure of 10 percentage points, (such as the change observed over the past two decades in the OECD countries), could lead to an

increase in steady-state output per capita of 4 per cent. Further evidence on the contribution of trade to economic growth comes from Wacziarg (2001) who investigates the link between trade policy and economic growth in the time period 1970 – 1989. The results suggest that trade openness affects growth mainly by raising the ratio of domestic investment to GDP. In addition, the rate of physical capital accumulation explains between 46% and 63% of the impact of trade policy on economic growth. FDI, as a proxy for technology transmission, and the quality of macroeconomic policies each account for roughly 20% of the overall effect of trade policy on growth.

The positive effect of trade openness on growth has not, however, found consistent support in the literature (Rodriguez and Rodrik, 2001). Although some of studies point to gains from trade, trade liberalization may affect growth negatively for countries in transition from controlled to market economies, such as is the case with most countries in Eastern Europe, Asia and sub-Saharan Africa. Parikh and Stirbu (2004) examined the impact of trade liberalization on economic growth, investment share of GDP, openness, trade balance and current accounts (as percentages of GDP) in 42 developing countries of Asia, Africa and Latin America. They found that trade balance deteriorated with liberalization and hence countries would have difficulty in reaching potential or planned growth in the subsequent periods after liberalization. Deterioration in trade balance could impact economic growth in subsequent periods.

C. Regional Trade, Growth and European Integration

Prior to the 1990s, most studies focused on the effects of integration on trade, not income or economic growth. This focus is perhaps due to Viner (1950) who focused on trade creation and trade diversion and within static economic models employed until the 1990s, the effect of integration and trade on growth in per capita income was little understood. For example,

Srinivasan *et al*. (1993) surveyed the empirical literature on the effects of regionalism up to the early 1990s, and identified only three retrospective empirical studies, all of which dealt only with effects on trade. These studies showed that European integration[4] caused a large expansion of the countries' trade, especially with each other. Viner (1950) had shown that not all such trade within a trading bloc is welfare improving, so this does not itself assure that the EU had increased incomes.

A major drawback in early empirical studies was the lack of mechanism to capture dynamic effects. These were generally unspecified and were assumed to come from the increased trade liberalization that comes with the formation of an RTA. The first effort to measure dynamic effects was by Brada and Mendez (1988) who reported panel regression estimates for two equations with investment shares and growth rates as dependent variables and with dummy variables for participation in six regional integration arrangements including the EU. The authors found that EU membership increases investment shares but not growth rate. In fact, their growth rate equation included capital accumulation as an explanatory variable, which is consistent with EU membership stimulating the growth rate only via investment and not improvements in technology.

By the mid 1990s, both theory and empirical work on dynamic effects had progressed far beyond the 1950s. Grossman and Helpman (1991) developed the closed-economy, endogenous-growth models of Romer (1986) and Lucas (1988) to show how international trade could increase long-run rates of economic growth. Studies, such as Baldwin (1992), also quantified

[4] The EU began as the European Coal and Steel Community (ECSC) in 1951with six members: Belgium, West Germany, Luxembourg, France, Italy and the Netherlands. In 1957, following the signing of the Treaties of Rome, the six ECSC countries created the European Atomic Energy Community (EURATOM) and the European Economic Community (EEC). The member states set about removing trade barriers between them and forming a "common market". The three communities merged in 1967 to form a single Commission and a single Council of Ministers as well as the European Parliament. Finally, the Treaty of Maastricht in 1992 ushered in the EU by adding new forms of co-operation between the member state governments.

dynamic effects and showed prospective gains from European community's single market. The empirical literature also sought to establish a direct link between trade and growth. For example, Hoeller *et al*. (1998) estimated time series and pooled regressions both in growth rates and in levels using co-integration techniques to test directly for the link between trade and growth in Europe through the technology channel. Their results point to a direct positive impact of openness on innovation and suggest that it is openness in general, rather than regional trade integration that has favored growth in Europe. Similarly evidence is provided by Coe and Moghadam (1993) who show that trade and capital (broadly defined) account for almost all the growth in the French economy in the last two decades while Antonelli *et al.*, (2003) document that economic growth in Italy has been critically influenced by external technology funneled by imports of investment goods.

