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Openess and Economic Growth: The case of European Expansion

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"Openness and Economic Growth: The case of the European Union Expansion"

Submitted by

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ABSTRACT

One of the rudiment features of international trade theory is that open economies achieve high economic growth rates than closed economies. This dissertation attempts to investigate the relationship between openness and growth by testing the hypothesis that openness causes growth. The analysis in this dissertation is limited to the member states of the European Union and some Eastern European countries. The data are analysed using the panel estimation. The sample groups of countries are divided into five groups. The countries are categorised by their period of accession to the European Union. The results of this dissertation show proposition that openness leads to economic growth is validated in three first groups of countries. However, for the last two groups of countries the hypothesis is not validated. For the group of countries that have not yet joined the European Union, the results show that openness does not cause growth. Moreover, there is also no clear evidence that openness cause growth for the group that consists of Eastern European countries that have just joined the European Union.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

This dissertation seeks to examine the association between openness and economic growth. More specifically, this analysis will mainly address itself to the effect of trade on growth.

Therefore, the testing of the hypothesis that openness has a positive influence on the rate of economic growth is the centrepiece of this dissertation. The concept of economic growth forms the core to the enhancement of the standard of living which is at the centre of policies designed to eradicate poverty. However, it is not the aim of this dissertation to advocate policies geared towards either uplifting the standard of living or the eradication of poverty through higher economic growth rates.

Its scope will be limited to the relationship between trade and growth within the member states of the European Union and other East European countries.

1.2 JUSTIFICATION FOR THE STUDY

Economic growth is the mainstay of any country's economic development because of its overall benefit to different sectors of the economy. As already mentioned above economic growth can increase the standard of living if the nation's wealth is distributed fairly. Secondly, because of positive influences on aggregate demand, growth augments employment rates. Thirdly, growth provides fiscal dividend through extra tax revenue which can be used to finance public projects. Fourthly, it enhances the accelerator effect by encouraging investment in new technology which then helps in sustaining economic growth through increased aggregate supply. Finally, growth boosts business confidence through its positive impact on firm's profits which in turn boosts their stock exchange values resulting in the growth of big companies.

International trade immensely benefit the citizens and firms of a country. Specialising in the production of goods and services where there is an absolute or comparative advantage results in an overall gain in welfare which in turn results in productive and allocation efficiency. Economists measure the benefits of free international trade by

using the concepts of consumer and producer surplus. The difference between the price that consumers would be willing to pay for a good or service rather than go without it and the price that they end up paying is called consumer surplus. It measures the welfare gain to the consumer. The difference between the price that producers will be willing to sell their produce at and the price they actually sell it at is called the producer surplus. These two concepts measure the total welfare gain from the product. International trade increases both consumer and producer surplus and thus total economic welfare.

Moreover, since most factors of production are not perfectly mobile, international trade increases the range of goods and services that consumers can enjoy. Consumers therefore gain from additional choice. The enormous benefits of trade and growth make the analysis of the relationship between openness and growth in the above mentioned groups of countries crucial.

1.3 THE OBJECTIVES AND METHODOLOGY OF THE STUDY

The objective of this study is to establish the relationship between openness and growth and to identify the effect of openness on growth. The study will therefore investigate the hypothesis that international trade results in high rates of economic growth. The methodology of the study will be based on panel estimations applied to five groups of countries. The countries are divided into five groups according to their accession to the European Union. The study will test the hypothesis that openness leads to convergence among member states and that openness leads to growth. The study will also apply the granger test to test for causality between openness and growth.

1.4 THE STRUCTURE OF THE STUDY

This dissertation consists of six chapters. The first three chapters deal with the theoretical background. Chapters four and five examine the econometric analysis. Chapter six provides a summary of the theoretical and the empirical parts of this dissertation. It concludes with some suggestions for further research on openness and growth.

CHAPTER 2

THEORY OF GROWTH AND TRADE

2.1 INTRODUCTION

The notion of economic growth is vital to economists because of its central role in economic development. Therefore, the key factors that propel economic growth have been an area of interest for a very long time to economists because of their significant role in the improvement of the standard of living of the populace. International trade as one of the factors that has a positive effect on economic growth has also become very important as the expansion of world markets took root within the global economy. The purpose of this chapter is to outline briefly the main theories of growth and trade. This is done by analysing the contribution of classical economists to the theory of trade and growth.

2.2 BRIEF HISTORY OF GROWTH THEORY

Growth theory is an ancient branch of economics. As early as the eighteen and nineteenth centuries some economists made salient contributions to the theory of growth. Their contributions to the growth theory are still used today as a solid foundation to modern theories of growth. This dissertation is going to discuss the contribution Adam Smith, Thomas Malthus and Karl Marx.

2.2 .1 ADAM SMITH

Adam Smith postulated economic growth is a supply-side driven phenomenon. It can be depicted this using the following production function.

$Y = f(L, K, T)$

where Y is output, L is labour, K is capital and T is land. According to Smith, output is correlated with labour and capital and land inputs. He argued that output growth (g_Y) was determined by population growth (g_L), investment (g_K) and land growth (g_T) and resulted in an increase in overall productivity (g_f).

$g_Y = \phi(g_f, g_K, g_L, g_T)$

Smith also suggested that population growth is endogenous because it depends on the sustenance available to accommodate an increasing workforce. Investment was, Smith argued, also endogenous because it is determined by the rate of savings. On the issue of land, Smith notes that land growth is dependent on the conquest of new lands or technological improvements to the fertility of old land.

Smith is of the view that technological progress could also increase growth overall. However, he is famous for his hypothesis that the division of labour, which he calls specialization, improves growth. He observes that upgrading machinery and the advancement of international trade ease specialization and serves as an engine of growth.

Smith also believes that the division of labour is constrained by the size of the market which gives rise to the notion of economies of scale. He reckons that as division of labour increases, output is stimulated and the prospects for further division of labour increase result in augmented growth. Thus, Smith argued, growth was self-reinforcing as it exhibited increasing returns to scale.

Finally, as savings of capitalists is responsible for the creation of investment and consequently growth, Smith believes that income distribution is the main determinant of the pace of economic growth for any country.

