“European Economic Integration and Its Impact on Growth”

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Abstract

This empirical study investigates the impact of European economic integration on the GDP growth rate by means of panel data regression analysis. The data sample consists of all 27 current members of the European Union over the time period from 1990 to 2010. Economic integration is measure by various different indicators. For most of these indicators, the stidy finds evidence that increasing economic integration leads to increases in the growth rate. Furthermore this study examines the possibility of asymmetric growth enhancing effects between large countries and small countries. No conclusive evidence is found that proves the existence of asymmetric effects of economic integration on the growth rate.

Key words: economic integration, growth, Europe, EU, GDP

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I. Introduction

European integration, starting soon after the Second World War, has ever since been seen as the most important reason for political stability and enduring economic growth in Europe. During the past years though, an increasing number of people began to question whether the deepening economic integration in Europe is still a positive and hence desirable process. Especially in light of the sovereign debt crisis and the accompanying risks of contagion, particularly among the members of the Eurozone (the most integrated area in Europe), arguments in favor of more independent economies seem to become more and more attractive. On the other hand, some argue the exact opposite: *"Only by moving forward towards full integration – now – can Europe save itself."* (Roubini & Berggruen, 2011).

Of course, integration raises questions about various different concerns in the different countries: for example questions about the sovereignty of the national states or social and cultural questions of their inhabitants. But integration also has important implications for economic development. It seems that the impact on the economic development plays a very prominent role in the general judgment about integration processes. In the decades prior to the current crisis few people questioned economic integration. Only now, that some economies are in a recession or crisis period, too much economic integration is regarded with skepticism. This is especially true for the common currency area, where many people object not only to the Euro itself, but they also criticize the increasing influence of foreign decision makers on their domestic policy. Traditionally economic integration has been seen as a growth enhancing process. It was Adam Smith already who stated in his "Wealth of Nations":

"The greatest improvement in the productive powers of labour […] seem to have been the effects of the division of labour." and *"The division of labour is limited by the extent of the market."* (Smith, 2008).

He suggests that a larger market size, possibly through an integration process of two or more countries, will have a positive impact on the level of productivity.

Given the current economic situation in Europe, it is important to investigate whether the process of economic integration actually impacted economic growth either in a positive or

negative way in the recent past. After having assessed this impact, one can make well-founded statements about whether economic integration should be promoted in the future (based on its medium and long term effects on growth) or not. This empirical study focuses on the past 20 years, so at the time after the fall of the iron curtain. This provides the possibility to investigate all 27 current members of the European Union in detail. This very heterogeneous group of countries allows a well diversified dataset of the recent past, which leads to a robust and up-to-date assessment of the influence of economic integration on growth. Based on the investigation of these countries in this time period, this study tries to answer two main questions, firstly: does economic integration have a positive impact on the growth rate in Europe? In a second step, this study tries to answer the question, whether this impact is symmetric between small and large countries, or if one group of countries benefits (or suffers) relatively more from increases in economic integration.

Since this is an empirical study, one has to measure economic integration. Integration is a multidimensional process that takes various forms, such as institutional integration, integrations through more trade of goods and services or financial market integration. It is therefore challenging to investigate its impact on growth. A range of measures of economic integration are possible and different empirical studies have employed different measures. These studies usually choose one indicator of economic integration (e.g. dummy for EU membership) and quantify its impact on growth. The results are mixed: some find evidence for a positive influence on growth, while others cannot find growth enhancing effects of economic integration.

This study employs a range of different measures of economic integration to better represent its multidimensional characteristics. It finds evidence for a growth enhancing impact of economic integration for most of these measures. This result turns out to be robust against a range of different robustness tests. The investigation of the second research question of this study does not lead to a clear answer though. Although there are some results that suggest that these effects might be asymmetric, this does not hold for all measures or all tests.

In order to work on a well-grounded theoretical basis, the second section provides information about the development of European integration as well as an overview about

theoretical considerations of integration and growth. Possibilities to measure of integration are also discussed. Section III presents some empirical studies and the working hypotheses of the forthcoming analysis for this study. The data that are used and the methodology that is employed will be introduced in sections IV and V. The results of this study will be discussed and analyzed in section VI, which will be followed by some concluding remarks.

II. Theoretical Background

Economic Integration does not have a clear cut definition. This is probably due to the fact that there is not one identifiable, single point in time when two countries change from the state of not being economically integrated to being economically integrated. It is rather a question of different stages or levels of integration. One could even argue that two countries that reach the state of being "fully" integrated merge into one single country. Balassa (1961) includes the fact that economic integration is a progression of different steps in his definition of economic integration and proposes

"[…] to define economic integration as a process and as a state of affairs. Regarded as a process, it encompasses measures designed to abolish discrimination between economic units belonging to different national states; viewed as a state of affairs, it can be represented by the absence of various forms of discrimination between national economies." (Balassa, 1961)

The European Union is the most economically integrated group of sovereign states in the world. In order to investigate growth in the context of economic integration, it is important to have a rough idea of how and why this high level of integration was reached. This will be presented in the first part of this section. It also helps to answer the question why one generally expects the GDP growth to be positively influenced by economic integration. This historical overview will be followed by a more technical part that investigates whether we should indeed expect an increase in GDP growth to go along with increasing economic integration and through which channels this might occur. The last part of this section discusses possible measures of economic integration.

a) Historical Overview of European Economic Integration

The process of European economic integration started with the Treaty of Rome in 1957 and the subsequent introduction of the European Economic Community (EEC) in 1958. The founding members of the EEC were Germany, France, Italy, Netherlands, Luxembourg and Belgium. The EEC was set up to form a customs union, to introduce free labor mobility and to promote free trade in services as well as higher capital market integration. While these are all economic measures that might increase growth, one of the most important reasons

for the formation of the EEC was the creation of a stable political environment in Europe by making economies more integrated and therefore more dependent on each other (Baldwin & Wyplosz, 2009).

Although it might have been political reasons that initially led to the introduction of the EEC, it was the completion of the customs union in 1968 and the extraordinary growth performance of the six EEC countries that caused the United Kingdom and in turn other European countries to apply for membership. Subsequently the first enlargement of the EEC took place in 1973 and introduced Denmark, Ireland and the United Kingdom as new members (Baldwin, 1994).

In 1978 the European Monetary System (EMS) started its operation with the objective to stabilize the exchange rates between the EEC members. This goal was successfully achieved for most of the time. In the following decade Greece (1981), Spain and Portugal (both 1986) joined the Community and completed the later called EU-12 (European Union: The History of the European Union, 2012).

The next important step in the process of economic integration in Europe was the Single Market Act from 1987. It was meant to transform the common market into a single market by removing any barriers concerning the free movement of goods, services, people and money that were still present. It was fully established in 1993 (European Union: The History of the European Union, 2012).

After the reunification of Germany in 1990 and the adoption of former East Germany as part of the reunited Germany in the EEC, the last major step in the economic integration (apart from further enlargements) was the Maastricht Treaty from 1992. It transformed the EEC into the European Community (EC) as part of the newly established European Union (EU). However, its main contribution to deeper economic integration was the creation of a roadmap to the establishment of a common currency. The Euro became the official (electronic) currency in 1999 in eleven member states (Baldwin & Wyplosz, 2009).

b) Growth Effects of Economic Integration

Economic integration can occur on different scales that need to be distinguished. Cities within one country can experience an increase in economic integration (e.g. through

improvements in their transport connections). Countries that are located in the same region can integrate with each other by means of political reforms or increases in economic interactions with each other. This is usually referred to as regional integration. The integration of the EU should therefore be considered in this category. Other examples of regional economic integration are the North American Free Trade Agreement (NAFTA) or the Asia-Pacific Economic Cooperation (APEC). Since the integration in the EU is subject of this study, economic integration in the forthcoming text refers to regional integration. Moreover there is of course integration on a worldwide level: globalization. In order to distinguish regional integration from within country integration in an empirical study, one has to focus on national level data. Additionally one has to define a specific group of countries whose integration is subject to the study and then analyze their data collectively.

Integration does not only have to be distinguished on its scale, but also on its level of integration. Regional integration comes about in multiple steps, which have a natural order: from a low level of economic integration to higher levels of economic integration. To facilitate internal trade, the first step is to remove internal quotas and tariffs. The implementation of a common external tariff as a second possible step has the same intent. Free factor mobility is the third step towards a more integrated economic area. This would be followed by a harmonized monetary and fiscal policy and the full integration of politics as a last fifth step (Pédussel Wu, 2004).

The described steps of possible developments in the level of economic integration are developments in the institutional economic integration. There are other driving forces of purely economic integration that can lead to a decline in the “economic distance” of the integrating countries. Especially technological progress in information, communication and transportation technologies, which takes place autonomously from institutional integration, helps to increase the level of economic integration (Krieger-Boden & Soltwedel, 2010).

In order for this integration to actually influence the economic growth of a country, different channels are utilized. Once the integration led to a wider market, firms have more potential buyers of their products. Free circulation of goods and factors of production might encourage a higher degree of specialization and countries can subsequently make better use of their resources. A higher degree of competition goes hand in hand with that. This

increased competition will force producers to erase inefficiencies in their businesses. The sum of these effects is then likely to increase economic growth (Maudos et al, 1999).

Moreover economic integration leads to reduced transaction and transportation costs which in turn increase trade. This will result in an adjustment of the international division of labor and capital through increased flows of capital and more migration. Furthermore the migration of labor also means that information and knowledge are transmitted through an additional channel (the workers) and hence even faster. These changes in the efficiency of the distribution of employment and capital will result in an increase of economic growth (Krieger-Boden & Soltwedel, 2010).

Badinger (2005) distinguishes between integration-induced technology-led growth and integration-induced investment-led growth. The technology-led growth is fostered by the already described enhanced factor mobility, lower trade costs and increased competition. This allows all countries to participate in each others technological progress and profit from not having to rely solely on the domestic technological progress. The investment-led growth on the other hand is driven by a decrease in the cost of capital. More efficient financial markets and reduced uncertainty decrease the premium for investments. This leads to more investments and a higher growth.

To determine whether these growth effects are short term level effects or long term effects that permanently increase the growth rate, one has to investigate the underlying theoretical growth models. The neoclassical growth theory only predicts short or medium term growth effects whereas the endogenous growth theory predicts a permanent effect on the growth rate.

Baldwin (1993) explains the dynamic medium term growth effects of an increase in economic integration. By facilitating economies of scale, countries will not only experience a growth effect through a more efficient allocation of production factors after an increase in economic integration. They will also gain an additional medium-term growth bonus via induced capital-formation. This can be illustrated with a simple Solow-Growth-Model diagram (see Figure 1).

Initially the country is in its steady state equilibrium. Y/L is the output per worker, δ(K/L) is the depreciation of capital per worker and s(Y/L) is the investment per worker. An increase in the level of economic integration increases the efficiency in the economy and the output per worker curve shifts upward to (Y/L)´. At the given level of capital per worker this would increase the output per capita from A to B. But at the same time the investment per worker curve shifts upward and (K/L) gradually increases to (K/L)´. This means that the output per capita also gradually increases from B to C. This second effect is the capital induced medium growth bonus (Baldwin, 1989).

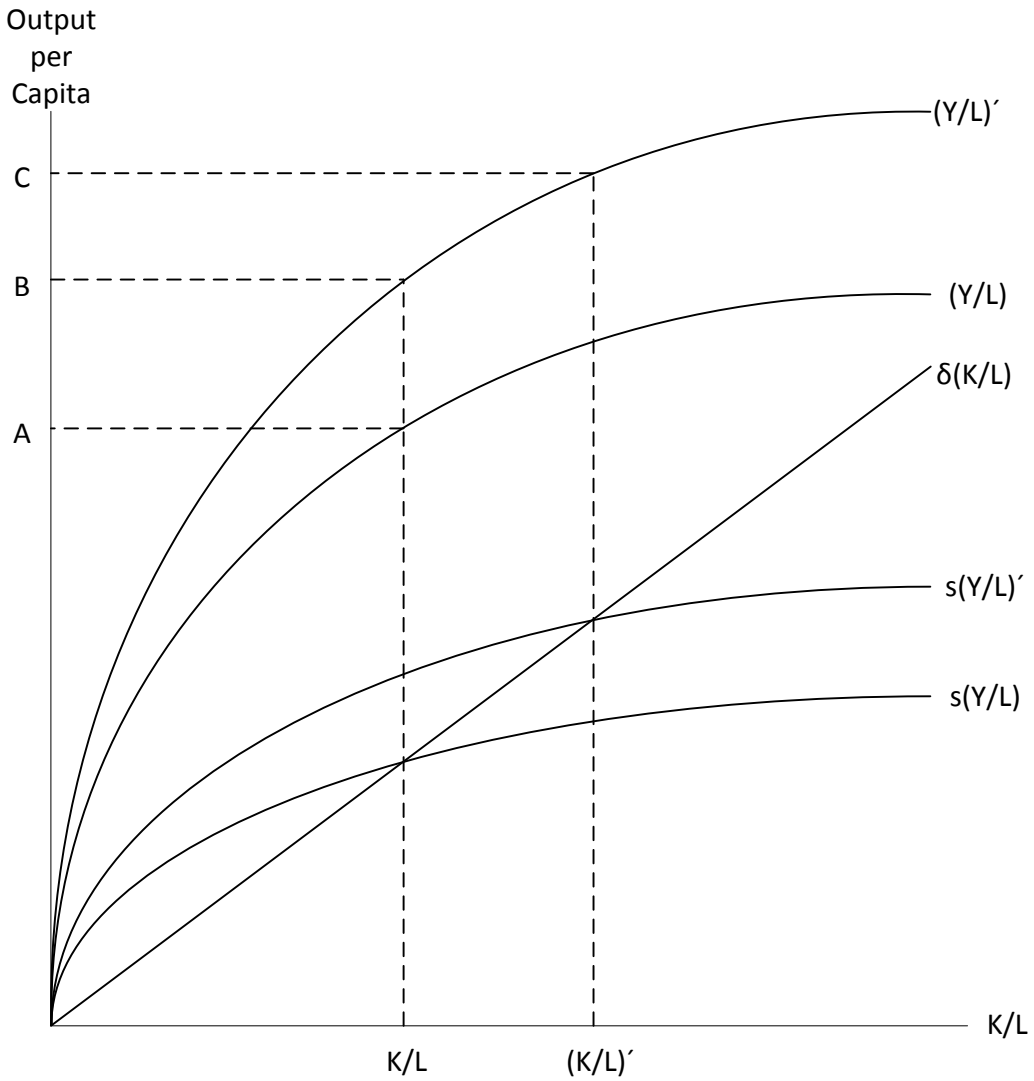

Figure 1: Solow-Growth-Diagram

The growth effect derived from the Solow-growth model does show that there is not only a short term level effect of integration on growth, but also a medium term growth effect.

