

## **REGIONAL INTEGRATION AND ECONOMIC GROWTH: THE CASE OF THE EUROPEAN UNION**

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### I. INTRODUCTION

The impact of integration on growth, in particular, the economic growth of the European region, and especially that of the European Union (EU), has been analyzed, not only through the application of commonly used theoretical models, but also in the light of specific characteristics of its economic and political integration. A special focus has been placed on the potential growth advantages that the EU may provide to its members. The most recent round of EU enlargement in May 2004 has brought further interest in the growth implications of the enlargement. In this paper, we further investigate the determinants of the growth patterns in the EU-15 group. Besides the analysis of common growth determinants, special interest is placed on the influence of variables that may capture the impact of integration, such as trade flows and the measures of trade barriers. Furthermore, we are particularly interested in another possible growth determinant in the form of foreign direct investment (FDI), as an additional potential proxy for measuring the integration benefits of FDI on growth, besides the widely analyzed “trade-induced investment-led” economic growth.

Although there is a great deal of work investigating the impact of the integration on economic growth in non-EU countries, this issue has been studied extensively for the EU countries.<sup>1</sup> Baldwin and Seghezza (1996)

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<sup>1</sup> Non-EU studies investigating the trade-growth link include Levine and Renelt (1992), Sala-i-Martin (1994), Lee (1995), Frankel and Romer (1999) and Yanikkaya (2003). Borensztein, De Gregorio and Lee (1998), Aitken and Harrison (1999), and Durham

investigated the impact of European integration on economic growth, using a two-equation system derived from a theoretical trade and growth model which emphasizes the link between trade barriers and the demand for capital. The first equation is the GDP per capita growth equation, which included the initial level of GDP per capita, population growth, investment in human capital, initial level of human capital and the investment-to-GDP ratio as explanatory variables. The second is an investment equation, which explained the investment ratio using the same variables as the growth equation plus some measures of domestic and foreign trade barriers. The results showed that domestic trade barriers tend to decrease investment and consequently have a negative impact on growth. Foreign barriers were found to have the same impact on growth, but those results were less robust to sample used and trade proxy changes. Since one of the main characteristics of the European integration was a sharp decline in trade barriers, the authors characterized this effect as trade-induced investment-led growth. Furthermore, they also tested for a possible impact of trade on technological progress, by including the trade variable both in the growth and investment equation, and found that there is no evidence of technology boosting impact of trade. However, they noted that those findings certainly did not provide conclusive evidence for the rejection of the trade-induced technology-led growth hypothesis since the investment coefficient in the growth equation may have picked some of the technological progress impact on growth.

Henrekson, Torstensson and Torstensson (1997) investigated the impact of the European Community (EC) and European Free Trade Area (EFTA) stages of European integration on economic growth in the 1960–1985 period (and subperiods), in a sample of 22 OECD countries. In a Barro-style regression, besides commonly-used variables, a trade policy variable (real exchange rate distortion) and a dummy variable for the EC or EFTA membership were included. They found a positive impact of

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(2004) study the FDI-growth link. Survey studies include Baldwin (2000), Saggi (2000) and Walde and Wood (2004).

European integration on growth, suggested by the significant EC/EFTA coefficient, which stayed significant even when the general trade policy measure is included in the regression.

Barrell and Pain (1997a) showed that FDI has a direct and significant effect on technical progress in the private sector in EU-15 countries. In addition, they found that FDI affects the economic growth in Europe positively. Dohrn, Milton and Radmacher-Nottelmann (2001) discussed several implications of the FDI inflows in the new EU member states who experienced a surge in FDI inflows in the 1990s as their accession to EU became more probable. They argued that FDI brings new technology transfers, skills and governance improvements. About half of those inflows came from present EU members, and half of that level represented FDI inflows from Germany. A positive correlation between the economic growth and FDI per capita was detected. Damijan, Knell, Majcen and Rojec (2003) performed a study of that type for eight transition economies, six newly accessed EU members and two candidate countries. Using a firm-level panel data sample for 1994-1998 period, they investigated the importance of several possible channels of technological development and transfers. The results showed that in five out of eight countries, direct FDI presented the most efficient source of productivity growth in the recipient firm, compared to some other channels of technological development, such as intra-industry FDI spillovers, firms' own R&D activities and international R&D spillovers through trade.