However, he is not oblivious of the fact that savings are partially determined by the profits of stock because as the capital stock of a country increases profit declines - not because of decreasing marginal productivity, but rather because the competition of capitalists for workers will bid wages up and lower profits as a consequence. So lowering the living standards of workers was another way to maintain or improve growth.

In spite of increasing returns, Smith does not see growth as infinitely rising, and for this reason he created a ceiling as well as a floor in the form of the stationary state where population growth and capital accumulation were zero.

2.2.2 DAVID RICARDO

The modification of Smith's growth model comes from David Ricardo who includes the concept of diminishing returns to land. He argues that output growth requires growth of factor inputs, but, unlike labour, land is variable in quality and fixed in supply. According to Ricardo as growth proceeds, more land must be taken into cultivation, but land is finite and cannot be created.

This, he argues, leads to two effects for growth. Firstly, increasing landowner's rents over time mainly because of the limited supply of land, cut into the profits of capitalists. Secondly, wage goods from agriculture will be rising in price over time and this then cuts into profits from below as workers require higher wages. This introduces a quicker limit to growth than Smith allowed, but Ricardo also claimed that this decline can be checked by technological improvements in machinery, although also with diminishing productivity and the specialization brought by trade.

Ricardo then modifies his position on machinery. He then claims that, in fact, machinery displaces labour which might not be reabsorbed elsewhere, because capital is not simultaneously set free, and thus merely creates downward pressure on wages and thus lower labour income. In order to reabsorb this extra labour without this effect, the rate of capital accumulation has to increase. He observes that there is no obvious mechanism for this to happen particularly given the tendency described above for profits and thus savings to decline over time.

2.2.3 THOMAS MALTHUS

Even though Ricardo's prognosis is somewhat more pessimistic than Smith's, the ultimately dismal portrayal, however, was sketched by Thomas Malthus with his famous claim that population growth was not so easily checked and would quickly outstrip the growth of food supply and cause increasing misery.

He stated that population grows faster than food. This difference between population and food growth results, he argued, in the fluctuation of per capita income and the subsistence level. He described a vicious cycle, where a potential increase in per

capita income leads to rising population, which in turn brings per capita income back to its initial level.

Malthus's theory and prediction is yet to be confirmed globally. Food production, for instance, has actually grown faster than he thought it would because of technical progress in agriculture.

2.2.4 KARL MARX

Karl Marx further modified the classical picture. For the modern growth theory, his achievement was critical. He provided, through his famous reproduction schema, the most rigorous formulation of the classical growth model, in a multi-sectoral context and provided, in the process, the concept of steady-state growth equilibrium.

Marx did not believe that labour supply was endogenous with respect to the wage. Instead, he stated that wages were not determined by necessity or natural/cultural factors but rather by bargaining between capitalists and workers and this process would be influenced by the amount of unemployed labourers in the economy. He also saw profits and raw instinct as the determinants of savings and capital accumulation.

Thus, contrary to Smith, he saw a dwindling rate of profit being less effective in decreasing capital accumulation and bringing the stationary state about, but only as an inducement for capitalists to reduce wages further and thus increase the misery of labour.

Like the classical economists, Marx believed there was a declining rate of profit over the long-term. The long-run tendency for the rate of profit to decline is brought about not by competition increasing wages, nor by the diminishing marginal productivity of land but rather by the rising organic composition of capital: more capital intensive methods of production being introduced over time.

2.3.1 THE SOLOW-SWAN GROWTH MODEL

This model was developed by Robert Solow and Trevor Swan in 1956. It is based on three assumptions. The first assumption is that there is constant exogenous rate of

growth of labour. The second assumption is that output is a function of capital and labour. According to this model capital includes buildings and machinery and it is a rival good, which simply means it cannot be used by many producers at the same time. Labour on the other hand includes inputs by humans, which may include working hours and the number of workers. Labour is also assumed to be rival in this model as workers cannot work on many activities simultaneously. The model also assumes that there are constant returns to scale as well as diminishing returns to inputs of production. It also states that states that the macroeconomic equilibrium condition is that aggregate demand equal aggregate supply, $Y^d = Y$. This translates, automatically, into claiming that investment equals savings, I = S. In other words, the saving rate of the economy shows the part of GDP that the economy spends on investment.

2.3.2 HARROD-DOMAR MODEL

This model was developed independently by Roy Harrod in 1939 and Ed Domar in the l946. It suggests that savings make available the funds that can be borrowed for investment. Their model therefore suggests that the economy's rate of growth depends on savings and investment. Whereas the Harrod-Domar model was initially developed to assist in analysing the business cycle it has since been used to clarify the concept economic growth.

The model commences from an essentially Keynesian framework and progresses to the long run by dropping one of Keynes' key assumptions that the rate of investment did not increase the size of the capital stock. It fashions out an equilibrium position that signifies a constant rate of growth in the economy.

However, the Harrod-Domar model raises long-run difficulties in attaining equilibrium growth at full employment. Harrord's argument is that there is no mechanism to ensure the necessary equality of the warranted and natural rates and, furthermore, the warranted rate of growth is inherently unstable. Domar argues that this arises because of a tendency to under invest so that the rate of growth of investment does not match the increase in general savings.
The model also assumes the equivalent of a constant capital-output ratio. Domar sees this as a convenient assumption above the fixity of technology. Harrod argues from a

fundamentally Keynesian scepticism above the magnitude of possible variations in the interest rates.
It also involve an element of instability although the actual mechanism is much clearer and, perhaps, more fundamental in Harrod's model. Instability in Harrod's model stems from the interaction of the investment function and the fundamental equation entrepreneurial expectations. In the Domar model, investment incentives are continually weakened although the exact mechanism does not seem to be very clear. They both visualise, as a plausible scenario, a long run state of depression with chronic unemployment and idle capacity.

The main prediction from model is that the key factor to economic growth is to expansion of the level of investment both in terms of fixed capital and human capital. The model advocates policies that encourage saving and generate technological advances which enable firms to produce more output with less capital so as to lower their capital output ratio.

The model concludes that economic growth depends on the amount of labour and capital. For example, as LDC's often have an abundant supply of labour, it is a lack of physical capital that holds back their economic growth and development. More physical capital generates economic growth. Net investment leads to more capital accumulation, which generates higher output and income. Higher income allows higher levels of saving.