However, once the new steady-state equilibrium is established, the growth rate is only determined in the neoclassical fashion: by the exogenous technological growth. But as already discussed earlier the technological growth might also be influenced by economic integration.

Riverra-Batiz and Romer (1991) assert that there is also a possibility for a permanent effect of integration on the growth rate: assuming that the technological growth is essential for the long term growth rate, they argue that the possibility to reuse ideas that are developed in other countries will lead to increasing returns in the research and development sector. These in turn induce scale effects that increase the growth rate permanently.

To clarify, the endogenous growth theory firstly argues that the increased market size increases the impact of spillover effects. Secondly, fixed costs of new innovations are spread out over a larger base and the average costs therefore decrease. Thirdly wasteful redundancy of research can be avoided. These effects of integration increase the technological development and therefore the economic growth permanently (Vanhoudt, 1999).

To conclude, there are various ways how economic integration can enhance growth. Most importantly, it will increase the efficiency of the use of factors of production, which leads to faster accumulation of capital and even more growth. It will decrease inefficiencies in the firms through the higher competition and it will boost technological progress. All of that makes the economically integrated region a more attractive investment opportunity, which will further augment economic growth.

c) Measures of Economic Integration

So far, economic integration has been defined rather vaguely as a process towards less trade barriers and more coordination between a group of countries. Since this is an empirical paper, one has to be able to measure economic integration in a numerical way. The following paragraphs provide an overview over possible measures that could be used as indicators of economic integration in an empirical study.

In order for the indicators to be operational, they have to be adequately specified, distinguish between regional and global integration and they have to be exogenous to the response variable (Krieger-Boden & Soltwedel, 2010).

Economic integration and therefore measurable indicators of economic integration as well can be distinguished into two groups: institutional and actual (or purely economic) integration. In the context of regional integration (since European integration is regional), institutional integration can be defined as *"[…]the policy decisions taken by two or more governments of countries belonging to the same geographic area in order to promote economic cooperation in terms of deepening and/or widening the spheres of co-ordination under the terms of an agreed pact".* Purely economic integration on the other hand can be defined as *"the degree of interpenetration of economic activity among two or more countries belonging to the same geographic area as measured at a given point in time"* (Mongelli et al., 2005).

The purely economic indicators are also referred to as outcome based indicators, because they can be the result of changes in the institutions. Changes towards more integration by institutions (e.g. abolishment of tariffs) can also be seen as increases in the supply of possibilities for cross-border economic activities (Prakash & Hart, 2000). Therefore one has to be aware of possible interactions between both sorts of indicators.

The most straight forward way to measure the institutional integration in econometric modeling is to introduce dummy variables. These dummy variables can stand for the participation or membership in a free trade area, political union or similar institutions. Of course, dummy variables can only capture a rather rough classification of a highly differentiable class of institutional integration indicators. Balassa (1961) introduced a classification of five different stages of institutional integration, namely free trade area, customs union, common market, economic union and total economic integration.

Durrucci et al. (2002) developed a composite index of institutional integration based on theses different stages of institutional integration for the EU-6[1] countries. They score the level of institutional integration on an ordinary scale between 0 and 100, where different integration policies (e.g. introduction of a common market) score points that eventually add

[1] Germany, France, Italy, Luxembourg, Belgium, Netherlands

up to the total score. This index can then be used in regression analysis. Based on the optimal currency area theory they also propose some measurable purely economic indicators of integration. Synchronization of the business cycles, convergence of inflation rates, exchange rate variability, trade openness, trade integration, financial market integration, convergence of interest rates and convergence of income constitute these outcome based indicators.

Given these various possibilities for choosing measureable and econometrically feasible indicators of economic integration, one can decide to use only one or multiple indicators. In addition to that it is possible to construct different composite indices from different sets of indicators. This would be especially useful if economic integration was a one-dimensional process. But in fact it is a multidimensional process: the lack of economic integration in one area (e.g. trade) might be compensated by a higher degree of integration in another area (e.g. financial markets). A composite index might capture the overall effect. Using multiple indicators on the other hand provides the possibility of a much more detailed and differentiated analysis (Prakash & Hart, 2000).

III. Actual Impact of economic integration on growth

After the theoretical considerations about the impact of economic integration on growth, it is necessary to have a look at the actual influence in the real world. The first part of this section will provide a brief overview over empirical studies concerning the relationship of economic integration and growth in Europe. After that the working hypotheses of this study will be presented.

a) Review of empirical literature

Multiple efforts have been made in order to assess the impact of the integration process in Europe and especially of the European Union on the growth performance. This section provides a brief overview over some of the empirical studies, their methods and their results.

Henrekson et al. (1997) investigate 22 OECD countries in the time from 1976 to 1985. They introduce a dummy variable for membership in the EU in order to check for possible effects of integration on growth. They find that indeed the European integration increased the annual growth significantly by 0.6 to 0.8 percentage points. Brodzicki (2003) also used a panel approach for 20 countries, consisting of 13 EU members and seven reference countries from the OECD in the time period between 1960 and 1999. Similar to Henrekson et al. he used a dummy variable for the EU to capture the level of economic integration. However he does not find a significant impact of the EU membership on the growth performance of the countries.

Landau (1995) investigates a sample of 17 OECD countries in the time period from 1950 to 1990. He also uses a dummy variable for members of the EEC and finds that the membership in the European Economic Community did not have a significant impact on the growth rates of the countries. Vanhoudt (1999) does not find a growth bonus for an EU membership either. His panel data consist of 23 OECD countries in the time period from 1950 to 1990. In addition to the EU dummy variable he also checks for the impact of the length of the membership, but again cannot find a significant influence on the growth.

In a different study, Torstensson (1999) finds that economic integration in Europe contributed to increase the levels of investment and total factor productivity. He argues that economic integration did foster growth trough these channels. The investigated data consists of 20 OECD countries in the time from 1976 to 1990 and a dummy for EU membership was applied to illustrate economic integration. Badinger (2005) also finds a positive influence of economic integration on growth. He looks at the growth performance of 15 EU countries between 1950 and 2000. As a measure of economic integration he uses a weighted sum of tariffs to develop a proxy for the level of protectionism. He defines the inverse of the protectionism index as the level of integration. His results show that integration did significantly improve the post war growth performance but he also concludes that this effect was only temporary and he does not find a permanent impact on growth.

b) Hypotheses

Considering these ambiguous findings as well as the theoretical forecast of the impact of economic integration on growth, the hypothesis that this study tries to prove is that economic integration has a positive influence on the growth performance of the integrating countries. This means that the following empirical analysis should show significant growth enhancing coefficients for the various indicators of economic integration described in the next section. Significant, growth enhancing indicators in the forthcoming regression analysis would also provide evidence for a long term effect of integration on growth, because the investigated time period is sufficiently long.

In addition to this first hypothesis, the impact of economic integration on small and large countries will be assessed. The theory points out that many of the potential growth enhancing effects are due to increases in efficiency, competition, market size and participation in other countries' technological progress. Larger economies should already have a higher competition and more specialized businesses, because of the obviously larger market size. The second hypothesis of this study is therefore that smaller economies benefit relatively more from economic integration. This implies that the coefficients found in the regression analysis should have the same signs for small and large economy countries but they should be larger in absolute values for the small economy countries.

IV. Data

This study focuses on today's EU-27 member states[2] in the time period between 1990 and 2010. Twelve states were already members of the European Union in 1990 and the remaining 15 states joined within the examined period.

This study tries to investigate economic integration; unfortunately there is not one single, well defined measure for economic integration. But, as already discussed in the previous section there is a wide range of possibilities to achieve a good proxy. The proxies used in this empirical analysis will be discussed in the first part of this section. Some of the indicators are institutional indicators and some are purely economic indicators. Taken together these different proxies should paint a very clear picture of the level and development of European regional integration. This level and development of integration in Europe will be presented in the second part of this section.

a) Data Description

The data necessary to quantify the effect of integration on growth are taken from different sources. The data for real GDP per capita per year are taken from the World Development Indicators (WDI) of the World Bank.

Measures of institutional integration:

Two dummy variables are introduced, which focus on the institutional integration: one for the membership in the European Union (equals one for membership and zero otherwise) and one for having the Euro as an official currency (equals one for membership in the Eurozone and zero otherwise). Dorrucci et al. (2002) developed a more detailed index for institutional integration. However the index focuses on a larger time period and the only major change in the index after the introduction of the single European market on January 1st 1993 is the introduction of the common currency. Furthermore the index does not differentiate between individual countries but examines the initial six founding members of the EU as a group. It is therefore sufficient to use the two dummy variables described above

[2] Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom

in order to capture the development of institutional integration in the investigated time period.

Apart from these dummy variables, other indicators for economic integration are also calculated. These measures for purely economic integration are mainly adopted from Dorrucci et al. (2002) and are only altered in order to be functional for the purpose of this study. These indicators are:

Convergence of inflation rates:

The first measure of purely economic integration is the convergence of inflation rates among the examined countries. The annual inflation is measured as the percentage changes in the consumer price indices. The data are taken from the International Financial Statistics (IFS) of the International Monetary Fund (IMF). The regions annual averages are calculated. After that the difference between this average and the countries' individual inflation rates in terms of percentage points are put in absolute values. This is to ensure that the level of convergence is the deterministic factor in the forthcoming regression, rather than the algebraic sign. Specifically:

$$convergence\ of\ inflation_{i,t} = \left| inflation_{i,t} - \frac{\sum_i^n inflation_{i,t}}{n} \right|$$

with i as the variable for the countries and t for the year.

Convergence of income:

Another measure is the income convergence. Data for real GDP per capita on an annual basis are taken from the WDI of the World Bank. In the same manner as for the inflation convergence indicator, first the regions annual averages are calculated. Then the percentage point differences (again in absolute values) are calculated:

$$convergence\ of\ income_{i,t} = \left| GDP\ per\ capita_{i,t} - \frac{\sum_i^n GDP\ per\ capita_{i,t}}{n} \right|$$

again, i stands for the country and t for the year.

Financial market integration:

Financial market integration is also a good proxy for economic integration. In this study it is defined as the correlation of the monthly returns of the individual countries' main equity market indices with the average equity market returns of all countries. The correlation is calculated individually for every year and each country. The data are taken from the eurostat database. Mathematically, it is calculated as:

$$financial\ market\ integration_{i,t} = \frac{\frac{1}{j}\left[\sum_{m}^{j}\left(r_{i,t,m} - \overline{r_{i,t}}\right) * \left(a_{t,m} - \overline{a_t}\right)\right]}{\sqrt{\frac{1}{j}\sum_{m}^{j}\left(r_{i,t,m} - \overline{r_{i,t}}\right)^2} * \sqrt{\frac{1}{j}\sum_{m}^{j}\left(a_{i,t,m} - \overline{a_{i,t}}\right)^2}}$$

with $r_{i,t,m}$ as the equity market return in country i, year t and month m. $\overline{r_{i,t}}$ is the average monthly equity market return in country i in year t. $a_{t,m}$ is the average equity market return in year t in month m over all countries ($a_{t,m} = \frac{\sum_{i}^{n} r_{i,t}}{n}$). Respectively $\overline{a_t}$ is the average equity market return in year t over all countries.

Trade integration:

A frequently employed measure for economic integration is trade openness, which is usually defined as the ratio of the value of exports plus imports over the GDP. In order to achieve a measure for regional trade integration this study uses the ratio of the value of imports plus the value of exports from and to the examined states relative to the GDP. This reflects the level of regional trade integration better and is well suited to be an additional indicator of economic integration for the EU-27 countries. The required data are taken from the IMF Direction of trade statistics. The formula for trade integration is:

$$trade\ integration_{i,t} = \frac{X_{i,t} + I_{i,t}}{GDP_{i,t}}$$

where $X_{i,t}$ is the value of all exports and $I_{i,t}$ is the value of all imports of country i in year t to/from the other 26 European countries investigated.

Exchange rate variability:

An additional measure for economic integration is exchange rate variability. It is measured as the standard deviation of the monthly growth rate of the bilateral exchange rate between

a country's home currency and the anchor currency. This standard deviation is calculated for every year and each country separately. The anchor currency for the period from 1990 until 1998 is the Deutsche Mark and after that the anchor currency is the Euro. This measure is calculated with the real and with the nominal exchange rate, so that this leads to two different measures for economic integration: nominal exchange rate variability and real exchange rate variability. Again, the required data are taken from the IFS of the IMF. The indicator is calculated as follows:

$$exchange\ rate\ variability_{i,t} = \sqrt{\frac{1}{j}\sum_{m}^{j}(e_{i,t,m} - \overline{e_{\iota,t}})}$$

with $e_{i,t,m}$ as the change in the monthly, nominal or real exchange rate of country i with the anchor currency in year t and in month m relative to the month prior to that. Accordingly $\overline{e_{\iota,t}}$ is the annual average of these changes in country i in year t ($\overline{e_{\iota,t}} = \frac{\sum_{m}^{j} e_{i,t,m}}{j}$).