As an extension of these studies, we analyzed the impact of trade and FDI net inflows on economic growth in the EU-15 countries, using a larger sample period than previous studies. Again, we are more interested in the impact trade flows and the measures of trade barriers, as well as net FDI inflows, as proxies for measuring the benefits of regional integration on growth. In the next section, we discuss our theoretical and empirical framework. The following section reports the empirical results and compares our findings with those of previous

studies. The final section concludes the paper with some policy implications of the findings.

## II. THEORETICAL AND EMPIRICAL FRAMEWORK

The starting point is the augmented Solow (1956) model of economic growth which includes human capital accumulation (Mankiw, Romer and Weil, 1992). The first equation of the system is the Cobb–Douglas production function in terms of GDP per capita ( $Y/L$ ), which depends on four factors: capital formation ( $K$ ), human capital ( $H$ ), labor force ( $L$ ) and total factor productivity ( $A$ ):

$$Y/L = (K/L)^\alpha (H/L)^\beta A^{1-(\alpha + \beta)} \quad (1)$$

with  $\alpha$  and  $\beta$  being the parameters that explain the magnitude of returns of physical and human capital, respectively.<sup>2</sup> In this function, the change in GDP per capita, representing living standards, can be explained by the changes in the investment rate ( $s_k$ ), human capital formation rate ( $s_h$ ),<sup>3</sup> population growth rate ( $n$ ) and the total factor productivity growth ( $g$ ). A high investment rate, human capital formation rate and Total Factor Productivity (TFP) growth all imply higher GDP per capita growth, while a high population growth rate impedes GDP per capita growth, since a greater share of investment has to be devoted to equipping the new workforce and a smaller share is devoted to capital deepening.

The second portion of the model defines the changes in capital stock, physical and human. When the production function and capital change equations are combined, the model predicts that each economy grows towards its own steady–state of physical and human capital per unit of effective labor ratios, or  $k^*$  and  $h^*$ , respectively. The steady–state is determined by the structural parameters: the savings rate, the rate of

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<sup>2</sup>  $(\alpha + \beta)$  is assumed to be smaller than 1; when  $(\alpha + \beta) = 1$ , then there are no diminishing returns to capital, and the steady state does not exist (the specification becomes a representation of an endogenous growth model).

<sup>3</sup> Or human capital level, depending on the specification.

investment in human capital, the population growth rate, the TFP growth,  $g$  and the capital depreciation rate,  $d$ . (Mankiw et al. (1992).

$$k^* = (S_k^\beta S_h^{1-\beta} / (n+g+d))^{1/(1-\alpha+\beta)} \quad (2)$$

$$h^* = (S_k^\alpha S_h^{1-\alpha} / (n+g+d))^{1/(1-\alpha+\beta)} \quad (3)$$

Once the steady state is reached, living standards continue to grow at the rate of total factor productivity growth. The Solow theory also accounts for the differences in a country's position relative to its steady state. The convergence theory implies that the further the economy is below its steady state, the faster it grows, since the low level of capital formation implies high returns and, thus, an increase in capital inflows which accelerates GDP per capita growth. In order to test for this effect, GDP per capita growth models include the log-value of the initial GDP per capita in the analyzed period. Although this theory predicts that each economy grows towards the steady state, it does not necessarily imply that living standards converge to the same steady state value, since steady-state parameters can be significantly different across countries. The theory only implies that living standards converge to a country's specific steady state, determined by its structural parameters (Jones, 2002). However, if the analyzed countries are similar in terms of their economic structure and development, their steady states will be similar as well. It may seem reasonable to assume similar economic structures for the EU-15 group since each member state was required to conduct strict structural pre-entry reforms in order to be integrated in the unified economic system of the Union. In addition, free capital flows and technological transfers that characterize free trade zones like the EU may imply similar total factor productivity levels and growth rates. Although this is a simplified structural representation of the EU, this study is not primarily focused on the analysis of the convergence theory; as a result, the estimated convergence coefficient in the growth regression may be analyzed based on this assumption.