However, the critics of the model have pointed out that economic growth and economic development are not the same. Economic growth is a necessary but not sufficient condition for development. They argued that it is difficult to stimulate the level of domestic savings particularly in the case of LDC's where incomes are low. The borrowing from overseas to fill the gap that was caused by insufficient savings caused debt repayment problems later. The law of diminishing returns would suggest that as investment increases the productivity of the capital will diminish and the capital to output ratio rise.

2.4 CONCLUSION

The aim of this chapter was to introduce the theory of growth and trade. A succinct historical background of the trade theory as well as the neoclassical growth theory was presented. The evolvement of the growth theory from Adam Smith, Karl Marx and David Ricardo has also discussed in this chapter. Trade theory shows that even though economic growth is influenced by many factors, international trade and the market reforms are important determinants of growth. This makes the investigation of the relationship between openness and growth very important. The following chapter of this dissertation review the empirical studies that explore this relationship further.

CHAPTER 3

LITERATURE REVIEW

3.1 INTRODUCTION

The question of whether openness has a positive influence on economic growth remains a crucial within the field of international economics. Thus there is a large literature that has tried to answer this question. Even though many studies have extensively engaged this question the debate as to whether openness results in higher economic growth rates continues. This chapter will review of the existing literature by analysing the important empirical studies thereby presenting the fundamental elements of the relationship between openness and economic growth.

3.2 ADVOCATES OF FREE TRADE

A number of empirical studies support the notion that trade *causes* economic growth. A significant number of them demonstrate the existence of a positive correlation between openness and economic growth. This section will briefly analyse some of this literature although it is not intended to be exhaustive.

The most prominent research work on the relationship between trade and growth is the paper by Sachs and Warner (1995). The central theme of their paper is the notion of convergence. They reach the conclusion that open economies tend to converge, while closed economies do not. In addition this they also offer confirmation that the existence of higher economic growth rates occur in countries that have applied market reforms. Moreover, they explain that even though trade liberalisation is just one of the stages of market reform process, it can be considered to be a measure that can be used as a proxy for the overall reform programme. Trade liberalisation, they argue, joins the domestic economies to the world system thus forcing governments to implement new phases of their market reform programme, in order to deal efficiently with international competition.

Sachs and Warner explain that it is efficient to specify a country's overall reform process according to the progress of its trade liberalisation and they emphasise their trade policy is a major tool of reform. They use a sample of 79 countries spanning the

period 1970-1989. To measure openness, an index of five indicators is used. This index classifies an economy as closed if one or more of the following characteristics exist:

- Non tariff barriers cover 40 per cent of trading activity
- Average tariff rates of at least 40 per cent
- A black market exchange rate which is depreciated by 20 per cent or more relative to the official exchange rate.
- A socialist economic system
- A monopoly of state on major exports.

This index is used as a binary variable in their model.

Edwards (1998) uses the concept of productivity to demonstrate that openness is a vital ingredient of economic growth. He runs a regression of total factor productivity on nine indicators of trade openness. These nine indicators are taken from the World Bank's classification of trade strategies in *World Development Report* 1987, namely; Edward Leamer's openness index (1998), the import tariffs from UNCTAD via Barro and Lee (1994), the average coverage of non-tariff barriers from UNCTAD via Barro and Lee (1994), the average black market premium, the openness index of Sachs and Warmer, the ratio of revenues on trade taxes and total trade, Holger Wolf's index of import distortion (1985) and the Heritage Foundation Index of Distortion in International Trade. He concludes by demonstrating the existence of a positive relationship between productivity growth and openness, because a majority of the indicators are positively correlated with productivity growth. His highest coefficient is from Sachs and Warner index which at 0.0094.

Frankel and Romer (1999) also subscribe to the notion that openness to trade is a crucial determinant of economic growth. They use the country's geographical characteristics to explain that distance from other countries plays a significant role in determining the amount of trade.

The equation they use encompass geographical characteristics such as the countries size, distance among countries and existence of common borders. They also use the ratio of exports plus imports to GDP to measure openness. They findings are that an increase of 1 per cent in the trade to GDP ratio raises per capita income by almost 2 per cent, demonstrating the strong effect of trade on growth. They also conclude that

geography plays a vital role in the relationship between trade and growth. More importantly, they find that countries which are open to foreign markets because of favourable geographical characteristics had higher economic growth rates after World War II.

However, Amavilah (2002) questions the model used by Frankel and Romer. According to Frankel and Romer output depends on international and internal trade. Internal trade in turn depends on the size of each country. The country's size depends on area and population. Amavilah explains that the extended use of variables of area and population brings the model into question as the constants and residual terms increase constantly, as more regressors are included in the model. Moreover, he observes that the variables of area and population specify and measure the same thing, using different methods. For instance, a country can be classified as large if its area and population are large, while at the same time another country can be said to be large if it has *either* a big area or a large population. So, even though area and population are different variables in the model, there is a clear relation between them that affects the efficiency of the estimates.

Furthermore, Frankel and Romer avow the proposition that openness results in higher economic growth rates, they do not deal with the likelihood that openness may itself result partially from growth. This therefore renders the method of using trade shares as measures of openness inefficient as it suffers from reverse causality between openness and growth. This reverse relationship assumes that growth leads to trade, when countries with high growth rates expand their activities in foreign markets.

Other advocates of the positive relationship between economic growth and openness are Dollar and Kraay (2001). They use a sample of 68 countries and seek to establish the relationship between per capita output and trade openness. They categorise the countries according to the increase of each country's trade to GDP ratio. There are 24 countries whose ratio increased considerably during the 1980s and 1990s which they classify as globalizers, they then classify the remaining 44 countries as non-globalizers. They find that the globalizers have experienced significant changes in the volume of trade between the 1970s and 1990s. The globalizers were able to reduce their tariffs by up to 22 per cent and have doubled their GDP ratio subsequently. On the contrary, the non-globalizers applied smaller reductions in their tariffs and have actually experienced lower trade to GDP ratios.

However, Dollar and Kraay concede that the measures for specifying trade openness are inadequate. For example, although tariffs are part of the procedure, the role of non- tariff barriers is not considered. Moreover, they state that the trade ratio depends on a country's initial conditions than on trade policy. Therefore, changes in this ratio do not always illustrate changes in trade patterns.