Synchronization of business cycles:

The final proxy for economic integration is a measure for the synchronization of the business cycles. Data of monthly industrial production are taken from IFS (IMF). To make sure that the data only contain cyclical changes and not a long term trend (which is not of interest here), a Hodrick-Prescott filter was used to "clean" the data of those distortions. The averages of the cyclical element of all countries' monthly industrial production were calculated for every point in time and used to compute the annual correlation of a country's industrial production cycle with the regions average. The exact calculation is:

$$sychronization\ of\ business\ cycle_{i,t} = \frac{\frac{1}{j}\left[\sum_{m}^{j}\left(c_{i,t,m} - \overline{c_{\iota,t}}\right) * (d_{t,m} - \overline{d_{t}})\right]}{\sqrt{\frac{1}{j}\sum_{m}^{j}\left(c_{i,t,m} - \overline{c_{\iota,t}}\right)^2} * \sqrt{\frac{1}{j}\sum_{m}^{j}\left(d_{i,t,m} - \overline{d_{\iota,t}}\right)^2}}$$

with $c_{i,t,m}$ as the cyclical element in the industrial production in country i, year t and month m. The average monthly cyclical element in the industrial production in country i in year t is $\overline{c_{\iota,t}}$. Meanwhile $d_{t,m}$ represents the average monthly cyclical element in year t in month m

over all countries ($d_{t,m} = \frac{\sum_i^n c_{i,t}}{n}$) and $\overline{d_t}$ is the average monthly cyclical element in the industrial production in year t over all countries.

Of course in addition to these explanatory variables, the study uses control variables that are commonly employed in growth regressions. These are the ratio of total investment over GDP, the ratio of general government expenditures over GDP and population growth. These data are taken from the World Economic Outlook database of the IMF.

b) Descriptive Statistics

In 1990 the EU had twelve members (EU-12)[3]. Over the observed time period from 1990 to 2010 a total of 15 additional countries joined the EU. Austria, Finland and Sweden became members in 1995. In 2004 the biggest enlargement of the EU took place: this so called eastern enlargement of the EU saw Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia joining the Union. The latest members were accepted in 2007: Bulgaria and Romania. Overall, this leads to relatively balanced distribution of observation points of members and non members.

The dummy variable for the Eurozone contains eleven[4] countries who founded the common currency in 1999. Within the observational period five other countries adopted the Euro as their official currency: Greece in 2001, Slovenia in 2007, Cyprus and Malta in 2008 and the Slovak Republic in 2009.

The aim of this study is to assess the impact of economic integration on growth. It is therefore important to have a short overview about the development of the growth rates in different periods. The growth rate is measured as the real GDP per capita growth per year. All countries except Cyprus and Malta experienced their best growth periods between 1996 and 2005 (Appendix: Table 11). The growth in the last period is greatly influenced by the recession due to the financial and economic crisis: the average annual growth rate over all countries between 2008 and 2010 is -1.30. Up until 2007 most countries as well as the overall average were well on their way to reach the highest growth rate average in the latest period instead of somewhere between 1996 and 2005.

[3] Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, United Kingdom

[4] Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain

The general public opinion is that the level of economic integration increased in the past 20 years. If this was true economic integration would indeed be correlated with the overall tendency of increasing growth rates. A closer look at the different measures of economic integration will help to evaluate this notion. Furthermore it is interesting to examine whether all countries experienced similar developments in their level of economic integration. One important question is of course if older member of the EU still experience increasing economic integration or if the indicators show that the economic integration is on a rather constant level, which would imply that they are either quite close to "complete integration" or that there might be a limit for integration that is difficult to cross. Additionally, in order to have a solid basis for the further investigation on whether small and large countries benefit symmetrically from increases in economic integration the tables already show the separate developments of economic integration for small and large countries. According to their average GDP between 1990 and 2010 the countries are assigned to be in the group of large[5] or small[6] economy countries.

The level of institutional economic integration, captured by the membership in the EU and Eurozone clearly increased. Because there is a sufficient number of countries who joined the EU in the observed period, the growth performance of these countries right before and right after joining the EU should give a first idea if it is a desirable goal to become a member of the Union (only in terms GDP growth of course). Table 1 shows that eleven out of the 15 countries experienced a higher average annual growth rate in the five years after joining the EU than in the five year period prior to joining. On average the absolute change in the average annual growth rate is 0.83. Bulgaria and Romania experienced the largest negative change in the growth rate from not being a member to being a member of the EU. This is probably closely related to the fact that they only joined in 2007 and the crisis negatively influenced their results. Without those two countries the average performance after joining the EU would be even better. The changes for small and large countries respectively are 0.78 and 0.96. This would suggest that large countries benefit more from EU membership.

[5] Austria, Belgium, Czech Republic, France, Germany, Greece, Italy, Netherlands, Poland, Portugal, Romania, Spain, Sweden, United Kingdom

[6] Bulgaria, Cyprus, Denmark, Estonia, Finland, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Slovak Republic, Slovenia

	prior	After	Absolute change
Austria	1.54	2.79	1.25
Bulgaria	6.61	2.11	-4.49
Cyprus	2.26	2.26	0.00
Czech Republic	2.72	4.66	1.94
Estonia	6.85	5.54	-1.30
Finland	-1.84	4.13	5.97
Hungary	4.09	2.85	-1.25
Latvia	7.16	7.37	0.22
Lithuania	5.49	7.43	1.94
Malta	0.89	2.60	1.71
Poland	3.23	5.31	2.08
Romania	6.45	1.67	-4.78
Slovak Republic	2.82	6.90	4.09
Slovenia	3.64	4.56	0.92
Sweden	-0.58	3.18	3.77
Average small Countries	3.82	4.60	0.78
Average large Countries	2.68	3.64	0.96
Average	3.44	4.27	0.83

Table 1: Average annual real GDP per capita growth rate, 5 years prior and after accidence into the EU

The same analysis for the countries' growth rates before and after adopting the Euro also leads to quite clear results (Table 2).

	prior	After	Absolute change
Austria	2.50	1.73	-0.77
Belgium	2.27	1.66	-0.61
Cyprus	1.81	0.12	-1.69
Finland	4.04	2.78	-1.26
France	1.75	1.46	-0.29
Germany	1.47	1.07	-0.40
Greece	2.86	3.61	0.75
Ireland	7.56	5.19	-2.37
Italy	1.85	1.20	-0.65
Luxembourg	2.40	3.58	1.18
Malta	1.50	1.03	-0.47
Netherlands	2.94	1.49	-1.45
Portugal	3.32	1.30	-2.02
Slovak Republic	6.90	-0.76	-7.67
Slovenia	3.96	0.11	-3.86
Spain	2.85	2.65	-0.21
Average small Countries	4.03	2.13	-1.90
Average large Countries	2.43	1.80	-0.62
Average	3.13	1.87	-1.26

Table 2: Average annual real GDP per capita growth rate, 5 years prior and after accidence into the Eurozone

The direction of the change of the growth rate is a different one though. Only Greece and Luxembourg experienced a higher growth in the time period after adopting the Euro than in

the 5 year prior to that, when they still used their national currencies. On average the annual growth rates decreased by 1.26. It also seems as if small countries suffered more than the larger ones with a decrease in the average annual growth rate of 1.93. In comparison the decrease in the growth rate of large countries was only 0.63. Of course not all small or large countries joined the EU or Eurozone between 1990 and 2010. So the sample size is reduced in these statistics that can only give a first idea of the developments anyway. It is therefore too early to dismiss the hypothesis, that small countries benefit more from economic integration.

For the indicators of purely economic integration, the approach to get a first impression of their development and possibly relationship with growth rates is slightly different. Since these indicators measure economic integration as a continuous process one should look at their development in different periods of time and then check if that is in line with the already discussed, slightly increasing development of the growth rates.

The measure for the convergence of inflation rates shows that all countries experienced their highest level of economic integration in terms of this indicator in the last two periods (Appendix: Table 12). This indicator is one part of the Euro Convergence Criteria from the Maastricht Treaty and therefore especially important for those countries, which joined or want to join the Eurozone. Nevertheless all countries, independent from the ambition to join the Euro, increased their level of inflation rate convergence immensely in the past two decades. It is also noteworthy that even though the EU-12 countries increased their level of integration, the newer members converged even faster and almost caught up to the older members.

The convergence of income is clearly an outcome based indicator of growth rates that might be influenced by economic integration. It is nevertheless worth looking at this measure, because it also shows the level of economic integration in terms of the harmonization of income across the countries in a region. The numbers reveal that the highest level of convergence was on average reached in the last period (Appendix: Table 13). This is true for all groups of countries as well as for the vast majority of the individual countries.

Low exchange rate variability is a key requirement for the adoption of a common currency according to recent theoretical literature about optimal currency areas (Dorrucci et al.,

2002). By design of the indicator, the nominal exchange rate variability for Euro members is zero after the adoption of the Euro (Appendix: Table 14). But the exchange rate variability has already been reasonably low for these countries before the introduction of the common currency. The nominal exchange rate variability is much higher for the countries not participating in the common currency. But this high degree of variability decreased over the time. The very high variability in the early periods is strongly influenced by the extreme values of Bulgaria and Romania.

The real exchange rate variability draws a more detailed picture of the level of integration measured by this indicator. While the overall tendency of decreasing variability and hence increasing integration is validated, the values for the countries' averages as well as the individual countries show a development towards a higher level of integration only from the first to the second and from the second to the third period (Appendix: Table 15). The numbers remain more or less constant after the third period. The difference between the Euro and non-Euro countries is also still detectable but not as strong as with the nominal exchange rate variability. Naturally the indicators nominal and real exchange rate variability are strongly correlated, shown by a very high correlation coefficient of 0.95. Small and large countries show a very similar development and level of integration when measured by the exchange rate variability.

All countries (with the exceptions of Spain and Malta) and all country group averages reach their highest level of financial market integration in the last period (Appendix: Table 16). Before that there is no clear development for either of the country groups except the EU-12. Their numbers show a clear development towards a higher level of financial market integration. The other countries as well as the overall average are quite constant in the first three periods. One might suspect that the clear picture of the last period as the one with the highest financial market integration is largely influenced by the enormous downturn in all the stock markets returns in the last period due to the economic crisis (even though that itself can be interpreted as a sign of financial market integration). But even without the years following 2008 the last period is still (even though not as strongly) the one with the highest level of financial market integration.

The level of trade integration as a measure for economic integration shows the development of the importance of intra-regional trade for the national economies. For the majority of the individual countries and for all country group averages the last period is the one with the highest level of trade integration. In contrast to the financial market integration, this is a relatively smooth and constant development with a clear trend towards more integration. Interestingly the non EU-12 countries started at a higher level of trade integration and even increased the difference to the EU-12 countries in the level of integration over time. Nevertheless the EU-12 also increased their level of integration. According to this indicator, the group of small countries is more integrated than the group of large countries (Appendix: Table 17).

Contrary to the other indicators, the level of business cycle synchronization between the observed countries does not allow to confirm an increasing trend in economic integration. While the individual countries vary in their development, the overall average is almost identical in each period (Appendix: Table 18).

Overall the belief that the economic integration increased in the past two decades can be verified by the indicators. While the core countries of the EU are still more integrated than the others, the difference is not nearly as substantial as in the early 1990s. The difference in the development of economic integration in small and large countries is not very high and varies between different indicators. As discussed earlier the growth rates also increased to a certain extent over this time. This suggests a positive correlation between economic growth rates and economic integration. Whether this relationship is indeed a significant (and possibly asymmetric between large and small countries) one will be further assessed in the following sections.

V. Methodology

Of course, the descriptive statistics can only give a first impression of the real relationship between economic integration and GDP growth. In order to get a more thorough picture, an regression analysis is needed. There are different possibilities to do that: time-series analysis, cross sectional analysis or panel data analysis. Panel data analysis has various advantages for the purpose of this particular study and it is therefore used to estimate the effect of integration on GDP growth.

First of all this method allows to correct for heterogeneity in unmeasured (hence omitted) variables that affect the endogenous variable differently in different time periods or over different countries. Since panel data allows for variation across countries and time simultaneously the variation in the data increases. This in turn helps alleviating possible multicollinearity problems. It also means that the need for very long time series or a very high number of cross sections in order to get reliable results is not present (Kennedy, 2008).

The panel data that is used consists of 27 countries over to time period from 1990 to 2010. Although all countries are current EU members, there are sufficient observations of non EU members (before entry into the EU). This also means that there is no need for the inclusion of other reference countries such as the United States or Japan.

In order to determine the exact specification of the panel data regression that is described in the second part of this section, some specification tests will were conducted and their results are portrayed in the forthcoming first part of this section.

a) Specification Tests

Working with panel data makes it necessary to decide on possible fixed or random effects for different time periods or cross sections. After running a first regression with all explanatory indicators on the GDP growth rate including random cross sectional effects, one can conduct the “Hausman-Test”. The random effects estimation relies on the assumption that the random effects are uncorrelated. The test compares the estimates of the coefficients for random and fixed effects estimations and then tests the assumption (Seddighi et al., 2000).

Table 19 shows that the Null-Hypothesis of no misspecification in the estimation with cross sectional random effects can be rejected at the one percent significance level. This result is independent from the use of the whole sample or the separate samples for small or large countries respectively.

Running the same regression with period random effects instead of cross sectional random effects and again employing the Hausman-Test also leads to a rejection of the Null-Hypothesis of no misspecification in this estimation; again regardless of the sample (Table 20).

These tests suggest that random effects should not be used in panel estimations with this data. This makes it necessary to check whether one should use fixed individual effects or no individual effects at all. A likelihood ratio test for redundant fixed effects can be employed for this purpose.