After substituting the steady state expressions for physical and human capital into the production function and taking logs, Mankiw et al. (1992) obtained the equation for GDP per capita and suggested a regression to investigate the living standards growth, based on this growth theory. In this model, GDP per capita growth is a function of the determinants of the steady state, population growth rate and investment in physical and human capital, and the initial level of GDP per capita as the convergence factor. As a result, the following empirical specification is used in this study:

$$g(Y/L)_{it} = \beta_1 + \beta_2 \ln(Y_0/L_0)_{it} + \beta_3 S_{k\ it} + \beta_4 n_{it} + \beta_5 S_{h\ it} + \beta_6 S_{h0\ it} + e_{it}, \quad (4)$$

where  $i$  [1,14] represents the country index (14 countries included)<sup>4</sup> and  $t$  represents the time index. In order to avoid the influence of short-term disturbances, the observations were averaged over 5-year intervals (5-year averages for the 1973–2002 period result in  $t$  [1,6])<sup>5</sup>.

The model implies that the average growth rate of GDP per capita,  $[g(Y/L)]$ , depends on the investment rate,  $S_k$ , the population growth rate,  $n$ , the starting log-value of GDP per capita,  $[\ln(Y_0/L_0)]$ , the rate of investment in human capital,  $S_h$ , and an additional human capital factor, namely, the initial investment in human capital,  $S_{h0}$ . Even though human capital formation is exogenous in this model, it may be possible that it is affected by some other variables in the model (e.g., income per capita) and thus, its initial value is included to allow for endogeneity. The coefficients on capital formation (physical and human) should enter as positive in the model, since higher levels of those variables imply higher steady-states and acceleration in growth rates. Population growth coefficient should have a negative sign, and the impact of the initial level of income per capita should be negative, since a low initial level of living standards leaves room for rapid “catch-up” growth. In fact, this effect

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<sup>4</sup> Luxembourg is not included in the analysis of the E-15 group due to lack of data and the characteristics of this economy.

<sup>5</sup> See for example, Barro and Sala-i-Martin (1992).

can include both rapid factor accumulation and rapid technological convergence. Therefore, this variable may serve as the only explanatory factor of the technological progress, because technological change is not explained by this specification of the model and is actually a part of the residual.

The impact of the EU integration variables is possible to investigate only through their influence on one of the four factors of the production function. This study assumes an endogenously-determined physical capital investment rate and derives the investment equation as following:

$$S_{k\ it} = \beta_1 + \beta_2 \ln(Y_0/L_0)_{it} + \beta_3 \Pi_{it} + \beta_4 S_{h\ it} + \beta_5 S_{h0\ it} + \beta_6 EU_{it} + e_{it} \quad (5)$$

The explanation for the factors and their expected signs are the same as represented for the growth equation, with the initial level of GDP per capita being a proxy for initial level of capital formation or the catch-up factor. Based on the findings of the studies discussed in the literature review section, this study uses trade barriers and volumes, and also FDI inflows, as proxies for benefits brought at least in part by the EU integration. Therefore, the EU variable in Equation 5 stands for the trade indicators or net FDI inflows and allows for the analysis of the integration-induced investment-led growth. If trade barriers are used as a proxy for integration, the expected sign is negative, and in the case of trade openness measures or net FDI inflows, the expected signs are positive. If those variables prove to have a significant impact on the investment rate, the results would imply that EU integration helped the investment rate increase and, thus, if higher investment increases growth, the integration also had a positive growth impact through this channel. Since the independent measure of technological progress is not available, this variable cannot be separately explained in the same manner as the investment rate. Therefore, after analysis of the integration variables' impact on the investment rate, the EU variable is also included in the growth regression, together with the investment rate variable, in order to investigate the presence of an impact that goes

beyond the integration's influence on the investment rate. If any separate, non-investment effect is found, that would imply that the integration had a significant impact on the technological development. This effect is known as the integration-induced technology led-growth (Levine and Renelt, 1992).

### III. EMPIRICAL RESULTS

The estimation was conducted as follows. First, a panel estimation technique was applied for the growth and investment equations, Equations 4 and 5, respectively. The Hausman test of random versus fixed effects was used to determine which specification fits the data better. In all estimations, the chosen model results are reported in the corresponding tables. The coefficients were then estimated using the least squares estimation technique.