However, Kappel (2003) questions the usage of this index as a binary variable and suggest this is the major weakness in the method used by Sachs and Warner. As an alternative, he suggests the use of a cumulative index, because according to him, the notion of openness is related to differences over time and among countries. He further explains that the percentages used in order to determine the openness of the economy are arbitrarily chosen.

The paper by Sachs and Warner was also critised by Rodriguez and Rodrick (1999). Their main argument is that three of the five elements of the index-the state monopoly on major exports, the black market premium and the classification as a socialist economy, reflect policies that are not related to trade policy at all. Thus Sachs and Warner are seen to be treating openness as a broad concept while Rodriguez and Rodrick treat it as a narrow concept.

Corden (1971) takes a different view on the manner at which trade affects growth. According to him there are five channels through which openness affects growth. The first channel is the 'impact effect' which is linked to the static gains from trade. This effect results in increased current real income. The second channel is the capital accumulation effect. This effect results from the increased real income from the first effect which is now being invested. As part of the real income is being invested, an increase in the present consumption is transferred to the future.

The third channel is the substitution effect which only holds when investment goods are import-intensive. Therefore, the relative price of investment goods to consumption goods may possibly fall, increasing the consumption ratio. This increased consumption ratio leads to an increase in the rate of growth.

The fourth channel is the distribution effect. This effect is related to the possible transfer of income to the productive factors that are mainly used in the production of the key exports of the economy. The final channel is the factor weight effect. This effect assumes that the rate of growth of output is a weighted average of labour and

capital growth rates. If there is an increase in exports, assuming that exports are based on the fastest growing factor of production between capital and labour, then the rate of growth of exports rises even faster. Corden explains that these five effects are cumulative. Therefore, they support and intensify the increase of the rate of growth of open economies.

Dan Ben-David (1993) also introduces a different approach to research on the effect of openness on growth. His main focus is the analysis of trade policy on income. He seeks to establish the impact of trade liberalisation on the dispersion of income among liberalising countries. He pays particular attention on the relationship between trade and convergence. The main theme of his work is the factor price equalisation theorem. According to this theorem, free trade results in the equalisation of prices of productive factors (land, labour and capital). Therefore, free trade leads to the equalisation of factor the prices which in turn results in results in income convergence. Ben-David finds that the observed convergence is not just a part of convergence trend. Focusing on the case of European Community, he shows that average growth was 3.4 per cent in the period 1945-1954. On the contrary, average growth was 1.2 per cent in the period 1900-1939. The sample he used include five members of the European Community; Italy, France Germany, Belgium and Netherlands. He concludes that free trade leads to the convergence of income among liberalising countries, through the factor price theorem.

Wacziarg (1998) also attempts to determine the ways in which trade openness affects growth. His index of openness includes three elements, that are TNB coverage ratio, the average import duty rate and the Sachs and Warner index. He uses five year average figures for 57 countries spanning the period 1970-1989. Wacziarg concludes that the basic channel through which openness increases economic growth is investment. However, as Rodriguez and Rodrick (2000) explain, Wacziarg should have uses a larger sample, since the five year averages may not be adequate for an efficient specification of results.

3.3 CRITICS OF THE STRONG RELATIONSHIPM BETWEEN OPENESS AND GROWTH

There is some literature that does not support the notion of the positive correlation between openness and growth. Rodrick (1995) is the most vocal critic of the strong relationship between openness and growth.

Rodrick focuses on the way the quality of institutions affects economic growth as opposed to the relationship of trade and growth. He bases his work on three elements; social trust, income inequality and ethnic fragmentation, in order to specify the notion of social conflicts.

He also uses seven factors as indicators of institutional conflict management; corruption, rule of law, political rights and civil liberties, government funding of social insurance, efficiency of the government bureaucracy, competitiveness of political participation and an index of the quality of institutions.

The sample size is 90 countries. Rodrick uses the Sachs and Warner index, the average tariff rate on imports, the ratio of debt to exports, the exports to GDP ratio and the share of government consumption in GDP. He finds that none of these elements, apart from government consumption, is significant. Therefore he concludes that there is no evidence of a positive relationship between trade and growth.

Lee (1993) also finds a negative relationship between openness and growth. He combines an index of trade policy with a measure of openness. The index of trade policy includes the black market premium and tariff average. The measure of openness consists of four elements. These are the distance from basic trade partners, land area, black market premia and import tariffs.

Lee concedes that a problem of reverse causation may be recent. This situation appears when countries with high growth rates proceed to liberalisation of their trade regime: openness is thus caused by growth. This is an element that impedes the examination of the effect of openness on growth.

Rodriguez and Rodrick (2000) also conclude that empirical evidence is inadequate and cannot thus support the notion that there is a positive relationship between trade openness and economic growth. They explain that the main inefficiency of the empirical evidence is the choice of the indicators that are used as measure of the types of openness. They argue that although many papers find that the there is a strong relationship between openness and growth after processing the date econometrically,

the problem in the specification of the econometric models persist. Rodriguez and Rodrick state that the measures used to specify trade policy are all correlated among themselves. Therefore, when all these measures are included in a regression, it is difficult to analyse and interpret the results efficiently and independently. The methodological problems thus leave the results of empirical research open to diverse interpretations. They conclude that the empirical research is uninformative and leaves the relationship between openness and growth an open issue.

Table 1 Empirical Evidence on Trade and Growth-Selected studies.

Date	Author	Data	Main Result
1992	Dollar	95 Developing countries	Positive
1992	Edwards	30 Developing countries	Positive
1993	Ben-David	European Economic community	Positive
1995	Sachs and Warner	122 countries	Positive
1996	Harrison	17-51 counties	Positive
1998	Edwards	93 countries	Positive (TPF)
1999	Frankel and Romer	98 countries	Positive- trade instrumented
2002	Irwin and Terivo	23-146	Positive- trade instrumented Not positive if geography measure is included.
2003	Dollar and Kraay	63-154 countries	Positive- trade instrumented Not positive if geography measure is included.
2004	Alcala and Ciccone	138 countries	Positive (TPF) both trade and institutions instrumented.

3.4 CONCLUSION

This chapter has critically assessed the empirical literature on the relationship between openness and growth. It would appear on balance that there seems to be more empirical evidence of a positive relationship between openness and growth. However, the analysis of this phenomenon is still subject to debate and further empirical research. The most contentious issue is the measure of openness. These measures are absolutely vital for empirical research because the way openness is measured is a key in the specification of the econometric methodology.