Table 21 shows the results of these tests. The Null-Hypothesis of redundant cross section fixed effects can be rejected for all three samples according to the F-Statistic as well as the Chi-squared test statistic at the one percent level. The same holds for time fixed effects. The test for the joint significance of both cross section and time fixed effects also leads to a rejection of the redundancy hypothesis of these effects. This array of tests leads to the conclusion that the right specification for the upcoming regressions has to contain both: time fixed effects as well as cross sectional fixed effects.

b) Regression Technique

The variable of interest in the regression analysis is the GDP growth. In order to fulfill the requirements of the linear regression analysis which is used, a linear relationship between endogenous and exogenous variables is vital for the regression analysis. Therefore the GDP growth rates are calculated using the log first difference method ($GDP\ growth\ rate_t = \ln(GDP_t) - \ln(GDP_{t-1})$) and subsequently used as the endogenous variable instead of the absolute values of the GDP, which could contain an exponential growth development.

The baseline regression is:

$$GDP\ growth\ rate_{it} = \alpha + \alpha_i + \alpha_t + \beta X'_{it} + \varepsilon_{it}$$

In this regression α represents the overall time and cross sectional consistent intercept. As determined with the specification tests discussed above a time fixed and a cross sectional fixed effect are added as well: α_i is the cross sectional fixed effect and α_t is the time fixed effect. That means that each time period has an additional different intercept which is consistent over countries and each country has an additional intercept which is consistent over time. Beta is the matrix of coefficients for the explanatory variables and X_{it}' is the inverse of the matrix of explanatory variables. The deviations from the estimated values to the actual values are captured by the error term ε_{it}.

As already mentioned above, the indicators for real exchange rate variability and nominal exchange rate variability are highly correlated. This means that both cannot be included in one regression simultaneously, because multicollinearity problems are very likely to arise. The baseline regression is therefore estimated two times: once with all explanatory variables including the real exchange rate variability and once with the nominal variability. Specifically the baseline regression is calculates as follows:

$$
\begin{aligned}
&GDP\ growth\ rate_{it} \\
&\quad = \alpha + \alpha_i + \alpha_t + \beta_1 EU + \beta_2 Euro + \beta_3 Income\ Convergence \\
&\quad + \beta_4 Inflation\ Convergence + \beta_5 Financial\ Market\ Integration \\
&\quad + \beta_6 Exchange\ Rate\ Variability \\
&\quad + \beta_7 Synchronization\ of\ Business\ Cycle + \beta_8 Trade\ integration + \varepsilon_{it}
\end{aligned}
$$

The fixed effects α_i and α_t are estimated using dummy variables that can be described as a vector with zeros and only one single one at the point of interest. This means that there is one dummy variable for each year and one dummy variable for each country included in the regression.

The added fixed effects are not only an artificial mathematical term but can be interpreted straight forward: the time fixed effects capture the difference of each year from a “normal” year: e.g. the GDP growth rates from 2008 to 2010 were relatively low and many were even negative. This is mainly due to the worldwide financial and economic crisis rather than a changing effect of the indicators of integration. The time fixed effects should therefore capture this deviation that is not explained by the exogenous variables used in the regression. Similar to that the cross sectional fixed effects account for fundamental

differences in the characteristics of the countries that affect the growth performance. The effects of other (omitted) variables that influence growth can also be party captured in these fixed effects. For example effects of a systematically more efficient political, law or tax system that could foster growth can only be captured by explanatory control variables to a very limited extend and are therefore incorporated in the country specific fixed effects.

Having determined the baseline regression, different variations will be estimated in the following procedure to determine a final specification that will be investigated on its robustness against control variables.

VI. Results

In the first part, this section will present the results of the baseline regressions and their implications for the decision of the final regression. In a second step the robustness of the results of the final regression will be tested using different econometrical methods.

a) Baseline Regression

Table 22 shows the results of the different baseline regressions for the full country sample (contains the observations of all countries). Table 23 and table 24 provide the results for the baseline regressions of the large country and small country sample respectively.

The first estimation (a) contains all explanatory indicators of economic integration except for the real exchange rate variability. The EU and Euro dummies have a negative sign in the full as well as in the large country sample. But significant are only the EU dummy for all countries and the Euro dummy for the large countries. In contrast to that, Euro has a positive influence on growth in the sample of small countries and is highly significant, while the coefficient of the EU-dummy is negative and insignificant.

The indicator for the convergence of income has the expected negative sign (meaning a higher level of convergence has a positive impact on growth) but is only significant for small countries. The convergence of inflation and the financial market integration indicators have their expected signs (a positive influence on growth) in all cases except for the convergence of inflation for the sample of small countries. However both these indicators are highly insignificant in all three samples.

A lower nominal exchange rate variability and a higher synchronization of the business cycle show their expected positive influence on the growth performance, but are only significant for the large and full country samples. A higher degree of trade integration improves the growth performance significantly in all samples.

Running the same regression with the real exchange rate variability instead of the nominal exchange rate variability (specification (b)) only leads to minor changes in the full and large country sample: for the full country sample the Euro-dummy now has a positive sign, but is still insignificant. The real exchange rate variability itself influences the growth positively

similar to the nominal variability before, but its coefficient has a larger value, meaning that its impact is stronger. The most important change in the results for the large country sample is the Euro-dummy that is still negative, but becomes insignificant.

In the small country sample, the convergence of income indicator becomes insignificant. A major difference is that the real exchange rate variability in contrast to the nominal variability is highly significant. It is noteworthy that in all the samples the explanatory power, measured by the R-squared and adjusted R-squared improves from the estimation of specification (a) to (b).

In the third estimation (specification (c)), the focus lies solely on the indicators of institutional integration. Taking only the two dummy variables for EU and Euro seems to confirm the impression from the descriptive statistics of the growth performance prior and past the entry in the EU and Euro respectively (in contrast to the first two estimations). It shows that the EU has a positive influence on growth in all three samples, while being significant only for the full and the small country sample. The Euro-dummy on the other hand shows a negative influence on growth in all three samples, while being significant for the full and large country sample. The coefficients for the two indicators of institutional integration as well as their significance changed drastically in comparison to the specifications (a) and (b). At this point one can therefore neither confirm nor reject the impressions from the descriptive statistics on the growth effects of membership in the Eurozone and in the EU.

The next estimation (specification (d)) focuses only on the indicators of purely economic integration. Therefore all indicators are included except for the two dummy variables and the real exchange rate variability. The results for the full and large country sample confirm the results from the first specification. The indicators for convergence of income, convergence of inflation and financial market integration have the expected signs and hence would improve economic growth, but all three coefficients are insignificant in both those samples. For the small country sample these three still have the same sign as in the first regression. This means that in this sample the convergence of inflation would have a negative impact on growth, but is insignificant. In addition to that the convergence of income has become insignificant as well.

Similar to estimation (a), lower nominal exchange rate variability, a higher degree of business cycle synchronization and a higher level of trade integration all improve the growth significantly in the large and full country sample. In the sample of small countries, the influence of the nominal exchange rate variability has become significant now. The synchronization of the business cycle still has no significant impact on growth, whereas the influence of trade integration on growth in small countries stays positive and significant.

The next estimation (specification (e)) is the same as the fourth, but nominal exchange rate variability is replaced by the real exchange rate variability. Parallel to specifications (a) and (d), this fifth estimation confirms the results of the specification (b). Real exchange rate variability, synchronization of the business cycle and trade integration are the only significant variables in the full and large country sample. The business cycle synchronization still lacks significance in the small country sample.

The results for convergence of income, convergence of inflation rates and financial market integration remain basically the same (exception: change of the sign of financial market integration in the small country sample) and are still all highly insignificant. Exactly like the comparison of estimations (a) and (b), the fact that real exchange rate variability replaces nominal exchange rate variability in estimation (e) relative to (d) helps to improve the explanatory power of the specification.

Having estimated these first regressions, one can conclude that some indicators are overall insignificant and should be dropped in the course of the proceeding investigation. These indicators are the convergence of income, convergence of inflation and financial market integration. These indicators of economic integration lack significance in any of the estimations and therefore do not contribute to the investigation of the impact of economic integration on growth, because they do not influence the growth rate. Nominal exchange rate variability can be dropped as well. While the nominal exchange rate variability does explain differences in the growth performances, so does real exchange rate variability. Because of the already mentioned high correlation between those variables and the risk of multicollinearity problems involved with this, both cannot be included at the same time. Since real exchange rate variability adds more explanatory power and is also highly

significant, it will be used as the only measure of exchange rate variability in the forthcoming estimations.

a) Robustness Analysis

The results of the baseline regressions showed, that the EU-dummy, the Euro-dummy, real exchange rate variability, the synchronization of the business cycles and trade integration should be the indicators of economic integration that have to be included in a regression that aims to explain the GDP growth rate. Unfortunately there are no observations of the indicator of business cycle synchronization for Estonia and Slovenia. That means that including this variable leads to the exclusion of those two countries. The following regressions are therefore conducted with and without including the variable business cycle synchronization.

The first estimation (specification (1)) in table 3 shows the results for the regression with the previously determined indicators of economic integration for the full country sample. Specification (2) simply additionally includes business cycle synchronization.

The first estimation shows insignificant coefficients for the two dummy variables. Real exchange rate variability is significant at the one percent level and shows that a lower variability increases the growth rate. Trade integration is highly significant as well and the positive coefficient suggests that a high level of trade integration has a positive influence on the GDP growth rate. The results in the second specification confirm the results of the first one. Synchronization of a country's business cycle with the business cycles of other countries also has a positive, significant impact on the growth rate.

The robustness of these results can be tested by including control variables. The total investment over GDP ratio, the government expenditures over GDP ratio and the population growth rate are standard control variables for economic growth (Brodzicki, 2003).

Specification (3) and (4) show the results of the estimation when adding these control variables to the initial estimations (1) and (2) respectively. All three control variables are highly significant in both estimations and have their expected influence on the GDP growth rate. The coefficient for the EU-dummy is significant now. According to these estimations, EU membership has a negative influence on the GDP growth rate. The influence of the

exchange rate variability becomes even stronger when adding the control variables. The business cycle synchronization in estimation (4) on the other hand becomes insignificant. The coefficient for trade integration stays relatively constant and is still significant.

Dependent Variable: Real GDP per Capita Growth Rate						
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.0254***	-0.0295***	-0.0019	-0.0204	1.4215***	1.5065***
	(0.0074)	(0.0092)	(0.0231)	(0.0245)	(0.1369)	(0.1494)
EU	-0.0005	-0.0025	-0.0077*	-0.0101**	0.0115***	0.0080*
	(0.0048)	(0.0049)	(0.0039)	(0.0044)	(0.0039)	(0.0041)
Euro	-0.0047	0.0007	-0.0032	-0.0042	-0.0089**	-0.0069*
	(0.0048)	(0.0047)	(0.0041)	(0.0044)	(0.0036)	(0.0037)
Real ExR	-0.1611***	-0.2346***	-0.4747**	-0.6004***	-0.4494**	-0.5465***
Variability	(0.0273)	(0.0398)	(0.2170)	(0.2134)	(0.1876)	(0.1801)
Sync. of	.	0.0202**	.	0.0101	.	0.0170**
Business Cycle		(0.0095)		(0.0087)		(0.0073)
Trade	0.0999***	0.0854***	0.0733***	0.0889***	0.0612***	0.0707***
Integration	(0.0136)	(0.0156)	(0.0152)	(0.0168)	(0.0132)	(0.0142)
Inv./GDP	.	.	0.0031***	0.0026***	0.0032***	0.0028***
			(0.0004)	(0.0004)	(0.0004)	(0.0004)
Gov. Exp. /GDP	.	.	-0.0015***	-0.0010***	-0.0008***	-0.0006**
			(0.0003)	(0.0004)	(0.0003)	(0.0003)
Population	.	.	-1.2930***	-0.9201***	-0.5885**	-0.5575**
Growth			(0.2833)	(0.2994)	(0.2516)	(0.2544)
Lag (ln(GDP per	.	.	.	.	-0.1469***	-0.1562***
capita))					(0.0140)	(0.0151)
Lag (GDP	.	.	.	.	0.2215***	0.2678***
Growth rate)					(0.0426)	(0.0437)
Observations	508	436	439	398	439	398
D.-W. stat.	1.19	1.27	1.31	1.26	1.77	1.86
R^2	0.58	0.64	0.73	0.73	0.80	0.81
Adj. R^2	0.54	0.59	0.70	0.69	0.77	0.78

Table 3: Final Estimation Results: Full Country Sample[7]

***, **, *** denotes significance at the 10%, 5% and 1% level respectively**

Standard errors in parentheses

However, some issues with the estimations (3) and (4) need some more attention. The possible catch up effect of economically less developed countries against high developed countries needs to be accounted for. Furthermore the Durbin-Watson statistics suggest that there might also be some problems with serial correlation in the first four estimations. Following Landau (1995), Badinger (2005) and Brodzicki (2003) the catch up effect will be controlled for by the logarithm of the GDP in the previous period. The serial correlation issue

[7] The Likelihood ratio test for redundant fixed effects still rejects the Null Hypothesis of redundancy. Test for distribution of residuals rejects normality. Coefficients are nevertheless consistent, but not efficient.

will be controlled by adding a lagged dependent variable. These additional control variables are highly significant and suggest that a higher initial GDP per capita indeed has a negative influence on the growth rate, while a high GDP growth rate in the previous period has a positive influence on the following GDP growth rate. Interestingly the coefficients for the EU-dummy have a positive, significant impact on the growth rate, when controlling for these effects. They show that EU membership increases the GDP per capita growth ceteris paribus by 0.0115 (specification (5)) or by 0.0080 (specification (6)). The Euro keeps its negative impact on the GDP growth rate and is significant now. Lower real exchange rate variability increases the growth rate significantly in both specifications. The same is true for a higher level of trade integration. Business cycle synchronization in (6) has a positive, significant influence on the growth rate. In both of the last two specifications, adding the additional control variables helped to decrease serial correlation issues.