#### *Data*

The list of sample countries is presented in Table 1. The sample period is 1973–2002. The sample periods are divided into 5-years intervals, each represented by one observation per country consisting of the averaged values of the included variables. Therefore, there are 84 observations. Besides the GDP per capita growth rate, log value of the initial GDP per capita (log value of GDP per capita in the starting year of each interval) and the population growth rate, the following variables are used for the growth and investment equations. As the measure of the investment rate, two indicators are used: gross capital formation as a percentage of GDP (addition to the fixed assets of the economy plus net changes in the inventory) and the gross domestic savings rate (GDP less total final consumption, as a percentage of GDP). The difference between those two categories equals total international savings. Human capital variables are represented by the secondary school enrollment rates (the interval average and the initial value of the interval). Two indicators are used as

the trade variable: import duties as a percentage of revenues (as a proxy for trade barriers) and the total value of exports and imports as a percentage of GDP (as the measure of the trade openness). FDI is represented by the net FDI inflows as a percentage of GDP. All the data was obtained from the World Development Indicators, 2004 database. Some missing observations were obtained from IMF's IFS database and from the Eurostat on-line database.

### *Results*

Table 2 presents the results of the basic growth regression. The Hausman test was used to determine the appropriate type of estimation and random effects were chosen in the estimations. The results suggest that gross capital formation has no effect on GDP per capita growth. However, when domestic savings rate is included, instead of gross capital formation, the coefficient of this factor becomes significant and positive. The results indicate that for each one percentage point increase in domestic savings rate, there is, on average, more than a 0.2 percentage point increase in GDP per capita growth, *ceteris paribus*. In addition, the catch-up factor also is significant and negative, but only when the savings rate is used, implying the existence of the convergence process toward the steady-states of the EU-15 members. If similar steady-state parameters are assumed for all members of this group, this finding also implies convergence among the countries. Contrary to some earlier studies, human capital formation is significant when gross capital formation is employed.

The issue of capital formation versus domestic savings deserves some further discussion. One possible explanation of the insignificance of the gross capital formation for economic growth may be derived from the predictions of the Solow model. Since the majority of the countries in this group can be characterized as developed, the model predicts that the most significant factor influencing the GDP per capita growth is actually the technological progress, and capital formation does not

contribute much to the further economic progress if a country has already reached higher development stages. Thus, one can expect that the factors which are included in the residual of the growth regression would actually have the most important impact on growth.

Second, it should be noted that the gross capital formation measure, as opposed to gross domestic savings, includes both domestic and international savings. In this group of countries, except for Greece, Portugal and the UK (the two poorest and one of the richest countries, respectively), all other economies had mostly negative values of international savings in the analyzed period, indicating that these countries have been investing abroad. Since the measure of gross domestic savings rate includes the positive investment in foreign countries (negative international savings), it is more likely that the significance of the savings rate coefficient in the growth equation is actually the result of the positive correlation between the economic growth and the outflows of investment. In other words, it may be the case that countries with higher growth also tend to have negative values of international savings (positive investment in foreign countries) and thus, have higher total domestic savings rates. In this sense, the impact of the gross domestic savings rate cannot be regarded as a contribution to the accumulation of physical capital.

Table 3 presents the analysis of the EU integration impact on the gross capital formation. Although the previous results show no significant impact of this factor on growth in the EU-15 group, and thus the accumulation of physical capital cannot be regarded as a possible channel of the EU integration impact on growth in those countries, gross capital formation rate is still one of the parameters that determine the steady state. Therefore, any positive impact of the integration on the accumulation of physical capital would raise the steady-state living standards.

In Table 3, three different specifications of the investment regression include three specific EU integration variables. The first model introduces

the measure of import duties, the second model includes the indicator of the trade openness of the economy, and finally, the third specification introduces FDI inflows. It is not assumed that the increase in FDI inflows is solely a result of integration progress and not a consequence of globalization, but it can be argued that at least some part of that effect came as a response to the development of the EU Single Market Program, and thus, in some sense, FDI inflows can be analyzed as a specific benefit of the EU integration for the EU-15 group.

The results show that in all three specifications, the initial value of GDP per capita is significant and of expected negative sign. Since this factor was not significant in the growth equation, it seems to be the case that a country's position relative to its steady state primarily had an impact on its physical capital investment rates. Less developed economies had higher rates of capital formation; however, they did not tend to grow faster. The initial human capital variable has only a marginal, positive and expected impact. Surprisingly, the impact of the human capital accumulation showed up to be negative (opposite of expected) and significant.