CHAPTER 4

DATA AND METHODOLOGY

4.1 INTRODUCTION

The study of the relationship between openness and growth has been of major interest to many economists. The numerous studies have used a wide range of variables as well as different measures for openness. The purpose of this chapter is to present the data and methodology that will be used in this study.

4.2 BRIEF HISTORICAL BACKGROUND OF THE EUROPEAN UNION

The European Union is an inter-governmental union of 25 countries. It was established in 1992 by the Treaty on European Union known as the Maastricht Treaty. However, it is worth noting that most aspects of this amalgamation existed before that date through a series of predecessor relationships, dating back to 1951.

The Union currently has a common single market consisting of a customs union and a single currency managed by the European Central Bank which is currently adopted by 12 of the 25 member states. It also has a Common Agricultural Policy as well as a common trade policy.

Moreover, a Common Foreign and Security Policy was also established as the second of the three pillars of the European Union. The Schengen Agreement abolished passport control, and customs checks were also abolished at many of the European Union's internal borders, creating a single space of mobility for EU citizens to live, travel, work and invest.

The most important European Union institutions, amongst others, are Council of the European Union, the European Commission, the European Court of Justice, the European Parliament, the European Council, and the European Central Bank. The European Parliament's origins go back to the 1950s and the founding treaties, and since 1979 its members have been elected by the people they represent. Every five years elections are held in which registered EU citizens may vote.

The European Union has over the years expanded its borders to include new member states. The past, current and future waves of accession have taken the following pattern:

Table 1: The waves of succession of the European Union

Date	History of Country's Membership
25 March 1957	Belgium, France, West Germany, Italy, Luxembourg, Netherlands, founding members
1 January 1973	Denmark, Ireland, United Kingdom
1 January 1980	Greenland withdrew after gaining home rule from Denmark
1 January 1981	Greece
1 January 1986	Portugal, Spain
3 October 1990	(The territory of the former German Democratic Republic as part of unified Germany also becomes part of the European Community)
1 January 1995	Austria, Finland, Sweden
1 May	Cyprus[1], Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta,

2004	Poland, Slovakia, Slovenia
1 January 2007	Bulgaria, Romania

Source: Wikipedia (*en.wikipedia.org*)

4.3 THE SAMPLE DATA

The data in the study will include thirty countries. Twenty five of the countries to be included are current members of the European Union. The other five members are Bulgaria, Croatia, Romania, Bosnia and Herzegovina and Turkey.

The variables which will be used in this study are as follows:

GDP92:
This is the Real GDP per capita in 1992. The Gross domestic product per capita is defined as the total market value of all final goods and services per person produced annually within the boundaries of a country, using both domestic and foreign-supplied resources.

GDP03
This is the Real GDP per capita in 2003.

G9203
Rate of Change in GDP

LGDP92
This is the natural log of real GDP per capita in 1992

PRSCER

This is the Primary School Gross Enrolment Rate. It is the ratio of total enrolment to the population of the age group that corresponds to the level of education shown. It is relevant and important because it provides children with basic skills such as reading, writing as well as elementary understanding of vital subjects such as history geography and social science.

SSER

This is the Secondary School Enrolment Rate. It is the ratio of total enrolment, to the population that correspond to the level of education shown. It completes the provision of basic education which began at the primary school level, and seeks to lay the foundations for lifelong learning and human development.

FR

This is the Fertility Rate.

It is the number of children that a woman will give birth to if she were to live to the end of her childbearing year.

GCE

This is the ratio of Real Government Consumption Expenditure to Real GDP.

HEXP

This is the health expenditure. It is the sum of both private and public health expenditures. It incorporates the provision of both preventive and curative health services as well as nutritional health and emergency health aid. However, it excludes the provision of clean water and sanitation.

EXPIMP

This is the ratio of exports to the sum of imports and exports. Exports of goods and services is the value of all goods and other market related services provided to the rest of the world. They include the value of merchandise freight, insurance, transport, travel, royalties, license fees, and other services, such as communications, construction, financial, information, business, personal and government services. They exclude labour and property income as well as transfer payments.

Imports of goods and services is the value of all goods and other market related services received from the rest of the world. They include the value of merchandise freight, insurance, transport, travel, royalties, license fees, and other services, such as communications, construction, financial, information, business, personal and government services. They exclude labour and property income as well as transfer payments.

TRD
This is trade ratio. It is the sum of exports and imports of goods and services measured as a share of GDP.

The values of these variables are expressed in constant 1995 U.S dollars. The sources of these data are the World Development Indicators (WDI), published by the World Bank, The Main Economic Indicators, published by the OECD,the United Nations Bulletin of Statistics and World Economic Outlook Databases published by the International Monetary Fund (IMF).
The sample period for the study is the period spanning 1992-2003. The reason for this sample period is that some of the Eastern European countries embarked on market restructuring as their economies changed from being centrally planned with the state playing a major role to market oriented economies dominated by the forces of the markets. The period before 1992 is therefore marred by a significant decline of the GDP for these economies. Any analysis covering this period will therefore be distorted. It is only after 1992 that the situation was normalised and the GDP for these economies climbed back to normal levels. The period after 1992 is therefore well suited for the analysis of this dissertation.

4.4 RATIONALE FOR CHOICE OF DATA

Most of the Eastern Europe countries have undertaken market and trade reforms since the early 1990's. These reforms have resulted in the change of the trade patterns for the Eastern European countries.
Moreover, the accession of some of these Eastern European countries to the European Union has also changed the trade pattern of the European countries. It is therefore of major interest to study the relationship between openness and convergence among the

European Union in the context of the latest development in the structure of the trade patterns between member countries.

The sample countries for this dissertation constitute of the 25 member countries of the European Union as well as the five countries that are most likely to join the European in the immediate future.

Economic growth is a multifaceted matter that is influenced by a variety of economic factors. This study will seek to investigate the effects of the some of these factors on economic growth. The notion of openness is measured by two major variables in this dissertation. These are the trade share and the ratio of exports to the sum of imports and exports. In addition to these two variables, two educational variables, the Primary School Gross Enrolment Rate as well as the Secondary School Enrolment Rate serve as indicators of the level of education.