The question of whether countries gain or lose from their participation in an RTA has produced mixed evidence. For instance, Venables (2003) reviews the cost and benefits of RTA membership. The author finds that the effect of integration on economic growth greatly depends on the extent of comparative advantage of member countries relative to each other and the rest of the world. In this context, the author also finds little evidence that regionalism has retarded multilateral trade liberalization or that continuing expansion of regional agreements will obviate the need for multilateral liberalization efforts. In a related vein of research, Kim and Shin (2002), conclude that globalization and regionalization are not contradictory processes and that trade regionalization is trade-creating, rather than trade diverting. Specifically, the authors find that although trade intensities among countries within the same geographic region are greater than those between countries in different geographic regions, these intensities increase concurrently across all time periods between 1959 and 1996.

In contrast, Chortareas and Pelagidis (2004) show that, contrary to conventional wisdom, international trade flows remain less dense than regional trading ties, even for countries operating without substantial trade barriers. In particular, trade regionalism grew much faster among EU member countries than did EU inter-regional transactions. In fact some evidence suggests there is a limited potential for increased trade openness in countries that have joined together to form limited-barrier environments for their production outputs and their consumer demands. For instance, Kotcherlakota and Sack-Rittenhouse (2000), test the hypothesis that regional trading blocs initially increase the propensity for openness of trade for their member countries. The find that as a country grows in development, openness will level off, or even decline when protectionism issues are involved. They conclude that of the countries studied, it is generally true that regional blocs have initial success achieving increased openness, but over time, this effect will level off or even decline.

III. DATA

In this section we descript the data used in the empirical analysis below. Table 1 summarizes the variables used in this analysis, the data sources, and overall descriptive statistics. Our focus variables, intraregional and extra-regional merchandize trade, were constructed using data from the *United Nations Comtrade* database which was available for all countries over the period 1980-2003.[5] The import, export, and total trade values were scaled by GDP in each year to obtain intraregional and extra-regional trade shares relative to the size of the economy for each country. Data on GDP per capita expressed in 2000 purchasing power parities were obtained

[5] Trade in services is not considered here as the removal of trade barriers implemented within the EU trade agreement applies only to goods. Initiatives to remove barriers to trade in services are currently underway: in April 2006 the European Commission adopted a proposal for the creation of an EU internal market in services (http://ec.europa.eu/internal_market/services/services-dir/index_en.htm). However, this process is not complete and trade between European countries continues to be predominantly in merchandize, with only 20% of all trade coming from the service sector as member states tend to 'self supply' in terms of services (European Commission, 2002).

from the *OECD Social Indicators* database. Data on investment as a share of GDP were obtained from the *Penn World Tables 6.1* for all countries. All remaining variables were obtained from the *IMF International Financial Statistics* database. Government consumption expenditures were also scaled by GDP to obtain the relative size of government with respect to the economy for each country. The difference in logs was used to approximate growth rates for GDP per capita, population and the GDP deflator (inflation).

Table 2 presents a detailed description of each variable as well as the data sources and overall summary statistics. Output growth per capita averaged 2 percent for sample countries over the period 1980 to 2003. The average population growth rate was 0.34 percent, while the share of investment in GDP averaged 22 percent across all countries over the period. The share of investment showed the least variability among all variables, possibly as a result of a strong commitment to capital accumulation in the countries sampled. Extra-regional and intraregional trade relative to GDP averaged relatively high at 28% and 29% respectively. Intraregional trade however, exhibited slightly higher variability compared to extra-regional trade, perhaps an indication that such trade was more vulnerable to shocks in the regional economies. Government consumption spending as a share of GDP averaged approximately as high as investment at 21.7% and 22%, respectively, while inflation was relatively low at 5.5 percent, on average.

Table 3 presents descriptive statistics for each country which highlight the variation in trade patterns between countries. Overall, countries with large trade shares exhibited higher mean growth rates. Specifically, Ireland stands out as a leader in both growth and intraregional trade with mean GDP per capita growth of 4.4% and mean intraregional trade intensity of 70.2% of GDP over the sample period. This motivates the need for a sensitivity analysis that excludes Ireland in the empirical estimation below. Finally, the composition of commodities in each of

these trade patterns is presented in Figure 3. An examination reveals no major differences in the make-up of intraregional and extra-regional trade but also highlights some differences. Specifically, a higher portion of agricultural products, chemicals, and manufactured goods are exchanged between EU member countries that traded with the rest of the world. Also machinery and transportation equipment stands out as the largest product category in both intra- and extra-regional trade.