The first integration variable is not significant. Since the import duties were eliminated or stayed close to zero for most of the second half of the analyzed period for the majority of the EU members, it can be expected that this factor's impact will no longer be significant. Therefore, the second integration measure is introduced in terms of the trade openness, exports plus imports, as a percentage of GDP. However, the openness of the EU-15 members did not prove to be a significant factor in the explanation of the gross capital formation. Finally, FDI inflows are introduced into the investment regression and the impact of this factor shows up to be insignificant, as well. According to these results, there is no evidence of a significant impact of the EU integration on physical capital formation in the EU-15 group. Having also in mind that the physical capital formation did not prove to have any impact on growth, it can be concluded that, based on this sample, there is no

evidence of the integration-induced investment-led growth in the analyzed period.

The results suggest that it is more important to analyze other channels of a possible growth impact of those integration variables. Furthermore, the model implies that the only important growth factor for the countries which have reached their steady-states is technological progress. Since some of the previous studies suggest the importance of FDI as a vehicle for technological transfers, the following analysis attempts to investigate the growth impact of FDI inflows which goes beyond their impact through capital formation, and includes both variables, FDI and capital formation, in the growth regression. Table 4 presents the results of that analysis.

In this specification, the impact of all previously analyzed variables is consistent with the results of the basic growth regression and the interpretation is the same. The most important result is that net FDI inflows prove to have a significant positive impact on GDP per capita growth: for each one percentage point increase in the FDI inflows (as a percentage of GDP), there is, on average, a 0.2981 percentage point increase in GDP per capita growth rate, *ceteris paribus*. Based on the theoretical model, this finding indicates that net FDI inflows have a positive impact on technological growth. To the extent that an increase in the net FDI inflows can be regarded as a result of the EU integration, these results also provide evidence of the FDI-induced technology-led growth.

#### *Summary and Comparison of the Empirical Findings with Previous Studies*

The basic growth regression results suggest that physical capital accumulation did not have a significant impact on the GDP per capita growth in the period analyzed. This finding is not surprising if the predictions of the Solow model are taken into account. That is to say, the model suggests that at the higher stages of economic development, which is the case for the majority of the countries in this group, if a

country has already reached its steady-state living standards level, higher physical capital formation does not have the ability to produce higher steady-state growth. The economy continues to grow at the rate of technological progress which becomes the only source of economic growth. As the results suggest, the overall impact of the human capital formation is also insignificant, as well as the coefficient of the “catch-up” factor, suggesting no presence of the convergence process in this group of countries during the period analyzed.

However, when a different proxy for investment, in terms of gross domestic savings rate, is applied, a substantial change in the results occurs. The technology “catch-up” factor proves to have a significant negative impact on GDP per capita growth, and the coefficient of the gross domestic savings rate also becomes significant and positive. Since the formation of capital, a valid proxy for domestic investment, does not have a significant impact on growth, the significance of the domestic savings rate coefficient cannot be regarded as a representation of the growth-boosting impact of investment. The gross domestic savings rate includes the portions of the total domestic savings that flow out of the country and which were mostly positive in the analyzed period for this group of countries. It is more likely that the results of this factor’s influence actually represent a bidirectional relationship of that component and GDP per capita growth. In other words, it may be the case that rich countries also tend to have higher domestic savings rates, but a clear causation, if it exists, cannot be determined.

Furthermore, the results show no significant impact of import duties, trade openness and net FDI inflows on gross capital formation, and thus imply that EU integration did not have a significant influence on the determination of the steady-state position through its impact on the capital formation parameter in EU-15. Moreover, since the capital formation variable did not have a significant growth impact, the evidence from this sample does not only dismiss the possibility that integration-induced investment-led growth has occurred, but it dismisses the

hypothesis that any investment-led growth has occurred, as well. Therefore, the influence of the integration variables on growth should be investigated through other channels. This study has focused on the impact of net FDI inflows. When both capital formation and FDI inflows are included in the growth regression, the impact of the net FDI inflows were positive and significant, suggesting the presence of the FDI influence through technological progress.