These results show that almost all included indicators of economic integration improve the GDP growth rate significantly if control variables are used to account for other influences on the growth rate. Only the Euro-dummy shows a robust, negative influence on the growth rate if the level of integration increases. This is in line with the impressions from the descriptive statistics.

As already mentioned earlier, it is important for countries to know, whether all countries benefit symmetrically or if there are asymmetric effects of economic integration on growth. In order to investigate this, the same regressions that have been estimated for the whole sample are also estimated for the individual samples of economically small and large countries. The different magnitude or possibly different sings of the coefficients should provide an answer in this matter.

Table 4 shows the regression results for the sample of large countries for the same six different specifications that have been estimated for the full country sample. Similar to the full country sample, the EU-dummy variable only shows a positive, significant impact on the growth rate, when all control variables are included (specification (5) and (6)). The Euro dummy on the other hand has a significant, negative impact on the growth rate throughout all estimations except for specification (4).

Dependent Variable: Real GDP per Capita Growth Rate						
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.0020	-0.0265*	-0.0560*	-0.0510*	0.6834***	0.7634***
	(0.0092)	(0.0135)	(0.0296)	(0.0304)	(0.1914)	(0.1901)
EU	0.0054	0.0002	-0.0024	-0.0048	0.0095**	0.0073*
	(0.0058)	(0.0061)	(0.0047)	(0.0050)	(0.0044)	(0.0044)
Euro	-0.0113**	-0.0079	-0.0078*	-0.0063	-0.0095**	-0.0081**
	(0.0051)	(0.0052)	(0.0044)	(0.0045)	(0.0037)	(0.0037)
Real ExR	-0.2581***	-0.2265***	-0.4322**	-0.4458**	-0.2512	-0.2716*
Variability	(0.0331)	(0.0346)	(0.1934)	(0.1946)	(0.1612)	(0.1592)
Sync. of	.	0.0354***	.	0.0186	.	0.0257**
Business Cycle		(0.0135)		(0.0125)		(0.0102)
Trade	0.0431**	0.0545**	0.0851***	0.0870***	0.0545***	0.0560***
Integration	(0.0217)	(0.0218)	(0.0212)	(0.0212)	(0.0175)	(0.0173)
Inv./GDP	.	.	0.0026***	0.0024***	0.0022***	0.0021***
			(0.0006)	(0.0006)	(0.0005)	(0.0005)
Gov. Exp./GDP	.	.	-0.0001	-0.0004	0.0004	0.0001
			(0.0004)	(0.0004)	(0.0003)	(0.0004)
Population	.	.	-1.0950***	-1.0563***	-0.4064	-0.4404
Growth			(0.3010)	(0.3143)	(0.2618)	(0.2674)
Lag (ln(GDP per	.	.	.	.	-0.0756***	-0.0839***
capita))					(0.0193)	(0.0192)
Lag (GDP	.	.	.	.	0.3914***	0.3774***
Growth rate)					(0.0655)	(0.0665)
Observations	272	268	252	248	250	246
D.-W. stat.	1.29	1.32	1.55	1.56	1.91	1.97
R^2	0.63	0.64	0.74	0.74	0.82	0.83
Adj. R^2	0.57	0.58	0.69	0.69	0.78	0.79

Table 4: Final Estimation Results: Large Country Sample[8]

***, **, *** denotes significance at the 10%, 5% and 1% level respectively**

Standard Errors in parentheses

Real exchange rate variability remains significant in the first four estimations. The level of its significance decreases when the last two control variables are included; in fact it is not significant at all in specification (5). Moreover the magnitude of its impact seems to be smaller for large countries, especially in the final two specifications. The coefficient for trade integration is highly significant and has a positive influence in the same vicinity as for the overall sample. This also holds when all other variables are included. The synchronization of the business cycle is significant and positive without control variables. It becomes insignificant in specification (4) and again significant in specification (6). This is the same pattern as for the full country sample. The coefficient itself is higher for the large country sample though.

[8] The Likelihood ratio test for redundant fixed effects still rejects the Null Hypothesis of redundancy. Test for distribution of residuals rejects normality. Coefficients are nevertheless consistent, but not efficient.

In order to have a comparison, one needs the same estimations for the small country sample of course. The results are presented in table 5. Including business cycle synchronization in the estimations (2), (4) and (6) is likely to cause most distortions in this sample, because Estonia and Slovenia (the countries whose observations are dropped when business cycle synchronization is included) belong to this group.

Dependent Variable: Real GDP per Capita Growth Rate						
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.0411***	-0.0189	0.0382	-0.0086	1.6174***	1.8514***
	(0.0115)	(0.0142)	(0.0382)	(0.0445)	(0.2051)	(0.2448)
EU	0.0002	-0.0080	-0.0009	-0.0096	0.0149**	0.0071
	(0.0089)	(0.0084)	(0.0078)	(0.0093)	(0.0068)	(0.0077)
Euro	0.0190**	0.0171*	0.0087	0.0065	-0.0012	0.0043
	(0.0091)	(0.0090)	(0.0080)	(0.0094)	(0.0067)	(0.0074)
Real ExR	-0.1045**	-1.6729***	-0.5016	-0.7108	-0.9781**	-1.1694***
Variability	(0.0408)	(0.4666)	(0.5066)	(0.5471)	(0.4245)	(0.4343)
Sync. of	.	0.0119	.	-0.0005	.	0.0046
Business Cycle		(0.0133)		(0.0138)		(0.0108)
Trade	0.1080***	0.1007***	0.0456*	0.0839***	0.0551***	0.0919***
Integration	(0.0184)	(0.0217)	(0.0231)	(0.0295)	(0.0195)	(0.0235)
Inv./GDP	.	.	0.0025***	0.0023***	0.0029***	0.0027***
			(0.0007)	(0.0008)	(0.0006)	(0.0006)
Gov. Exp./GDP	.	.	-0.0021***	-0.0012*	-0.0015***	-0.0009*
			(0.0006)	(0.0006)	(0.0005)	(0.0005)
Population	.	.	-1.3214***	-0.6991	-0.2280	-0.3429
Growth			(0.4769)	(0.5839)	(0.4157)	(0.4568)
Lag (ln(GDP per	.	.	.	.	-0.1646***	-0.1913***
capita))					(0.0212)	(0.0250)
Lag (GDP	.	.	.	.	0.1839***	0.0219***
Growth rate)					(0.0635)	(0.0682)
Observations	236	168	187	150	187	150
D.-W. stat.	1.16	1.33	1.27	1.16	1.73	1.79
R^2	0.64	0.76	0.80	0.79	0.86	0.88
Adj. R^2	0.58	0.70	0.74	0.73	0.83	0.83

Table 5: Final Estimation Results: Small Country Sample[9]

***, **, *** denotes significance at the 10%, 5% and 1% level respectively**

Standard Errors in parentheses

The coefficient for the EU-dummy shows a significant (positive) effect only in specification (5), when business cycle synchronization is excluded and at the same time all other effects are controlled for. The Euro-dummy has a positive, significant coefficient in the first two

[9] The Likelihood ratio test for redundant fixed effects still rejects the Null Hypothesis of redundancy. Test for distribution of residuals does not reject normality. Coefficients are consistent and efficient.

estimations, but as soon as control variables are added, one can see that this significance is not robust.

Real exchange rate variability is significant in all estimations except for (3) and (4). The positive influence of a stable exchange rate seems to be much stronger in the small country sample than in the other two samples. Business cycle synchronization is not significant in any of the three specifications, in which it is included. However it does influence the magnitude of the other coefficients. The indicator for trade integration has a positive, significant impact on the growth rate in all six estimations. Its magnitude has roughly the same size as the one in the large sample size.

The explanatory power of the various estimations for the three different samples ranges from 0.59 and 0.88. These relatively high values for the R-squared are confirmed by the values for the adjusted R-squared, which are reasonably close to the unadjusted R-squared. The high explanatory power of the model is partly due to the significance of the various exogenous variables, but also partly due to the inclusion of the two-way fixed effects. The results for the time and cross sectional fixed effects can be found in the appendix in tables 25, 26, 27, 28, 29 and 30. The lagged dependent variable also contributes to these values for the R-squared.

Having estimated the different specifications for all three samples, one can see that not only the significance levels of the coefficients for the indicators of economic integration differ between the group of small and the group of large countries but also the magnitudes of the coefficients are different. For specification (5), the EU-dummy coefficient is larger for small countries. The Euro-dummy coefficient is insignificant for small countries, but significantly negative for large countries. Real exchange rate variability is highly significant for the small country sample, and also larger in terms of the absolute value. The impact of trade integration is almost identical in both samples, according to the coefficients. In order to investigate whether these differences are statistically significant, a Wald-test can be employed.

Table 6 shows the results of the Wald-tests for specification (5). First of all the joint hypothesis, that assumes all four indicators of economic integration have the same coefficients in both samples is tested. According to the statistics, this hypothesis can be

rejected at the one percent significance level. Next, the hypotheses that the individual coefficients for the EU-dummy, the Euro-dummy, the exchange rate variability and trade integration in the large country sample estimation are equal to their counterparts in the small country sample estimation are tested. This hypothesis can be rejected for the Euro-dummy at the five percent significance level and for the real exchange rate variability at the one percent significance level. According to the different statistics of the Wald-test, there is no significant difference between the coefficients for trade integration and the EU-dummy in the two samples.

	t-statistic	F-statistic	Chi-squared
Joint Hypothesis	.	6.89***	27.50***
EU	-1.26	1.58	1.58
Euro	-2.22**	4.93**	4.93**
Real ExR variability	4.51***	20.34***	20.34***
Trade integration	-0.03	0.00	0.00

Table 6: Wald-Test results for coefficients of LS estimation (5)

Null Hypothesis: Coefficients of large country sample equal coefficients of small country sample

***, **, *** denote rejection of Null Hypothesis at the 10%, 5% and 1% significance level respectively**

The same testing procedure is conducted for the coefficients of specification (6). While the coefficients for the EU-dummy are similar in both samples, only the one for large economy countries is significant. The coefficient for the Euro-dummy is positive but insignificant for small countries and significantly negative for large countries. Real exchange rate variability is significant for both samples, but seems to be much more beneficial for small countries. The same holds for trade integration. Synchronization of business cycle is the only indicator of economic integration that seems to be more beneficial for large countries in this specification.

	t-statistic	F-statistic	Chi-squared
Joint Hypothesis	.	10.41***	52.05***
EU	-0.06	0.00	0.00
Euro	-3.37***	11.37***	11.37***
Real ExR variability	5.64***	31.81***	31.81***
Sync. of Business Cycle	2.07**	4.27**	4.27**
Trade integration	-2.08**	4.32**	4.32**

Table 7: Wald-Test results for coefficients of LS estimation (6)

Null Hypothesis: Coefficients of large country sample equal coefficients of small country sample

***, **, *** denote rejection of Null Hypothesis at the 10%, 5% and 1% significance level respectively**

The results of the different Wald-tests are presented in table 7. The joint hypothesis of equal coefficients is again rejected at the one percent level. The coefficients for the Euro-dummy,

exchange rate variability and synchronization of business cycle and trade integration are also significantly different from each other in the two samples. The coefficients for the EU-dummy do not differ significantly from each other according to the Wald-test.

The results of the Wald-tests suggest that economic integration has asymmetric effects on large and small countries. Six out of the nine individual coefficients tested showed significant differences. Five of those six coefficients favored small countries, meaning that an increase in economic integration had a more beneficial effect on the growth rate of GDP per capita in small countries in comparison to large countries. The only indicator of economic integration that favors large countries is business cycle synchronization. This result might also be influenced by the reduced sample size of small countries, when including this variable. Nevertheless large countries also benefit from economic integration with the exception of the membership in the Eurozone according to the conducted estimations.

However these results might not be as robust, as they seem. The inclusion of the lagged dependent variable as well as the lagged GDP stock in the last two estimations will cause biased results in the least squared estimation method used. In fact, these variables transform the previously static panel estimation into dynamic panel estimation. The bias in the estimation arises, because those two variables are correlated with the individual cross section fixed effects (Asteriou, 2006; Verbeek, 2008).

Instead of using least squares, one can employ the generalized method of moments (GMM), which will lead to unbiased results. While fixed period effects are still included, the cross section effects will be removed with the first differencing method (Arellano & Bond, 1991). The lagged GDP growth rate and the lagged GDP stock will be instrumented by their own lags.

The results of theses GMM estimations are depicted in table 8. The denotation of the specifications (5') and (6') refers to their counterparts (5) and (6) from the least squares estimations. For the full country sample, the EU-dummy still has a positive, significant coefficient. The Euro-dummy also keeps the negative estimated impact from the least squares regression, but it is only significant in specification (5'). Real exchange rate variability and synchronization of business cycle are also similar to the least squares estimations and stay highly significant. Trade integration also shows a positive, significant impact on the

growth rate. Overall the estimations of the GMM regression for the full country sample confirm the previous regression results, meaning that a higher level of integration increases the growth rate, with the exception of the membership in the Eurozone.