IV. EMPIRICAL FRAMEWORK

Our empirical analysis begins with an effort to statistically determine the direction of causality between trade and growth in our sample. To this end we estimate a series of Granger-causality tests[6] for EU countries. In general, if Granger causality is found to run only in one direction, say from trade to growth, then the case for linear prediction can be made. In addition, lagging trade variables when estimating their effect on output, ensures that observations on trade precede growth effects. Thus, if a significant relationship exists, then the case for linear prediction is strengthened. Furthermore, the endogeneity of trade and growth problem can be avoided in RTAs, in that, the amount of trade by member countries depends on geographic factors such as proximity and size (Frankel and Romer, 1999) and is purposefully influenced by preferential trade agreements. In this context, intraregional and extra-regional trade reflects policy choices and can thus be considered exogenous to the growth process. Therefore, in a growth equation, trade variables can be used as explanatory variables.

Table 3 shows the results of the tests for Granger causality between trade and per capita output growth. Extra-regional trade granger causes growth in 10 of the 13 countries, while intra-regional trade Granger causes growth in 7 countries. Jointly the trade variables Granger cause growth in 11 of the 13 countries or in 85 percent of the countries. The two countries for which

[6] Generally, a variable x_t is Granger-causal for y_t if x_t helps predict y_t at some stage in the future.

Granger causality did not hold are Finland and the United Kingdom (UK). It should be noted that the Granger causality results here should not be viewed true causality. Rather, they can be best interpreted as an attempt at specifying a necessary condition for a causal relation.

A. Estimation Methodology

Following Bassanini *et al*. (2001) we consider a specification which includes the basic determinants of output growth. Specifically, we include the accumulation of physical capital and population growth as well as a set of policy and institutional factors potentially affecting economic efficiency. These include: the size of government (which we measure as government consumption spending); inflation; and trade intensities – *intraregional and extra-regional trade* (the variables of interest for the study). Thus, the equation can be written as follows:

$$\Delta \ln y_{it} = \beta_0 + \beta_1 \ln k_{it} + \beta_2 n_{it} + \beta_3 \ln r_{it-1} + \beta_4 \ln w_{it-1} + \beta_5 \ln G_{it} + \beta_6 \ln \pi_{it} + \alpha_1 \Delta \ln k_{it} + \alpha_2 \Delta n_{it} + \alpha_3 \Delta \ln r_{it} + \alpha_4 \Delta \ln w_{it} + \alpha_5 \Delta \ln G_{it} + \alpha_6 \Delta \ln \pi_{it} + \varepsilon_{it} \qquad (1)$$

where k is the share of investment in GDP; n is population growth; r is the ratio of intraregional trade to GDP; w is the ratio of extra-regional trade to GDP; G is government consumption expenditure relative to GDP; π is inflation; the α-regressors capture short-term dynamics; and ε is the usual error term.

The β-coefficients measure the long-term growth effects of the respective explanatory variables. To control for short-run adjustments in growth the model also includes regressors (α–coefficients) that are intended to proxy for cyclical components inherent in year-to-year variations in output. However, it should be noted that the α–coefficients in the model may not

necessarily represent transitory growth effects, but may indicate more permanent effects (Bassanini *et al*, 2001).[7] *A priori* expectations of the model coefficients are presented in Table 4.

Based on the summary statistics in Table 2 and the Granger causality results in Table 3, we estimate several specifications of the model to verify the robustness of our results. In the first specification we use the entire sample of 13 countries. In the second, we use the 11 countries where Granger causality holds in order to check for sensitivity of the results when Finland and the UK are excluded. Finally, we estimate equation 1 excluding Ireland. As Table 2 shows, Ireland stands out in the sample with its high economic growth and intraregional trade intensity. Finally, we use lagged values for our trade intensity variables to ensure that trade observations preced growth effects.

V. EMPIRICAL RESULTS

We report fixed effects estimation results in Table 5 with standard errors for each coefficient are shown in parenthesis. In general, the signs of the regression coefficients for level variables are consistent with theoretical predictions and robust across specifications. The coefficient on the log of investment is small, while the rate of change in the share of investment has a very strong and significant effect on growth. This suggests that growth responded more strongly to the rate at which investment levels changed. Government consumption spending has a strong negative and significant effect on growth, a likely outcome of the social welfare programs in a number of EU countries. The inflation coefficient is weak but significant, an indication of the strong stance against inflation that a number of EU monetary authorities have taken.