The results presented above are partially consistent with those obtained in Baldwin and Seghezza (1996), because they detected the presence of integration-induced investment-led growth, but not any evidence of the EU integration impact on growth through the technology channel. However, several facts that may explain the different findings should be noted. First, Baldwin and Seghezza (1996) analyzed growth patterns in the earlier stages of EU integration, and second, the authors used somewhat different indicators of integration policies from the ones used in this study. Second, the sample periods used are different. Finally, they specially note that their findings certainly do not provide conclusive evidence for the rejection of the trade-induced technology-led growth hypothesis. Furthermore, Henrekson, Torstensson and Torstensson (1997) found a significant and positive impact of the EC/EFTA dummy on growth, but, as opposed to Baldwin and Seghezza (1996), no impact of European integration on investment was found, suggesting that the integration growth effect was led by technology in the 1976–85 period, which is consistent with the results of this study.

The results of this study are consistent with those obtained by Dohrn et al. (2001), who argued that FDI brings new technology transfers, skills and governance improvement, and found a positive correlation between the economic growth and FDI per capita. The results of Damijan et al. (2003) showed that direct FDI presents the most efficient source of productivity growth in the recipient firm, and if one can assume that EU integration encourages FDI inflows in the EU member states, which is supported by evidence (i.e., Barrell and Pain, 1997b and Dohrn et al.,

2001), they also concluded that the integration has a beneficial impact on growth through this channel.

#### IV. CONCLUSION

This study investigated the impact of the trade and FDI variables on the growth performance of the EU-15 group. The results do not provide any evidence of the capital formation impact on growth. Therefore, the presence of any kind of investment-led growth can hardly be supported by the evidence from this sample. However, the presence of the net FDI inflow's impact on technology has been detected, suggesting that the FDI inflows have mostly served as a special channel for technological transfers. To the extent that the EU integration has caused higher FDI inflows, it is clear that this process had a beneficial impact on growth. This has important policy implications, not only for the EU-15 countries, but also the new EU members that joined in 2004. In order to set the FDI-induced technology-led growth process in motion, foreign investment inflows should be encouraged through the creation of favorable economic and political conditions in the host countries through substantial reduction in the regulatory burden, improvement in the government performance and responsibility, and further democratization of the society.

## REFERENCES

- Aitken, B.J. and Harrison A.E. 1999. "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela," *American Economic Review* 89(3): 605–618.
- Baldwin, R.E. 2000. "Trade and Growth: Still Disagreement about the Relationships," OECD Economics Department Working Papers, No.264.
- Baldwin, R.E. and Seghezza E. 1996. "Testing for Trade-Induced Investment-Led Growth," NBER Working Paper Series, No.5416.
- Barrell, R. and Pain N. 1997a. "Foreign Direct Investment, Technological Change, and Economic Growth within Europe," *Economic Journal* 107(445): 1770–1786.
- Barrell, R. and Pain N. 1997b. "The Growth of FDI in Europe," *National Institute Economic Review* 160: 63–75.
- Barro, R.J. and Sala-i-Martin X. 1992. "Convergence," *Journal of Political Economy* 100(2): 223–251.
- Borensztein, E., De Gregorio J, and Lee J.W. 1998. "How Does Foreign Direct Investment Affect Economic Growth?," *Journal of International Economics* 45: 115–135.
- Damijan, J., Knell M., Majcen B. and Rojec M. 2003. "The Role of FDI, R&D Accumulation and Trade in Transferring Technology to Transition Countries: Evidence from Firm Panel Data for Eight Transition Countries," *Economic Systems* 27: 189–204.
- Dohrn, R., Milton A.-R. and Radmacher-Nottelmann N.A. 2001. *The Impact of Trade and FDI on Cohesion. Final Report to the European Commission DG Regional Policy*, RWI Essen.
- Durham, B.J. 2004. "Absorptive Capacity and the Effects of Foreign Direct Investment and Equity Foreign Portfolio Investment on Economic Growth," *European Economic Review* 48: 285–306.
- Frankel, J.A. and Romer D. 1999. "Does Trade Cause Growth?," *American Economic Review* 89(3): 379–399.
- Henrekson, M., Torstensson J. and Torstensson R. 1997. "Growth Effects of European Integration," *European Economic Review* 41: 1537–1557.
- Jones, C.I. 2002. *Economic Growth*. W.W. Norton & Company, Inc. New York, 63–74.