One of the central themes of trade is specialisation. Trade theory states that the labour force can be channelled to specific parts of the production process; it is through this specialisation that the labour force can acquire and develop new skills which may positively influence productivity. However, the level and speed of assimilation and adjustment is heavily dependent on the education level of the labour force. This justifies the inclusion of these variables in the analysis.

The ratio of real government consumption expenditure to real GDP is an indicator of the allocation government resources. The way government allocates its resources is closely linked to the development of any country, which explains the inclusion of the variable in the analysis.

The fertility rate variable is an indicator of the population rate. The health expenditure variable is another indicator of the population rate as it affects the health welfare of the population. The health expenditure variable is also an important development indicator as evident in the percentage of the health budget in developed countries. These variables have been included in the analysis because of their impact on the population dynamics and the quality of life.

4.5 THE RELIABILITY OF THE DATA

Economic variables are notoriously auto correlated. That is to say the error terms in the regression model are not independent. In order to overcome this problem legged

dependent variables are included in the model. If such a variable has a coefficient of 1, the series is said to have a unit root.

Consider the following model:

$Y_t = \rho Y_{t-1} + \varepsilon_t$

If $\rho=1$, Y_t is a unit root process. However, The Classical Linear Regression Model (CLRM) assumes stationary. A unit root does not satisfy this assumption

The Augmented Dickey-Fuller Test (ADF) test is used to detect non stationarity. The ADF test considers the following model:

$Y_t = \rho Y_{t-1} + \varepsilon_t$

The null hypothesis is that the coefficient of the lagged equals 1,while the alternative is that the coefficient is less than 1.

Ho: $\rho=1$
H_1: $|\rho|<1$

The critical values of ADF test are derived from the Mackinnon tables.

4.5.1 ADF TESTS

The variables included in this paper do not exhibit ant trend. Therefore, the SDF tests do not include trend. Moreover, the general form of the ADF tests is the following

ADF (p) WHERE p=data frequency(number of observation per year)+ 1

Therefore, 2 lags are used in the ADF tests in this paper. This section includes the ADF tests performed for the nine variables included in the econometric analysis in this paper.

Variable G9203 - Rate of Change in GDP

Null Hypothesis: G9203 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.598878	0.0002
Test critical values:	1% level	-3.448363	
	5% level	-2.869374	
	10% level	-2.571011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(G9203)
Method: Least Squares
Date: 11/09/06 Time: 10:07
Sample (adjusted): 2 360
Included observations: 359 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G9203(-1)	-0.111285	0.024198	-4.598878	0.0000
C	0.333438	0.079394	4.199765	0.0000

R-squared	0.055929	Mean dependent var	0.001857
Adjusted R-squared	0.053285	S.D. dependent var	0.647321
S.E. of regression	0.629839	Akaike info criterion	1.918850
Sum squared resid	141.6208	Schwarz criterion	1.940484
Log likelihood	-342.4336	F-statistic	21.14968
Durbin-Watson stat	1.895864	Prob(F-statistic)	0.000006

The ADF statistic is -4.598878.Since |-4.598878| > |-2.869374|, the null hypothesis of unit root is rejected. Therefore, variable G9203 is stationary.

Variable LGDP92 -The natural log of real GDP per capita in 1992

Null Hypothesis: LGDP92 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.910680	0.0022
Test critical values:	1% level	-3.448363	
	5% level	-2.869374	
	10% level	-2.571011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGDP92)
Method: Least Squares
Date: 11/09/06 Time: 10:16
Sample (adjusted): 2 360
Included observations: 359 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP92(-1)	-0.081112	0.020741	-3.910680	0.0001
C	0.316677	0.081767	3.872919	0.0001

R-squared	0.041079	Mean dependent var	-0.000572
Adjusted R-squared	0.038393	S.D. dependent var	0.197782
S.E. of regression	0.193948	Akaike info criterion	-0.436893
Sum squared resid	13.42891	Schwarz criterion	-0.415259
Log likelihood	80.42233	F-statistic	15.29342
Durbin-Watson stat	1.923380	Prob(F-statistic)	0.000110

The ADF statistic is -3.910680.Since | -3.910680| > |-2.869374 |, the null hypothesis of unit root is rejected. Therefore, variable LGDP92 is stationary.

Variable SSER - The Secondary School Enrolment Rate

Null Hypothesis: SSER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.986077	0.0017
Test critical values:	1% level	-3.448363	
	5% level	-2.869374	
	10% level	-2.571011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SSER)
Method: Least Squares
Date: 11/09/06 Time: 10:20
Sample (adjusted): 2 360
Included observations: 359 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SSER(-1)	-0.094284	0.023653	-3.986077	0.0001
C	9.702665	2.449785	3.960619	0.0001

R-squared	0.042610	Mean dependent var	0.144958
Adjusted R-squared	0.039928	S.D. dependent var	9.709784
S.E. of regression	9.513962	Akaike info criterion	7.348953
Sum squared resid	32314.02	Schwarz criterion	7.370587
Log likelihood	-1317.137	F-statistic	15.88881
Durbin-Watson stat	1.878181	Prob(F-statistic)	0.000081

The ADF statistic is -3.986077.Since |-3.986077 | > |-2.869374 |, the null hypothesis of unit root is rejected. Therefore, variable SSER is stationary.

Variable PSER - The Primary School Gross Enrolment Rate

Null Hypothesis: PSER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.906745	0.0000
Test critical values:	1% level	-3.448363	
	5% level	-2.869374	
	10% level	-2.571011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PSER)
Method: Least Squares
Date: 11/09/06 Time: 10:25
Sample (adjusted): 2 360
Included observations: 359 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PSER(-1)	-0.126314	0.025743	-4.906745	0.0000
C	12.80575	2.622724	4.882615	0.0000

R-squared	0.063179	Mean dependent var	-0.006128
Adjusted R-squared	0.060555	S.D. dependent var	4.826832
S.E. of regression	4.678405	Akaike info criterion	5.929347
Sum squared resid	7813.828	Schwarz criterion	5.950981
Log likelihood	-1062.318	F-statistic	24.07614
Durbin-Watson stat	1.847904	Prob(F-statistic)	0.000001

The ADF statistic is -4.906745. Since | -4.906745| > |-2.869374 |, the null hypothesis of unit root is rejected. Therefore, variable PSER is stationary.