[7] This is the case in models that explicitly consider different types of capital goods (e.g. physical and human), each characterized by its own accumulation process (e.g. investment and education).

Our focus variables, extra-regional trade and intraregional trade, are both significant and both have positive effects on output growth per capita. The coefficients on the rate of change variables (short-run regressors) are both positive and significant. These similarities are a likely indication that these variables have similar structural linkages to growth. Of interest is the size of these coefficients. The coefficient on extra-regional trade (3.02) is about 30 percent higher than the coefficient on intraregional trade (2.37). This suggests that, all else equal, a 1 percent increase in each of these variables, extra-regional trade will increase growth by 0.03 percentage points while intraregional trade will increase growth by 0.024 percentage points. To test whether the difference in the trade coefficients is statistically significant, we perform a difference-in-means test. Our null hypothesis is that the difference in means of the estimated coefficients on lnr_{t-1} and lnw_{t-1} is zero. The computed test statistic is 17.42 (P-value = 0.000) which rejects the null hypothesis, implying that, extra-regional trade has a significantly greater effect on growth than intraregional trade in the sample countries.

Our results support empirical findings in previous literature on trade, regionalism and growth. With respect to trade and growth, Bassanini *et al*. (2001) conclude that 1 percentage point increase in trade exposure results in a 4 percent increase in steady-state output per capita in 21 OECD countries between 1971 and 1998. Italianer (1994) found that trade based proxies for integration increased per capita output growth by 0.3 percentage points in six EU countries between 1961 and 1992. Similarly, Alcalá and Ciccone (2003) found that an increase in real openness (total trade measured in purchasing power parities relative to GDP) from the 25^{th} to 75^{th} percentile was associated with a 0.8 percent increase in the annual growth rate.

Regarding the effects of different trade patterns on growth, Vamvakidis (1999) found that participation in RTAs was on average associated with slower growth rates than following a

policy of broad liberalization. Hoeller *et al.* (1998) also found that it is openness in general, rather than regional trade integration that has favored growth in Europe. On the other hand, Johansson (2001) showed that total factor productivity was positively related to intra-EU imports, but not imports from outside. Although her study focused only on imports, the results add credence to the finding that extra-regional trade and intraregional trade patterns have different effects on growth. Finally, Alcalá and Cicone (2003) found that the effect of trade on growth depended on country (*market*) size. Thus, it is clear that the findings of this study on the size of trade effects on growth are consistent with other contemporary studies on the subject.

A number of factors could be responsible for the observed difference in trade effects on growth. These could include market size, different structural relationships between growth and trade patterns, or the composition of commodities in the respective trade patterns. With respect to the composition of commodities, conventional knowledge would suggest higher proportions of capital goods in extra-regional trade may be responsible for its greater effects. However, an examination of commodities in EU trade does not show any significant difference in the relative compositions of intraregional and extra-regional trade that would alter their growth effects (see Figure 3). Therefore, based on the findings of Alcalá and Ciccone (2003), and Johansson (2001) it seems more likely that the difference in trade effects lies mainly in the market size and possibly the structural linkages between growth and trade patterns as extra-regional trade exposes countries to a much larger and diverse market than intraregional trade.

VI. CONCLUDING REMARKS

This study represents a significant departure from most previous studies on RTAs that have assessed growth effects of RTAs by use of dummy variables which do not capture dynamic

effects and some that treat trade as having the same effect regardless of trade partners involved. Although, this study does not attempt to determine the growth effects of RTAs, it provides insight into the marginal contribution of intraregional trade, a key factor in RTAs. A central feature in RTAs is the reduction/ removal of tariff and non-tariff barriers to increase trade among members. Countries expend considerable amounts of resources to establish and maintain these RTAs often on the understanding that increased intraregional trade flows resulting from the removal of trade barriers will lead to faster economic growth for the participating countries. Available evidence in the literature indicates that trade openness has positive effects on growth. It further shows that the argument that RTAs are trade diverting is not supported by empirical data. And so we can conclude that any efforts, such as RTAs, that aim to increase trade are growth enhancing.

However, RTAs are primarily focused on increasing intraregional trade rather than extra-regional trade. By separating extra-regional trade flows from intraregional trade flows, this study shows that in the case of the 13 EU countries, intraregional trade has had a lesser impact on output growth than extra-regional trade by almost 30 percent, holding all other factors constant. This is likely due to the fact that extra-regional trade exposes countries to a larger and more diverse global market, which implies more possibilities for transfer of skills and technology. Furthermore, the global market implies larger economies of scale and greater competition leading to higher efficiency in production.