Dependent Variable: Real GDP per Capita Growth Rate						
	Full Sample		**Large Country Sample**		**Small Country Sample**	
Variable	(5')	(6')	(5')	(6')	(5')	(6')
EU	0.0092**	0.0088*	0.0088	0.0061	-0.0160	-0.0046
	(0.0042)	(0.0051)	(0.0054)	(0.0056)	(0.0133)	(0.0137)
Euro	-0.0086**	-0.0055	-0.0061	-0.0046	-0.0107	0.0011
	(0.0043)	(0.0045)	(0.0047)	(0.0047)	(0.0093)	(0.0112)
Real ExR	-0.7921***	-0.8453***	-0.5850***	-0.3986**	-2.1270***	-2.3255***
Variability	(0.2361)	(0.2213)	(0.2090)	(0.1993)	(0.5373)	(0.6643)
Sync. of	.	0.0179**	.	0.0365***	.	0.0211
Business Cycle		(0.0076)		(0.0126)		(0.0131)
Trade	0.0857***	0.1030***	0.0824***	0.0909***	0.0566	0.0175
Integration	(0.0149)	(0.0175)	(0.0241)	(0.0241)	(0.0369)	(0.0468)
Inv./GDP	0.0043***	0.0041***	0.0046***	0.0047***	0.0072***	0.0077***
	(0.0004)	(0.0004)	(0.0007)	(0.0007)	(0.0009)	(0.0011)
Gov. Exp./GDP	-0.0011***	-0.0008**	0.0003	-0.0005	-0.0033***	-0.0021**
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0009)	(0.0010)
Population	-0.3812	-0.1859	0.0809	-0.0868	0.0785	-0.4011
Growth	(0.2761)	(0.2792)	(0.3192)	(0.3219)	(0.5186)	(0.5981)
Lag (ln(GDP per	-0.1715***	-0.2015***	-0.0972***	-0.1201***	-0.2120***	-0.2601***
capita))	(0.0142)	(0.0166)	(0.0227)	(0.0232)	(0.0277)	(0.0373)
Lag (GDP	0.1131***	0.1423***	0.2602***	0.2336***	-0.0313	0.0239
Growth rate)	(0.0408)	(0.0423)	(0.0686)	(0.0714)	(0.0658)	(0.0801)
Observations	412	373	236	232	174	139

Table 8: GMM Estimation Results

***, **, *** denotes significance at the 10%, 5% and 1% level respectively**

Standard Errors in parentheses

The previous results for the two separate samples are not as robust as the ones for the full country sample: for both samples, all dummy variable coefficients become insignificant in the GMM estimation. For the small country sample, the EU-dummy coefficient evens becomes negative. The influence of the real exchange rate variability on the other hand increases in both samples in both specifications. The positive impact of the business cycle synchronization on the growth rate stays robust, but is still only significant for the large country group. The influence of trade integration stays positive and highly significant for large countries, but loses its significance for the sample of small countries in both specifications. In light of these changed coefficients for the two sub-samples, the Wald-Test

was again used to check whether there are significant asymmetric impacts of integration on small and large countries.

Table 9 shows the results of the Wald-Tests for the coefficients of specification (5'). The joint hypothesis of equal coefficients is rejected at the one percent significance level. Furthermore there is a significant difference in the coefficients for the EU-dummy and the real exchange rate variability. In the GMM estimation however the large countries benefitted more from the EU-dummy, while small countries still benefit more from and equal change in the exchange rate variability. There are no significant differences in the coefficients for the Euro-dummy or trade integration in this specification.

	t-statistic	F-statistic	Chi-squared
Joint Hypothesis	.	18.75***	75.00***
EU	4.57***	20.92***	20.92***
Euro	0.98	0.97	0.97
Real ExR variability	7.38***	54.44***	54.44***
Trade integration	1.07	1.14	1.14

Table 9: Wald-Test results for coefficients of GMM estimation (5')

Null Hypothesis: Coefficients of large country sample equal coefficients of small country sample

***, **, *** denote rejection of Null Hypothesis at the 10%, 5% and 1% significance level respectively**

The joint hypothesis is also rejected for the coefficients of estimation (6'). Moreover the coefficients for the EU-dummy, the real exchange rate variability and trade integration are significantly different in this specification (Table 10). The EU-dummy coefficients and trade integration suggest that large countries benefit more from economic integration, while the coefficient for real exchange rate variability is dramatically larger for the small country sample.

	t-statistic	F-statistic	Chi-squared
Joint Hypothesis	.	21.60***	108.00***
EU	1.93*	3.71*	3.71*
Euro	-1.21	1.47	1.47
Real ExR variability	9.67***	93.49***	93.49***
Sync. of Business Cycle	1.22	1.48	1.48
Trade integration	3.05***	9.28***	9.28***

Table 10: Wald-Test results for coefficients of GMM estimation (6')

Null Hypothesis: Coefficients of large country sample equal coefficients of small country sample

***, **, *** denote rejection of Null Hypothesis at the 10%, 5% and 1% significance level respectively**

Overall the outcome of these new Wald-Tests is quite different than from the ones on the coefficients estimated with the least squares method: five out of the nine individual tests

show a significant difference in the estimated coefficients between the sample for the large and the sample for the small countries. Three out of these five coefficients favor large economy countries, meaning that large countries benefit more from an equal increase in the level of integration in those coefficients. This shows that the results from the earlier tests are not robust to the change in the estimation method.

VII. Concluding Remarks

This study has investigated the impact of European integration on growth. Although not all indicators of economic integration turned out to be significant and robust, there is sufficient evidence to conclude that the hypothesis of a positive impact of integration on growth can be confirmed. Especially low real exchange rate variability contributes immensely to a higher growth rate.

The tests of hypothesis of asymmetric effects of economic integration on growth led to mixed results. The least squares specification suggests that small economies do benefit relatively more from economic integration than large countries. These results are not robust to a change in the estimation method though. Contrary to the expectation the impact of the Eurozone membership is on the growth rates is negative or at best insignificant.

As already mentioned above, the results of this study are in line with some previous studies. But some studies have also led to different results. However, previous studies have usually only employed a dummy variable for the EU and this turned out to be insignificant for the reduced samples. The inclusion of different measures of economic integration provides a more comprehensive picture and reveals the indicators of economic integration that are most beneficial. This provides the possibility of very detailed policy advice.

Possible interactions between the different indicators (especially between the institutional indicators on the one hand and the purely economic indicators on the other hand) were not investigated in this study and should be carefully examined in the future.

Of course these results cannot be generalized easily. They only apply for Europe within the investigated time period. However, as long as there is no structural break in the development of the growth rates in Europe (the sovereign debt crisis might turn out to be one), one can expect that the positive effects of integration on growth also apply in the near future. This implies that economic integration should be further promoted and protectionist tendencies in the political discussions are worrisome, if one seeks to increase economic growth.

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Appendix

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	1.72	2.94	1.13	0.98	1.69
Belgium	1.49	2.59	1.14	0.36	1.40
Bulgaria	-3.00	0.64	6.41	3.05	1.49
Cyprus	2.54	2.45	1.42	1.19	1.93
Czech Republic	-1.14	1.56	3.73	1.99	1.52
Denmark	1.85	2.41	0.95	-0.64	1.17
Estonia	-6.00	6.76	8.16	-0.41	1.57
Finland	-0.97	4.42	2.33	0.37	1.40
France	1.00	2.23	0.87	0.05	1.03
Germany	1.89	1.71	0.53	1.37	1.40
Greece	0.14	2.86	3.61	-0.18	1.53
Hungary	-2.48	3.12	4.32	-0.09	1.01
Ireland	4.63	8.10	3.03	-1.65	3.52
Italy	1.35	1.85	0.40	-0.86	0.71
Latvia	-10.73	6.43	8.48	-0.81	-0.02
Lithuania	-11.03	5.03	7.99	1.37	0.57
Luxembourg	2.73	4.61	2.24	0.03	2.41
Malta	4.55	4.09	-0.09	1.62	2.62
Netherlands	1.90	3.37	0.82	1.01	1.78
Poland	1.77	5.34	3.18	4.59	3.71
Portugal	1.98	3.77	0.20	0.25	1.56
Romania	-2.67	-1.14	6.27	2.87	1.08
Slovak Republic	-3.47	3.22	4.79	4.27	1.87
Slovenia	-0.76	4.26	3.44	1.14	2.00
Spain	1.60	3.58	1.71	-0.35	1.62
Sweden	0.06	3.35	2.30	0.56	1.49
United Kingdom	1.20	3.81	2.38	-0.21	1.76
average EU-12	1.82	3.41	1.49	-0.06	1.67
average non EU-12	-1.94	3.52	4.26	1.56	1.64
average small	-1.95	3.98	4.21	0.98	1.59
average large	0.94	2.71	2.02	0.90	1.61
Average	-0.18	3.47	3.03	0.85	1.69

Table 11: Average annual real GDP per capita growth rates

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	27.36	14.26	1.45	1.18	11.84
Belgium	27.99	14.01	1.37	1.04	11.91
Bulgaria	87.98	227.34	2.15	3.63	80.64
Cyprus	25.90	12.75	1.24	0.70	10.90
Czech Republic	6.57	10.50	1.23	0.56	4.39
Denmark	28.53	13.35	1.52	1.06	11.95
Estonia	30.00	10.76	0.73	2.35	8.85
Finland	27.78	14.12	2.28	1.14	12.11
France	28.19	14.46	1.58	1.49	12.23
Germany	23.44	14.41	1.96	1.42	9.61
Greece	15.60	10.81	0.65	0.95	7.41
Hungary	10.02	11.90	2.39	2.38	6.83
Ireland	27.96	13.11	0.64	2.45	11.85
Italy	25.34	13.23	1.06	1.10	10.90
Latvia	76.30	10.60	2.22	5.12	20.79
Lithuania	148.60	12.48	2.63	2.50	29.66
Luxembourg	27.66	14.09	1.19	0.92	11.76
Malta	27.30	13.25	1.10	0.99	11.45
Netherlands	27.93	13.53	0.99	1.47	11.79
Poland	101.03	10.84	1.09	1.47	32.05
Portugal	22.43	13.04	0.47	1.27	9.93
Romania	143.93	53.17	15.14	3.18	53.85
Slovak Republic	4.49	12.52	2.56	0.89	5.23
Slovenia	4.43	10.00	2.17	0.29	4.20
Spain	25.18	13.04	0.53	0.84	10.63
Sweden	25.36	15.20	2.02	1.48	11.70
United Kingdom	26.29	14.07	2.04	1.17	11.63
EU-12	25.77	13.43	1.17	1.26	11.14
Non EU-12	56.97	29.31	2.69	1.86	24.34
Average Small Countries	40.62	28.94	1.75	1.88	19.36
Average Large countries	39.79	16.04	2.26	1.33	16.04
Average	40.24	22.25	2.01	1.59	17.65

Table 12: Convergence of inflation

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	0.41	0.40	0.33	0.30	0.36
Belgium	0.38	0.34	0.27	0.22	0.31
Bulgaria	0.63	0.69	0.65	0.58	0.64
Cyprus	0.03	0.01	0.03	0.05	0.03
Czech Republic	0.20	0.23	0.24	0.17	0.21
Denmark	0.42	0.41	0.31	0.23	0.35
Estonia	0.56	0.55	0.43	0.34	0.47
Finland	0.15	0.17	0.19	0.18	0.17
France	0.32	0.26	0.18	0.10	0.22
Germany	0.45	0.36	0.25	0.22	0.33
Greece	0.06	0.11	0.07	0.06	0.08
Hungary	0.37	0.41	0.37	0.36	0.38
Ireland	0.06	0.34	0.50	0.42	0.32
Italy	0.30	0.24	0.15	0.03	0.19
Latvia	0.61	0.65	0.56	0.47	0.57
Lithuania	0.50	0.59	0.51	0.41	0.50
Luxembourg	1.49	1.53	1.63	1.61	1.56
Malta	0.18	0.10	0.17	0.18	0.16
Netherlands	0.46	0.48	0.40	0.37	0.43
Poland	0.56	0.50	0.48	0.40	0.49
Portugal	0.10	0.08	0.13	0.20	0.12
Romania	0.63	0.67	0.66	0.60	0.64
Slovak Republic	0.43	0.42	0.41	0.29	0.39
Slovenia	0.18	0.15	0.11	0.06	0.13
Spain	0.09	0.09	0.08	0.02	0.07
Sweden	0.28	0.26	0.26	0.24	0.26
United Kingdom	0.22	0.26	0.28	0.22	0.24
EU-12	0.36	0.37	0.35	0.31	0.35
Non EU-12	0.38	0.39	0.36	0.31	0.36
Average Small countries	0.43	0.46	0.45	0.40	0.44
Average Large countries	0.32	0.31	0.27	0.23	0.28
Average	0.37	0.38	0.36	0.31	0.36

Table 13: Convergence of income

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	0.0010	0.0003	0.0000	0.0000	0.0004
Belgium	0.0043	0.0004	0.0000	0.0000	0.0013
Bulgaria	0.4644	0.1659	0.0025	0.0025	0.1588
Cyprus	0.0091	0.0036	0.0042	0.0013	0.0048
Czech Republic	0.0079	0.0145	0.0113	0.0155	0.0131
Denmark	0.0067	0.0013	0.0016	0.0026	0.0032
Estonia	0.0022	0.0024	0.0022	0.0024	0.0023
Finland	0.0193	0.0034	0.0000	0.0000	0.0063
France	0.0058	0.0013	0.0000	0.0000	0.0020
Germany	0.0000	0.0000	0.0000	0.0000	0.0000
Greece	0.0078	0.0089	0.0000	0.0000	0.0043
Hungary	0.0220	0.0083	0.0144	0.0226	0.0171
Ireland	0.0116	0.0071	0.0000	0.0000	0.0050
Italy	0.0195	0.0037	0.0000	0.0000	0.0065
Latvia	0.0193	0.0131	0.0114	0.0056	0.0116
Lithuania	0.0485	0.0211	0.0081	0.0044	0.0174
Luxembourg	0.0043	0.0004	0.0000	0.0000	0.0013
Malta	0.0120	0.0097	0.0063	0.0037	0.0081
Netherlands	0.0010	0.0004	0.0000	0.0000	0.0004
Poland	0.0243	0.0232	0.0213	0.0244	0.0234
Portugal	0.0126	0.0023	0.0000	0.0000	0.0042
Romania	0.2001	0.0458	0.0176	0.0175	0.0764
Slovak Republic	0.0101	0.0139	0.0118	0.0073	0.0109
Slovenia	0.0211	0.0045	0.0026	0.0006	0.0065
Spain	0.0136	0.0018	0.0000	0.0000	0.0043
Sweden	0.0190	0.0121	0.0100	0.0152	0.0143
United Kingdom	0.0178	0.0172	0.0130	0.0206	0.0172
EURO Members	0.0092	0.0039	0.0016	0.0008	0.0041
Non EURO Members	0.0972	0.0295	0.0103	0.0121	0.0402
Average Small Countries	0.0601	0.0196	0.0050	0.0041	0.0240
Average Large Countries	0.0250	0.0094	0.0052	0.0067	0.0122
Average	0.0387	0.0143	0.0051	0.0054	0.0170