- Lee, J.W. 1995. "Capital Goods Imports and Log-run Growth," *Journal of Development Economics* 48:91-110.
- Levine, R. and Renelt D. 1992. "A Sensitivity Analysis of Cross-Country Growth Regressions," *American Economic Review* 82(4): 942-963.
- Mankiw, G.N., Romer D. and Weil D.N. 1992. "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics* 107(2): 407-437.
- Saggi, K. 2000. "Trade, Foreign Direct Investment, and International Technology Transfer: A Survey," *The World Bank Research Observer* 17(2): 191-235.
- Sala-i-Martin, X. 1994. "Cross-sectional Regressions and The Empirics of Economic Growth," *European Economic Review* 38: 739-747.
- Solow, R.M. 1956. "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics* 70(1): 65-94.
- Walde, K. and Wood C. 2004. "The Empirics of Trade and Growth: Where are The Policy Recommendations?, "European Commission Economic Papers, No.204.
- Yanikkaya, H. 2003. "Trade Openness and Economic Growth: a Cross-country Empirical Investigation," *Journal of Development Economics* 72: 57-89.

**Table 1. Countries Included in the Study**

<b>EU-15 Members</b>	
<b>Country</b>	<b>Accession year</b>
Belgium	1951
Germany	1951
France	1951
Italy	1951
The Netherlands	1951
Denmark	1973
Ireland	1973
Great Britain (U.K.)	1973
Greece	1981
Spain	1986
Portugal	1986
Austria	1995
Finland	1995
Sweden	1995

**Table 2. GDP Per Capita Growth: Base Regressions**

Dependent Variable: GDP Per Capita Growth		
Variable	Estimated coefficients	
Constant	3.5041 (8.3866)	9.9753 (7.2003)
Gross Capital Formation	0.0382 (0.0736)	–
Domestic Savings rate	–	0.2175 *** (0.0419)
Log Initial GDPpc	–0.3313 (0.8108)	–1.4750 * (0.7822)
Initial Sec.School.Enroll.	0.0750 ** (0.0361)	0.0531 (0.0359)
Secondary School Enroll.	–0.0607 (0.0370)	–0.0317 (0.0364)
Population Growth	–0.1743 (0.6294)	–0.3227 (0.4722)
Number of Observations	84	84
Adj.R <sup>2</sup>	0.02	0.31
Hausman test	5.1737	1.0542
p-value	0.0753	0.5903
Type of estimation	Random eff.	Random eff.

\*\*\* significant under 1%, \*\* 5% and \* 10% (standard errors in parenthesis)

Table 3. Investment Regressions

Dependent Variable: Gross Capital Formation			
Variable	Estimated coefficients		
Constant	49.2897*** (8.8302)	53.8218*** (14.1954)	51.3408*** (8.2850)
Log Initial GDPpc	-2.1015** (0.9031)	-2.5312* (1.5518)	-2.2535*** (0.7992)
Initial Sec.School.Enroll.	0.1430* (0.0751)	0.1423* (0.0725)	0.1232* (0.0722)
Sec. School Enroll.	-0.2094** (0.0825)	- 0.2051*** (0.0757)	-0.1969** (0.0798)
Population Growth	1.6081 (1.3286)	1.9735** (0.8759)	1.8885** (0.9071)
Import Duties	0.0895 (0.1351)	-	-
Openness	-	-0.0101 (0.0181)	-
FDI	-	-	0.0755 (0.0518)
Number of Observations	84	84	84
Adj.R <sup>2</sup>	0.44	0.44	0.44
Hausman test	6.2183	4.8533	16.0069
p-value	0.0446	0.0883	0.0003
Type of estimation	Random eff.	Random eff.	Random eff.

\*\*\* significant under 1%, \*\* 5% and \* 10% (standard errors in parenthesis)

**Table 4. GDP Per Capita Growth: FDI Impact**

<b>Dependent Variable: GDP Per Capita Growth</b>	
<b>Variable</b>	<b>Estimated coefficients</b>
Constant	9.8591 (7.0466)
Gross Capital Formation	0.0180 (0.0484)
Log Initial GDPpc	-0.8058 (0.6980)
Initial Sec.School.Enroll.	0.0318 (0.0279)
Secondary School Enroll.	-0.0352 (0.0282)
Population Growth	-0.5328 (0.4059)
FDI	0.2981*** (0.0567)
Number of Observations	84
Adj.R <sup>2</sup>	0.39
Hausman test	0.4402
p-value	0.8024
Type of estimation	Random eff.

\*\*\* significant under 1%, \*\* 5% and \* 10% (standard errors in parenthesis)