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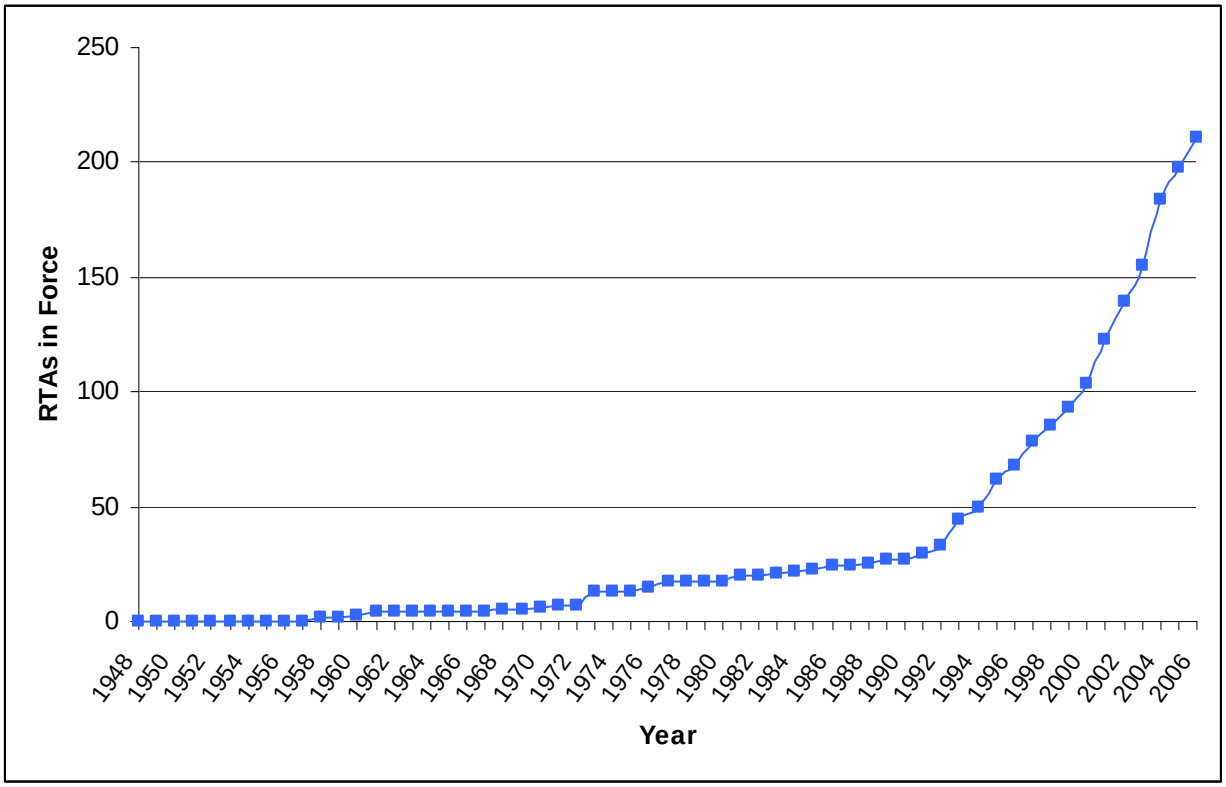
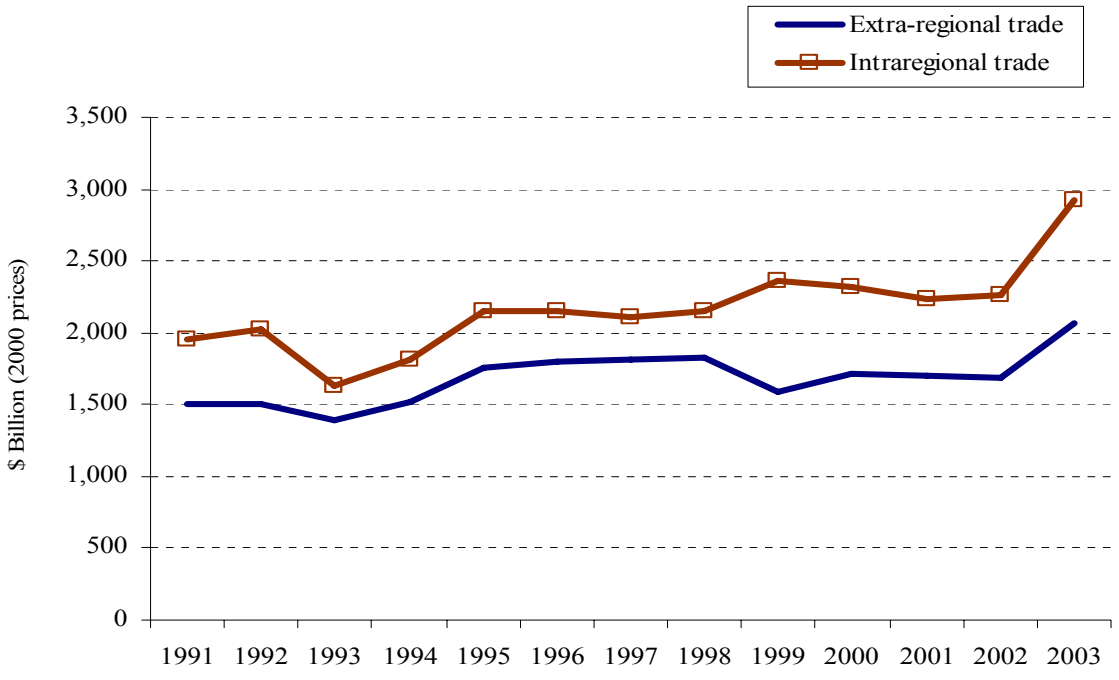
Figure 1. Notifications of RTAs by Date of Entry into Force[1]