Variable FER - The Fertility Rate

Null Hypothesis: FER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.850122	0.0001
Test critical values:	1% level	-3.448363	
	5% level	-2.869374	
	10% level	-2.571011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FER)
Method: Least Squares
Date: 11/09/06 Time: 10:30
Sample (adjusted): 2 360
Included observations: 359 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FER(-1)	-0.123694	0.025503	-4.850122	0.0000
C	0.192319	0.040387	4.761905	0.0000

R-squared	0.061819	Mean dependent var	0.000418
Adjusted R-squared	0.059191	S.D. dependent var	0.158240
S.E. of regression	0.153485	Akaike info criterion	-0.904873
Sum squared resid	8.410075	Schwarz criterion	-0.883239
Log likelihood	164.4247	F-statistic	23.52368
Durbin-Watson stat	1.927868	Prob(F-statistic)	0.000002

The ADF statistic is -4.850122 Since | -4.850122| > |-2.869374 |, the null hypothesis of unit root is rejected. Therefore, variable FER is stationary.

Variable HEXP- The Health Expenditure

Null Hypothesis: HEXP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.170266	0.0000
Test critical values:	1% level	-3.450348	
	5% level	-2.870247	
	10% level	-2.571478	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(HEXP)
Method: Least Squares
Date: 11/09/06 Time: 10:34
Sample (adjusted): 2 360
Included observations: 324 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HEXP(-1)	-0.150135	0.029038	-5.170266	0.0000
C	1.119071	0.218116	5.130627	0.0000

R-squared	0.076654	Mean dependent var	0.019228
Adjusted R-squared	0.073786	S.D. dependent var	0.901407
S.E. of regression	0.867514	Akaike info criterion	2.559784
Sum squared resid	242.3312	Schwarz criterion	2.583122
Log likelihood	-412.6851	F-statistic	26.73165
Durbin-Watson stat	1.980111	Prob(F-statistic)	0.000000

The ADF statistic is -5.170266. Since |-5.170266 | > | -2.870247|, the null hypothesis of unit root is rejected. Therefore, variable HEXP is stationary.

Variable GCE - The ratio of Real Government Consumption Expenditure to Real GDP

Null Hypothesis: GCE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.476921	0.0000
Test critical values:	1% level	-3.449053	
	5% level	-2.869677	
	10% level	-2.571174	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GCE)
Method: Least Squares
Date: 11/09/06 Time: 10:39
Sample (adjusted): 2 360
Included observations: 346 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCE(-1)	-0.160581	0.029320	-5.476921	0.0000
C	3.117402	0.581552	5.360485	0.0000

R-squared	0.080206	Mean dependent var	0.003121
Adjusted R-squared	0.077532	S.D. dependent var	2.362104
S.E. of regression	2.268688	Akaike info criterion	4.482044
Sum squared resid	1770.549	Schwarz criterion	4.504278
Log likelihood	-773.3936	F-statistic	29.99666
Durbin-Watson stat	2.045264	Prob(F-statistic)	0.000000

The ADF statistic is -5.476921. Since |-5.476921 | > | -2.869677|, the null hypothesis of unit root is rejected. Therefore, variable GCE is stationary.

Variable TRD - The sum of Exports and Imports of goods and services measured as a share of GDP.

Null Hypothesis: TRD has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.697490	0.0045
Test critical values:	1% level	-3.448728	
	5% level	-2.869534	
	10% level	-2.571097	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TRD)
Method: Least Squares
Date: 11/09/06 Time: 10:43
Sample (adjusted): 2 360
Included observations: 352 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRD(-1)	-0.085007	0.022991	-3.697490	0.0003
C	8.315412	2.398436	3.467014	0.0006

R-squared	0.037593	Mean dependent var	0.223324
Adjusted R-squared	0.034843	S.D. dependent var	18.73882
S.E. of regression	18.40947	Akaike info criterion	8.669273
Sum squared resid	118618.0	Schwarz criterion	8.691225
Log likelihood	-1523.792	F-statistic	13.67143
Durbin-Watson stat	2.194406	Prob(F-statistic)	0.000253

The ADF statistic is -3.697490. Since |-3.697490 | > | -2.869534|, the null hypothesis of unit root is rejected. Therefore, variable TRD is stationary.

Variable EXPIMP - The Ratio of Exports to the sum of Imports and Exports

Null Hypothesis: EXPIMP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.263573	0.0000
Test critical values:	1% level	-3.448363	
	5% level	-2.869374	
	10% level	-2.571011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXPIMP)
Method: Least Squares
Date: 11/09/06 Time: 10:48
Sample (adjusted): 2 360
Included observations: 359 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPIMP(-1)	-0.198516	0.031694	-6.263573	0.0000
C	0.096980	0.015606	6.214236	0.0000

R-squared	0.099013	Mean dependent var	-0.000157
Adjusted R-squared	0.096490	S.D. dependent var	0.034788
S.E. of regression	0.033067	Akaike info criterion	-3.975005
Sum squared resid	0.390354	Schwarz criterion	-3.953371
Log likelihood	715.5134	F-statistic	39.23235
Durbin-Watson stat	2.118440	Prob(F-statistic)	0.000000

The ADF statistic is -6.263573. Since |-6.263573 | > | -2.869374|, the null hypothesis of unit root is rejected. Therefore, variable EXPIMP is stationary.

The above ADF tests show that the variables of the model are stationary. Therefore, the stationary assumption of the Classical Regression Model is satisfied.

4.6 METHODOLOGY

This main aim of this dissertation is to investigate the relationship between openness and economic growth. The econometric analysis examines particularly economic growth and convergence among European Union member states.
The market reforms that have been undertaken by Eastern European countries have resulted in a significant change in their trade patterns. The econometric analysis of this dissertation will seek to test the hypothesis that the openness that has been achieved by these market reforms leads to convergence among member states.