Table 14: Nominal exchange rate variability

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	0.0043	0.0028	0.0021	0.0017	0.0027
Belgium	0.0049	0.0035	0.0078	0.0087	0.0062
Bulgaria	0.2088	0.0533	0.0091	0.0082	0.0698
Cyprus	0.0154	0.0125	0.0105	0.0069	0.0113
Czech Republic	0.0088	0.0174	0.0119	0.0171	0.0147
Denmark	0.0086	0.0034	0.0030	0.0047	0.0049
Estonia	0.0137	0.0058	0.0049	0.0058	0.0069
Finland	0.0220	0.0049	0.0028	0.0034	0.0083
France	0.0066	0.0032	0.0016	0.0019	0.0033
Germany	n/a	0.0023	0.0035	0.0035	0.0033
Greece	0.0139	0.0130	0.0104	0.0094	0.0117
Hungary	0.0248	0.0118	0.0148	0.0240	0.0188
Ireland	n/a	0.0065	0.0031	0.0030	0.0038
Italy	0.0224	0.0045	0.0033	0.0035	0.0084
Latvia	0.0241	0.0146	0.0115	0.0102	0.0141
Lithuania	0.0437	0.0221	0.0092	0.0083	0.0183
Luxembourg	0.0053	0.0043	0.0058	0.0046	0.0050
Malta	0.0135	0.0119	0.0144	0.0128	0.0131
Netherlands	0.0048	0.0048	0.0051	0.0045	0.0048
Poland	0.0292	0.0251	0.0218	0.0240	0.0250
Portugal	0.0148	0.0046	0.0037	0.0027	0.0065
Romania	0.1857	0.0408	0.0164	0.0173	0.0651
Slovak Republic	0.0116	0.0161	0.0156	0.0091	0.0134
Slovenia	0.0191	0.0059	0.0053	0.0039	0.0080
Spain	0.0140	0.0035	0.0036	0.0037	0.0062
Sweden	0.0220	0.0132	0.0104	0.0154	0.0153
United Kingdom	0.0196	0.0169	0.0129	0.0218	0.0178
EURO Members	0.0123	0.0067	0.0062	0.0052	0.0076
Non EURO Members	0.0710	0.0204	0.0115	0.0143	0.0293
Average small countries	0.0443	0.0137	0.0085	0.0081	0.0186
Average large Countries	0.0283	0.0116	0.0082	0.0097	0.0144
Average	0.0344	0.0126	0.0083	0.0089	0.0160

Table 15: Real exchange rate variability

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	0.70	0.52	0.57	0.94	0.68
Belgium	0.73	0.45	0.81	0.92	0.73
Bulgaria	n/a	n/a	0.15	0.66	0.41
Cyprus	n/a	n/a	0.67	0.79	0.76
Czech Republic	0.63	0.56	0.77	0.90	0.73
Denmark	0.73	0.67	0.74	0.87	0.75
Estonia	n/a	0.61	0.68	0.68	0.66
Finland	0.69	0.71	0.63	0.87	0.72
France	0.68	0.80	0.87	0.92	0.81
Germany	0.65	0.86	0.79	0.88	0.79
Greece	0.71	0.41	0.64	0.88	0.66
Hungary	0.64	0.81	0.82	0.88	0.79
Ireland	0.63	0.64	0.71	0.85	0.71
Italy	n/a	0.85	0.82	0.92	0.87
Latvia	n/a	0.27	0.40	0.57	0.47
Lithuania	n/a	0.44	0.53	0.61	0.56
Luxembourg	n/a	0.87	0.81	0.89	0.85
Malta	n/a	0.34	0.37	0.36	0.36
Netherlands	0.76	0.77	0.87	0.91	0.82
Poland	0.45	0.74	0.71	0.86	0.69
Portugal	0.49	0.78	0.73	0.79	0.72
Romania	n/a	n/a	0.34	0.82	0.58
Slovak Republic	0.44	0.08	0.07	0.37	0.22
Slovenia	0.25	0.35	0.35	0.47	0.37
Spain	0.78	0.72	0.82	0.78	0.77
Sweden	0.78	0.84	0.80	0.84	0.81
United Kingdom	0.69	0.56	0.79	0.89	0.73
EU-12	0.70	0.69	0.78	0.88	0.76
Non EU-12	0.62	0.55	0.52	0.71	0.60
Average Small Countries	0.63	0.54	0.53	0.68	0.60
Average Large Countries	0.69	0.68	0.74	0.87	0.74
Average	0.67	0.62	0.64	0.78	0.68

Table 16: Financial market integration

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	0.38	0.48	0.61	0.63	0.52
Belgium	n/a	1.03	1.22	1.28	1.19
Bulgaria	0.30	0.41	0.52	0.61	0.45
Cyprus	0.32	0.26	0.27	0.30	0.29
Czech Republic	0.56	0.75	0.94	1.07	0.86
Denmark	0.34	0.38	0.42	0.44	0.39
Estonia	0.42	0.93	0.95	0.90	0.82
Finland	0.28	0.36	0.37	0.38	0.34
France	0.22	0.26	0.30	0.30	0.27
Germany	0.25	0.28	0.36	0.44	0.33
Greece	0.20	0.19	0.17	0.18	0.19
Hungary	0.36	0.74	0.85	1.01	0.72
Ireland	0.70	0.73	0.64	0.51	0.65
Italy	0.20	0.23	0.25	0.26	0.24
Latvia	0.25	0.49	0.57	0.60	0.49
Lithuania	0.27	0.49	0.59	0.68	0.52
Luxembourg	n/a	0.79	0.87	0.78	0.81
Malta	0.98	0.77	0.75	0.63	0.79
Netherlands	0.59	0.61	0.74	0.85	0.69
Poland	0.24	0.32	0.42	0.53	0.37
Portugal	0.37	0.39	0.40	0.43	0.39
Romania	0.20	0.35	0.49	0.47	0.37
Slovak Republic	0.55	0.64	0.80	1.11	0.80
Slovenia	0.69	0.65	0.72	0.87	0.74
Spain	0.20	0.28	0.29	0.27	0.26
Sweden	0.27	0.36	0.40	0.43	0.36
United Kingdom	0.22	0.22	0.21	0.22	0.22
EU-12	0.33	0.43	0.49	0.49	0.43
Non EU-12	0.38	0.53	0.62	0.68	0.54
Average Small Countries	0.45	0.58	0.64	0.68	0.58
Average Large Countries	0.29	0.40	0.49	0.52	0.42
Average	0.36	0.49	0.56	0.60	0.49

Table 17: Trade integration

	1990-1995	1996-2000	2001-2005	2006-2010	Average
Austria	0.87	0.89	0.89	0.88	0.88
Belgium	0.74	0.82	0.75	0.83	0.78
Bulgaria	n/a	0.40	0.38	0.60	0.48
Cyprus	0.53	0.65	0.61	0.66	0.61
Czech Republic	0.78	0.75	0.84	0.91	0.83
Denmark	0.47	0.53	0.51	0.62	0.53
Estonia	n/a	n/a	n/a	n/a	n/a
Finland	0.48	0.58	0.58	0.72	0.59
France	0.89	0.89	0.88	0.83	0.87
Germany	0.87	0.88	0.83	0.90	0.87
Greece	0.59	0.58	0.50	0.50	0.53
Hungary	0.53	0.71	0.85	0.91	0.74
Ireland	0.90	0.83	0.59	0.27	0.66
Italy	0.81	0.83	0.80	0.79	0.81
Latvia	n/a	0.11	0.56	0.42	0.40
Lithuania	n/a	0.17	0.28	0.40	0.29
Luxembourg	0.77	0.76	0.78	0.80	0.78
Malta	n/a	n/a	0.62	0.67	0.66
Netherlands	0.72	0.65	0.50	0.32	0.56
Poland	0.48	0.61	0.68	0.89	0.65
Portugal	0.77	0.76	0.78	0.77	0.77
Romania	0.36	0.47	0.57	0.82	0.55
Slovak Republic	0.65	0.79	0.83	0.87	0.80
Slovenia	n/a	n/a	n/a	n/a	n/a
Spain	0.81	0.81	0.82	0.82	0.81
Sweden	0.64	0.60	0.60	0.61	0.61
Unites Kingdom	0.79	0.84	0.85	0.82	0.82
EU-12	0.77	0.77	0.71	0.69	0.74
Non EU-12	0.57	0.60	0.64	0.72	0.63
Average Small Countries	0.61	0.60	0.60	0.63	0.61
Average Large Countries	0.73	0.74	0.73	0.76	0.74
Average	0.69	0.69	0.68	0.70	0.69

Table 18: Business cycle synchronization

	Full sample	Large countries	Small countries
Chi² statistic	88.28***	47.09***	32.31***

Table 19: Hausman Test for cross sectional random effects

Null Hypothesis: No misspecification

***, **, *** denote rejection of Null Hypothesis at the 10%, 5% and 1% significance level respectively**

	Full sample	Large countries	Small countries
Chi² statistic	37.56***	52.34***	30.54***

Table 20: Hausman Test for period random effects

Null Hypothesis: No misspecification

***, **, *** denote rejection of Null Hypothesis at the 10%, 5% and 1% significance level respectively**

	Full sample	Large countries	Small countries
Cross-section F-statistic	5.54***	5.47***	4.55***
Cross-section Chi² statistic	129.65***	73.54***	51.63***
Period F statistic	19.62***	14.72***	8.84***
Period Chi² statistic	291.27***	212.72***	138.06***
Cross-section/period F statistic	13.17***	12.04***	8.21***
Cross-section/period Chi² statistic	386.16***	261.45***	171.40***

Table 21: Likelihood ratio test for redundant fixed effects

Null Hypothesis: Fixed effects are redundant

***, **, *** denote rejection of Null Hypothesis at the 10%, 5% and 1% significance level respectively**

Dependent Variable: Real GDP per Capita Growth Rate					
Variable	(a)	(b)	(c)	(d)	(e)
Constant	-0.0262*	-0.0167	0.0168***	-0.0253**	-0.0141
	(0.0139)	(0.0152)	(0.0052)	(0.0128)	(0.0141)
EU	-0.0095**	-0.0115**	0.0118*	.	.
	(0.0048)	(0.0049)	(0.0063)		
Euro	-0.0008	0.0011	-0.0268***	.	.
	(0.0049)	(0.0048)	(0.0062)		
Convergence income	-0.0119	-0.0094	.	-0.0134	-0.0113
	(0.0192)	(0.0266)		(0.0192)	(0.0266)
Convergence Inflation	-0.0001	-0.0002	.	-0.0001	-0.0001
	(0.0003)	(0.0003)		(0.0003)	(0.0003)
Financial Integration	0.0033	0.0015	.	0.0028	0.0010
	(0.0054)	(0.0054)		(0.0054)	(0.0054)
Nominal ExR Variability	-0.7764***	.	.	-0.7173***	.
	(0.2117)			(0.2037)	
Real ExR Variability	.	-1.2394***	.	.	-1.1592***
		(0.2392)			(0.2334)
Sync. of Business Cycle	0.0277***	0.0240**	.	0.0242**	0.0188*
	(0.0101)	(0.0103)		(0.0096)	(0.0100)
Trade Integration	0.0897***	0.0911***	.	0.0770***	0.0757***
	(0.0167)	(0.0167)		(0.0155)	(0.0155)
Observations	412	396	563	412	396
D.-W. stat.	1.28	1.29	1.05	1.27	1.27
R^2	0.68	0.69	0.43	0.68	0.69
Adj. R^2	0.64	0.65	0.37	0.64	0.64

Table 22: Preliminary Estimation Results: Full Country Sample

***, **, *** denotes significance at the 10%, 5% and 1% level respectively**

Standard Errors in parentheses

Dependent Variable: Real GDP per Capita Growth Rate					
Variable	(a)	(b)	(c)	(d)	(e)
Constant	-0.0018	0.0007	0.0179***	-0.0170	-0.0065
	(0.0159)	(0.0163)	(0.0062)	(0.0136)	(0.0141)
EU	-0.0027	-0.0041	0.0083	.	.
	(0.0051)	(0.0052)	(0.0061)		
Euro	-0.0099**	-0.0056	-0.0233***	.	.
	(0.0049)	(0.0049)	(0.0057)		
Convergence income	-0.0348	-0.0323	.	-0.0200	-0.0253
	(0.0256)	(0.0258)		(0.0245)	(0.0247)
Convergence Inflation	-0.0002	-0.0003	.	-0.0001	-0.0002
	(0.0003)	(0.0003)		(0.0003)	(0.0003)
Financial Integration	0.0012	0.0004	.	0.0014	0.0003
	(0.0054)	(0.0054)		(0.0054)	(0.0054)
Nominal ExR Variability	-0.8909***	.	.	-0.8261***	.
	(0.2205)			(0.2191)	
Real ExR Variability	.	-1.0100***	.	.	-0.9952***
		(0.2320)			(0.2313)
Sync. of Business Cycle	0.0237**	0.0234*	.	0.0289***	0.0242**
	(0.0120)	(0.0120)		(0.0108)	(0.0108)
Trade Integration	0.0582***	0.0607***	.	0.0567***	0.0562***
	(0.0200)	(0.0196)		(0.0178)	(0.0176)
Observations	254	248	292	254	248
D.-W. stat.	1.44	1.49	1.05	1.40	1.48
R^2	0.70	0.71	0.49	0.70	0.71
Adj. R^2	0.64	0.65	0.42	0.64	0.65