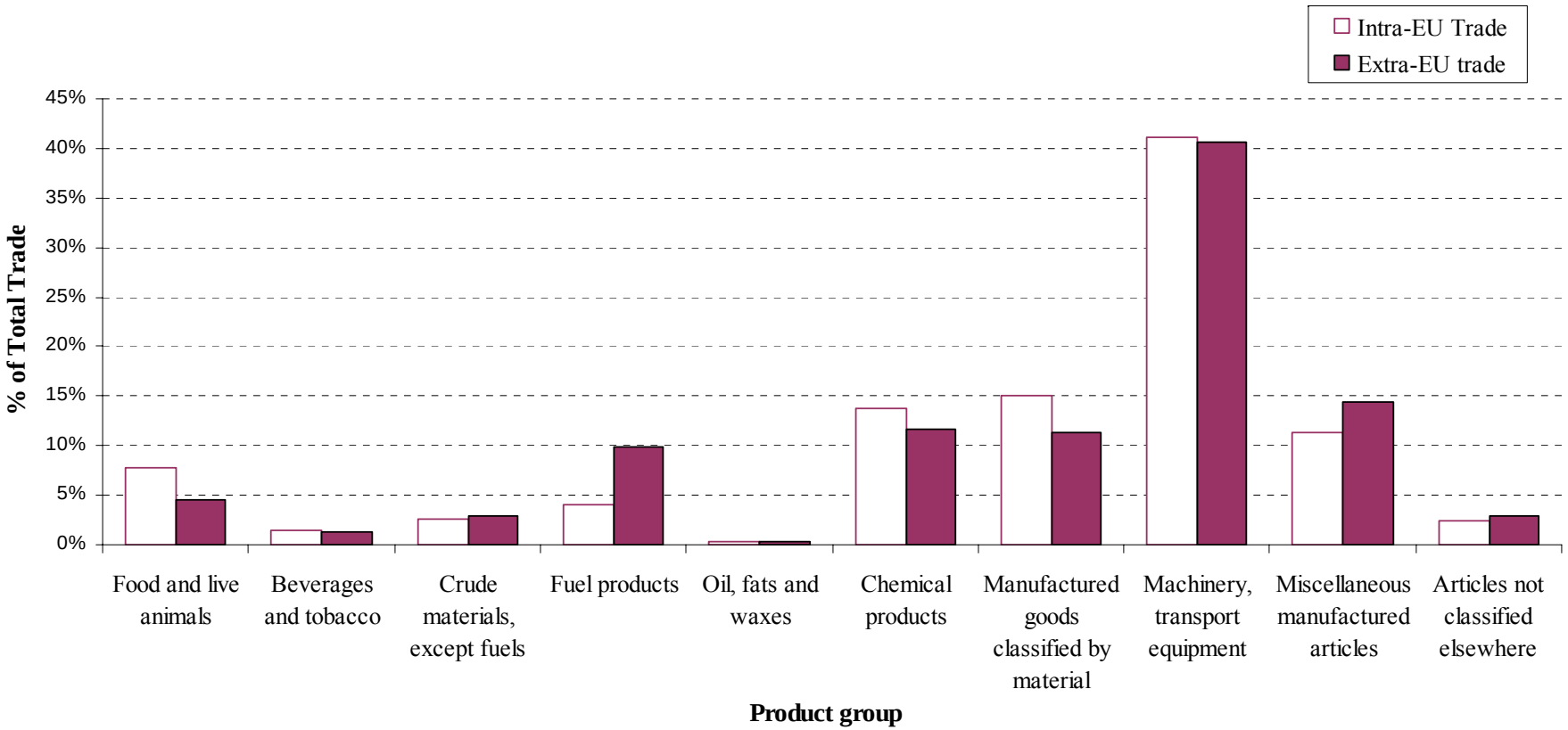
Source: World Trade Organization. Data are current as of September 15, 2006.

Figure 2. The Composition of Trade in the European Union: 1991 – 2003



[1] Excludes Belgium and Luxembourg. Source: UN Comtrade data

Figure 3. The Composition of Trade in the European Union by Product Category, 2003



Source: European Communities, 2005

Table 1. Variables, Data Sources, and Summary Statistics: 1980 - 2003

Variable	Description	Sources	Summary Statistics		
			Observations	Mean	Std. Deviation
GDP per capita growth (ΔlnY)	Growth in real GDP per capita expressed in (2000) Purchasing Power Parities (PPP).	OECD Social indicators database	312	1.99	2.13
Population growth (n)	The rate of growth in total population (ΔlnP)	IMF International financial statistics database	312	0.34	0.2927
Investment (lnk)	The percentage share of investment in GDP	Penn World Tables 6.1	273	22.00	2.8102
Intraregional trade (lnr)	Total intraregional trade (exports and imports) as a percentage of GDP	UN Comtrade database	301	29.14	16.386
Extra-regional trade (lnw)	Total extra-regional regional trade (exports and imports) as a percentage of GDP. Extra-regional trade refers to trade with countries outside the RTA.	UN Comtrade database	301	28.32	14.6657
Indicator of Government Size (lnG)	Government consumption expenditure as a percentage of GDP	IMF International financial statistics database	312	21.69	8.7769
Inflation ($ln\pi$)	The rate of change of the GDP deflator ($\Delta lnGDP\text{-}deflator$)	IMF International financial statistics database	312	5.48	5.115

Table 2: Summary Statistics by Country: 1980-2003

Variables	GDP per capita growth ($\Delta logY$)		Population growth (n)		Investment (k)		Intraregional trade (r)		Extra-regional trade (w)		Indicator of Govt. Size (G)		Inflation (π)	
Statistics	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Austria	1.9%	1.20	0.3%	0.31	25.1%	1.07	24.8%	13.74	25.2%	7.57	17.3%	3.34	2.4%	2.40
Denmark	1.5%	1.63	0.2%	0.17	21.3%	2.40	34.3%	9.53	29.0%	5.64	31.3%	5.12	4.0%	2.88
Finland	1.9%	3.11	0.4%	0.15	24.3%	3.55	28.0%	6.28	31.1%	7.22	25.2%	4.77	4.2%	3.13
France	1.5%	1.18	0.5%	0.11	23.8%	1.66	17.4%	5.88	19.8%	5.10	23.2%	3.79	3.8%	3.33
Germany	1.6%	1.54	0.2%	0.28	23.1%	0.96	26.4%	2.64	24.6%	2.30	19.4%	3.85	2.5%	1.64
Greece	1.3%	2.25	0.5%	0.25	21.1%	1.64	21.8%	8.97	30.9%	29.24	24.4%	17.08	12.4%	6.46
Ireland	4.4%	3.10	0.6%	0.53	19.7%	2.03	70.2%	12.25	43.8%	6.83	17.3%	4.08	5.6%	4.06
Italy	1.7%	1.20	0.1%	0.09	21.8%	1.36	17.0%	3.75	21.4%	8.77	19.9%	4.25	6.9%	4.97
Netherlands	1.6%	1.63	0.6%	0.14	22.1%	1.15	37.0%	15.40	43.7%	10.34	15.5%	4.05	2.2%	1.75
Portugal	2.4%	2.72	0.1%	0.29	21.9%	3.67	31.2%	8.00	24.1%	22.51	16.6%	6.80	11.0%	7.95
Spain	2.3%	1.63	0.4%	0.13	23.4%	1.75	17.0%	5.81	15.2%	5.32	15.5%	3.28	6.7%	3.75
Sweden	1.7%	1.89	0.3%	0.26	20.5%	2.11	33.7%	6.19	33.3%	9.23	35.6%	8.03	4.7%	4.09
UK	2.0%	1.85	0.3%	0.09	17.9%	1.97	18.7%	3.08	24.4%	5.88	21.0%	3.48	4.9%	3.53