Table 23: Preliminary Estimation Results: Large Country Sample

***, **, *** denotes significance at the 10%, 5% and 1% level respectively**

Standard Errors in parentheses

Dependent Variable: Real GDP per Capita Growth Rate					
Variable	(a)	(b)	(c)	(d)	(e)
Constant	-0.0178	0.0002	0.0094	-0.0189	-0.0005
	(0.0265)	(0.0333)	(0.0072)	(0.0271)	(0.0338)
EU	-0.0128	-0.0141	0.0240**	.	.
	(0.0096)	(0.0098)	(0.0119)		
Euro	0.0296***	0.0243**	-0.0176	.	.
	(0.0112)	(0.0116)	(0.0113)		
Convergence income	-0.0660*	-0.0682	.	-0.0263	-0.0295
	(0.0371)	(0.0593)		(0.0348)	(0.0564)
Convergence Inflation	0.0003	0.0005	.	0.0001	0.0003
	(0.0007)	(0.0007)		(0.0007)	(0.0007)
Financial Integration	0.0079	0.0028	.	0.0047	-0.0010
	(0.0108)	(0.0112)		(0.0109)	(0.0113)
Nominal ExR Variability	-0.6037	.	.	-0.9937***	.
	(0.4298)			(0.3783)	
Real ExR Variability	.	-1.4727***	.	.	-1.8403***
		(0.5501)			(0.4813)
Sync. of Business Cycle	0.0187	0.0198	.	0.0136	0.0142
	(0.0168)	(0.0180)		(0.0171)	(0.0182)
Trade Integration	0.1041***	0.0999***	.	0.0902***	0.0830***
	(0.0294)	(0.0304)		(0.0270)	(0.0277)
Observations	158	148	271	158	148
D.-W. stat.	1.32	1.26	1.05	1.27	1.22
R^2	0.77	0.78	0.49	0.76	0.77
Adj. R^2	0.70	0.71	0.42	0.68	0.70

Table 24: Preliminary Estimation Results: Small Country Sample

***, **, *** denotes significance at the 10%, 5% and 1% level respectively**

Standard Errors in parentheses

COUNTRY	(1)	(2)	(3)	(4)	(5)	(6)
Austria	-0.0055	-0.0130	-0.0012	-0.0101	0.0438	0.0347
Belgium	-0.0720	-0.0665	-0.0418	-0.0588	0.0029	-0.0102
Bulgaria	0.0127	0.0329	-0.0131	-0.0067	-0.1463	-0.1558
Cyprus	0.0194	0.0161	0.0257	0.0225	0.0252	0.0210
Czech Republic	-0.0341	-0.0311	-0.0512	-0.0583	-0.0742	-0.0855
Denmark	0.0006	0.0021	0.0138	0.0079	0.0491	0.0478
Estonia	-0.0148	.	-0.0537	.	-0.1295	.
Finland	0.0120	0.0083	0.0269	0.0222	0.0479	0.0428
France	0.0138	0.0033	0.0285	0.0217	0.0514	0.0430
Germany	0.0102	0.0005	0.0103	0.0065	0.0513	0.0445
Greece	0.0297	0.0297	0.0289	0.0354	0.0125	0.0149
Hungary	-0.0316	-0.0295	-0.0289	-0.0376	-0.0865	-0.1019
Ireland	-0.0042	-0.0020	0.0011	-0.0027	0.0528	0.0526
Italy	0.0145	0.0052	0.0183	0.0160	0.0410	0.0357
Latvia	0.0194	0.0288	-0.0214	-0.0137	-0.1309	-0.1364
Lithuania	0.0035	0.0303	-0.0021	0.0037	-0.0881	-0.0930
Luxembourg	-0.0242	-0.0238	-0.0081	-0.0184	0.1332	0.1319
Malta	-0.0229	0.0048	0.0027	0.0161	-0.0168	-0.0166
Netherlands	-0.0215	-0.0191	-0.0095	-0.0159	0.0455	0.0425
Poland	0.0310	0.0298	0.0282	0.0283	-0.0630	-0.0748
Portugal	0.0067	0.0004	-0.0076	-0.0077	-0.0266	-0.0331
Romania	0.0160	0.0194	-0.0024	0.0037	-0.1405	-0.1519
Slovak Republic	-0.0110	-0.0094	-0.0321	-0.0380	-0.0926	-0.1065
Slovenia	-0.0144	.	-0.0341	.	-0.0390	.
Spain	0.0208	0.0116	0.0046	0.0053	0.0109	0.0072
Sweden	0.0090	0.0089	0.0376	0.0306	0.0646	0.0603
United Kingdom	0.0273	0.0213	0.0333	0.0337	0.0615	0.0586

Table 25: Full Country Sample: Estimated cross section fixed effects

YEAR	(1)	(2)	(3)	(4)	(5)	(6)
1990	0.0304	0.0334	.	.	.	.
1991	-0.0145	-0.0166	-0.0091	-0.0088	-0.0330	-0.0336
1992	-0.0129	-0.0061	-0.0063	-0.0045	-0.0278	-0.0250
1993	-0.0211	-0.0112	-0.0098	-0.0089	-0.0303	-0.0281
1994	0.0115	0.0204	0.0154	0.0154	-0.0024	-0.0012
1995	0.0195	0.0225	0.0214	0.0223	-0.0078	-0.0066
1996	0.0084	0.0126	0.0105	0.0106	-0.0139	-0.0132
1997	0.0175	0.0145	0.0163	0.0151	-0.0025	-0.0038
1998	0.0145	0.0146	0.0093	0.0120	-0.0083	-0.0065
1999	0.0110	0.0084	0.0096	0.0114	0.0011	0.0004
2000	0.0172	0.0141	0.0122	0.0125	0.0092	0.0071
2001	0.0007	0.0013	-0.0037	-0.0012	-0.0019	-0.0018
2002	0.0027	-0.0018	0.0008	-0.0006	0.0093	0.0056
2003	0.0012	-0.0021	-0.0010	-0.0009	0.0114	0.0100
2004	0.0094	0.0070	0.0094	0.0093	0.0184	0.0187
2005	0.0058	0.0012	0.0052	0.0026	0.0168	0.0149
2006	0.0121	0.0078	0.0079	0.0056	0.0257	0.0245
2007	0.0098	0.0070	0.0019	0.0018	0.0232	0.0236
2008	-0.0228	-0.0230	-0.0233	-0.0220	0.0037	0.0056
2009	-0.0867	-0.0865	-0.0689	-0.0688	-0.0351	-0.0335
2010	-0.0138	-0.0175	0.0021	-0.0030	0.0444	0.0432

Table 26: Full Country Sample: Estimated period fixed effects

COUNTRY	(1)	(2)	(3)	(4)	(5)	(6)
Austria	-0.0041	-0.0109	-0.0131	-0.0146	0.0118	-0.0151
Belgium	-0.0329	-0.0430	-0.0600	-0.0619	-0.0216	-0.0508
Czech Republic	-0.0131	-0.0218	-0.0548	-0.0570	-0.0543	-0.0420
France	-0.0004	-0.0027	0.0151	0.0144	0.0216	0.0062
Germany	-0.0006	-0.0035	0.0052	0.0028	0.0246	0.0000
Greece	0.0110	0.0253	0.0273	0.0343	0.0104	0.0251
Italy	-0.0010	-0.0008	0.0106	0.0105	0.0182	0.0058
Netherlands	-0.0113	-0.0070	-0.0188	-0.0152	0.0139	-0.0129
Poland	0.0250	0.0267	0.0263	0.0264	-0.0292	0.0213
Portugal	-0.0002	-0.0003	-0.0070	-0.0076	-0.0163	-0.0065
Romania	0.0149	0.0178	0.0101	0.0089	-0.0512	0.0274
Spain	0.0063	0.0061	0.0090	0.0070	0.0082	0.0039
Sweden	-0.0012	0.0052	0.0167	0.0216	0.0248	0.0141
United Kingdom	0.0075	0.0090	0.0333	0.0303	0.0391	0.0235

Table 27: Large Country Sample: Estimated cross section fixed effects

YEAR	(1)	(2)	(3)	(4)	(5)	(6)
1990	0.0237	0.0277	.	.	.	.
1991	-0.0090	-0.0083	-0.0037	-0.0023	-0.0220	-0.0247
1992	-0.0158	-0.0140	-0.0088	-0.0053	-0.0264	-0.0254
1993	-0.0202	-0.0176	-0.0192	-0.0151	-0.0332	-0.0320
1994	0.0070	0.0110	0.0078	0.0104	0.0021	0.0015
1995	0.0154	0.0172	0.0140	0.0160	-0.0077	-0.0080
1996	0.0050	0.0078	0.0056	0.0076	-0.0138	-0.0136
1997	0.0049	0.0066	0.0119	0.0126	-0.0019	-0.0033
1998	0.0037	0.0042	0.0075	0.0080	-0.0055	-0.0068
1999	0.0123	0.0111	0.0105	0.0101	0.0024	0.0007
2000	0.0174	0.0162	0.0096	0.0092	0.0045	0.0033
2001	0.0036	0.0032	-0.0018	-0.0018	-0.0080	-0.0082
2002	-0.0022	-0.0027	-0.0050	-0.0052	-0.0044	-0.0048
2003	-0.0016	-0.0031	-0.0054	-0.0060	-0.0007	-0.0017
2004	0.0096	0.0085	0.0074	0.0070	0.0108	0.0101
2005	0.0009	-0.0006	-0.0011	-0.0018	-0.0006	-0.0011
2006	0.0142	0.0130	0.0081	0.0077	0.0153	0.0153
2007	0.0099	0.0085	0.0007	0.0003	0.0048	0.0052
2008	-0.0116	-0.0135	-0.0179	-0.0180	-0.0123	-0.0115
2009	-0.0607	-0.0630	-0.0548	-0.0552	-0.0367	-0.0368
2010	-0.0058	-0.0074	-0.0048	-0.0048	0.0269	0.0268

Table 28: Large Country Sample: Estimated period fixed effects

COUNTRY	(1)	(2)	(3)	(4)	(5)	(6)
Bulgaria	0.0211	0.0311	-0.0030	0.0016	-0.1255	-0.1527
Cyprus	0.0290	0.0146	0.0240	0.0221	0.0536	0.0594
Denmark	0.0127	-0.0049	0.0230	0.0126	0.0936	0.0973
Estonia	-0.0069	.	-0.0324	.	-0.1001	.
Finland	0.0103	-0.0036	0.0275	0.0233	0.0845	0.0830
Hungary	-0.0226	-0.0238	-0.0054	-0.0248	-0.0446	-0.0772
Ireland	-0.0156	-0.0248	-0.0038	-0.0110	0.0780	0.0850
Latvia	0.0298	0.0300	-0.0099	-0.0058	-0.103	-0.1247
Lithuania	0.0133	0.0304	0.0054	0.0093	-0.0626	-0.0805
Luxembourg	-0.0367	-0.0457	-0.0060	-0.0221	0.1728	0.1858
Malta	-0.0175	0.0092	0.0124	0.0215	0.0155	0.0105
Slovak Republic	-0.0062	-0.0125	-0.0121	-0.0269	-0.0576	-0.0860
Slovenia	-0.0107	.	-0.0196	.	-0.0046	.

Table 29: Small Country Sample: Estimated cross section fixed effects

YEAR	(1)	(2)	(3)	(4)	(5)	(6)
1990	.	.	.	.	.	.
1991	-0.0306	-0.0289	-0.0608	-0.0658	-0.0810	-0.0839
1992	-0.0128	0.0201	-0.0146	-0.0240	-0.0304	-0.0371
1993	-0.0260	0.0148	0.0223	0.0090	-0.0061	-0.0190
1994	0.0129	0.0461	0.0536	0.0381	0.0123	-0.0046
1995	0.0215	0.0378	0.0213	0.0285	-0.0240	-0.0206
1996	0.0090	0.0239	0.0119	0.0137	-0.0300	-0.0293
1997	0.0297	0.0312	0.0238	0.0212	-0.0160	-0.0233
1998	0.0260	0.0345	0.0161	0.0205	-0.0248	-0.0285
1999	0.0102	0.0119	0.0120	0.0178	-0.0169	-0.0218
2000	0.0200	0.0200	0.0204	0.0207	-0.0022	-0.0119
2001	0.0010	0.0075	-0.0014	0.0034	-0.0155	-0.0213
2002	0.0113	0.0072	0.0098	0.0088	0.0025	-0.0082
2003	0.0079	0.0067	0.0052	0.0081	0.0034	-0.0013
2004	0.0127	0.0135	0.0097	0.0150	0.0031	0.0026
2005	0.0150	0.0107	0.0119	0.0109	0.0084	0.0050
2006	0.0152	0.0107	0.0101	0.0075	0.0134	0.0093
2007	0.0135	0.0129	0.0045	0.0071	0.0155	0.0162
2008	-0.0342	-0.0258	-0.0319	-0.0271	-0.0095	-0.0066
2009	-0.1201	-0.1108	-0.0977	-0.0928	-0.0619	-0.0584
2010	-0.0254	-0.0280	-0.0009	-0.0048	0.0371	0.0321

Table 30: Small Country Sample: Estimated period fixed effects