Sources: UN Comtrade, IMF International Financial Statistics, Penn World Tables 6.1 and OECD social indicators databases.

Table 3. Granger Causality Wald Test Results

Dependent Variable	GDP per capita growth		
Explanatory Variables	Extra-Regional Trade	Intra-Regional Trade	Total Trade
Austria	+	-	+
Denmark	-	+	+
Finland	+	-	-
France	+	-	+
Germany	+	-	+
Greece	+	+	+
Ireland	+	-	+
Italy	+	+	+
Netherlands	+	+	+
Portugal	-	+	+
Spain	+	+	+
Sweden	+	+	+
United Kingdom	-	-	-

Notes: "+" indicates the explanatory variable Granger causes the dependent variable at either the 1%, 5%, or 10% level. "-" indicates the explanatory variable does not Granger cause the dependent variable at either the 1%, 5%, or 10% level.

Table 4. Explanatory Variables and Expected Signs

Variable	**Expected Sign**
Population Growth (*n*)	Negative (-)
Investment (*lnk*)	Positive (+)
Intraregional Trade (*lnr*)	Positive (+)
Extra regional trade (*lnw*)	Positive (+)
Indicator of Government Size (*lnG*)	Negative (-)
Inflation ($ln\pi$)	Negative (-)

Note: Expectations are not implied for short-term explanatory variables.

Table 5. The Role of Trade Patterns on Output Growth – Fixed Effects Estimation

Variables	Estimated coefficients		
	Full sample[1] (N=237)	Sample excluding UK & Finland[2] (N=119)	Sample excluding Ireland[3] (N=217)
Investment (ln***k***)	**1.67***	**2.39****	**1.32**
	(0.97)	*(1.15)*	*(0.94)*
Population growth (***n***)	**-0.66***	**-0.57**	**-1.55*****
	(0.40)	*(0.41)*	*(0.47)*
Lagged Intraregional trade (lnr_{t-1})	**2.37*****	**2.12*****	**1.80*****
	(0.44)	*(0.47)*	*(0.43)*
Lagged Extraregional trade (lnw_{t-1})	**3.02*****	**2.79*****	**2.10*****
	(0.36)	*(0.39)*	*(0.38)*
Indicator of Government size (ln***G***)	**-6.21*****	**-5.76*****	**-4.55*****
	(0.68)	*(0.74)*	*(0.69)*
Inflation (lnπ)	**-0.52*****	**-0.61*****	**-0.36****
	(0.18)	*(0.20)*	*(0.18)*
Short-run regressors:			
Δln***k***	**15.92*****	**14.08*****	**17.27*****
	(1.46)	*(1.61)*	*(1.50)*
Δ***n***	**0.09**	**0.06**	**0.04**
	(0.58)	*(0.60)*	*(0.64)*
Δln***r***	**1.94****	**2.08****	**1.20**
	(0.88)	*(0.90)*	*(0.84)*
Δln***w***	**2.32*****	**1.82****	**1.50****
	(0.75)	*(0.80)*	*(0.72)*
Δln***G***	**3.64*****	**3.43*****	**3.27*****
	(1.07)	*(1.13)*	*(1.03)*
Δlnπ	**0.54*****	**0.54****	**0.54*****
	(0.20)	*(0.24)*	*(0.19)*

Notes: N = no. of observations; ***, ** , * denote significance at the 1%, 5% and 10% respectively.
Standard errors in parentheses.

1. R^2 = 0.45 overall; 0.68 within; 0.40 between; Model P-value =0.000.
2. R^2 = 0.43 overall; 0.65 within; 0.39 between; Model P-value =0.000.
3. R^2 = 0.46 overall; 0.68 within; 0.12 between; Model P-value =0.000.