The method that will be used is panel estimation. The regression equation is the following:

$$G9203= \alpha_1+\beta_1 LGDP92+\beta_2 PSER+\beta_3 SSER+\beta_4 FER+\beta_5 GCE+\beta_6 HEXP+\beta_7 EXPIMP+ \beta_8 TRD+ \varepsilon_t$$

There will be five different panel estimations. The first panel estimation examines the relationship between openness and growth in the entire sample consisting of all 30 countries. The second panel estimation consists of the initial 15 member states of the European Union. The third panel estimation comprise of the current 25 member states of the European Union which encompass the ten member states that have just joined the European Union in its recent expansion. The fourth panel estimation is made up of the Eastern European countries that are already member states of the European Union (Hungary, Poland, Czech Republic, Slovakia, Estonia, Latvia and Lithuania). The fifth panel estimation examines the relationship between openness and growth in the five countries that are not yet members of the European Union but are due to join the Union in the immediate future (Bulgaria, Romania, Croatia, Bosnia, and Herzegovina and Turkey).

4.7 CONCLUSION

The focus of this chapter was to present the data and methodology that are employed in this dissertation. The presentation of the data encompassed the description of the countries, and the variables as well as the sample period. A brief historical background of the European Union has also been incorporated into this chapter to bring the analysis into its proper perspective. In addition, this chapter also included the rationale for the choice of data, as well as techniques used to test the reliability of the data. The central role of this chapter was to provide the information needed for interpreting the results from the econometric analysis.

CHAPTER 5

RESULTS

5.1 INTRODUCTION

The major role of this chapter is to present the econometric analysis of the five groups of countries. There are three different types of regression that have been run for each group of countries. The first regression tests the convergence hypothesis while the second regression incorporate the five variables that can influence the growth rate, the last regression further encompass the two main variables that are indicators of openness.

5.2 RESULTS FROM THE ANALYSIS OF THE FIRST GROUP OF COUNTRIES

This regression examined the relationship between the dependent variable G9203 – the rate of change of economic growth against the independent variable LGDP92 – natural log of real GDP per capita in 1992 among all the thirty countries. The results as presented in Table 1 show that the coefficient LGDP92 is significant with a value of -0.596979. The negative sign of the coefficient validates the convergence hypothesis. The conclusion reached therefore is that there is adequate proof of convergence within this group of countries.

Table 1: Group 1 Regression 1 – The regression testing the convergence hypothesis for the 30 countries using the

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:08
Sample: 1 360
Included observations: 360

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.314367	0.566232	9.385490	0.0000
LGDP92	-0.596979	0.143600	-4.157235	0.0000

R-squared	0.046052	Mean dependent var	2.978889
Adjusted R-squared	0.043388	S.D. dependent var	1.373784
S.E. of regression	1.343651	Akaike info criterion	3.434198
Sum squared resid	646.3326	Schwarz criterion	3.455788
Log likelihood	-616.1557	F-statistic	17.28261
Durbin-Watson stat	0.218128	Prob(F-statistic)	0.000040

The second regression tests the hypothesis of convergence with the additional five independent variables that have an effect on growth. The added five variables are; PSER-the Primary School Gross Enrolment Rate, SSER-the Secondary School Enrolment Rate, FR-the Fertility Rate, GCE-ratio of Real Government Consumption Expenditure to Real GDP, and the HEXP-health expenditure. The results of this regression, as presented in Table 2, also confirm the convergence hypothesis as reflected by the negative sign of the income coefficient.

The inclusion of these variables to the regression present a mixed picture in terms of the results obtained. The results reveal a positive effect of primary school education. This can be interpreted to mean that primary school education plays has an important role in laying a solid foundation for basic education as well as equipping the workers with basic skills to enhance their ability to easily specialise in their line of production thus positively influencing growth. The secondary school education has a negative effect reflecting the fact that the emphasis for secondary education is less than that of primary education. The results also show that the coefficients of government consumption expenditure and health expenditure are negative. This means that the

way that the governments of the sample countries allocate resources and proportion of government expenditure that goes to heath expenditure has less impact on economic growth in this group. However, results also show that the fertility rate has an important effect on growth as reflected by the positive value of its coefficient. The conclusion of the analysis for this group reflects the fact that primary education and the fertility rate are the most important variables that positively influence the economic growth within this group of countries.

Table 2: Group 1 Regression 2 – The regression testing the convergence hypothesis including the six independent variables for the 30 countries

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:10
Sample: 1 360
Included observations: 325

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.729122	0.980700	-0.743471	0.4577
LGDP92	-0.115956	0.225104	-0.515120	0.6068
PSER	0.029266	0.009375	3.121550	0.0020
SSER	-0.001423	0.004352	-0.327075	0.7438
GCE	-0.012375	0.018923	-0.653967	0.5136
FER	1.191935	0.220264	5.411393	0.0000
HEXP	-0.064612	0.056855	-1.136436	0.2566

R-squared	0.150903	Mean dependent var	2.778359
Adjusted R-squared	0.134883	S.D. dependent var	1.242621
S.E. of regression	1.155783	Akaike info criterion	3.148736
Sum squared resid	424.7950	Schwarz criterion	3.230233
Log likelihood	-504.6695	F-statistic	9.419283
Durbin-Watson stat	0.193110	Prob(F-statistic)	0.000000

The third regression introduces the concept of openness into the analysis by including the two main indicators of openness-TRD-the trade ratio and the EXPIMP-the ratio of exports to the sum of imports and exports. The results of this regression, as shown in table 3, corroborate the hypothesis that openness contributes significantly to the

accomplishment of higher economic growth rates as reflected by the positive coefficients of both the TRD and the EXPIMP. The results reveal that out of the two measure of openness, the ratio of exports to the sum of imports and exports is the most crucial to economic growth. This is illustrated by the strong influence of EXPIMP on the economic growth of these countries; their economies grow on average by 2.948493 percentage points annually due to EXIMP. The TRD has a relatively less impact on growth as reflected by the fact that these economies grow on average by 0.012598 percentage points annually as a result of the trade ratio.
The mixed picture of the six variables added in regression two above does not change much in this regression. The primary school education effect is still positive while that of secondary school and government consumption is negative. The coefficient of the health expenditure is still positive. The reasons that were outlined above for the behaviour of these variables still hold for this regression as the only change that has been made to the regression has been the addition of the measures of openness.

Table 3: Group1 Regression 3 – The regression testing the convergence hypothesis including the two variables that measure openness for the 30 countries

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:12
Sample: 1 360
Included observations: 322

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.822712	1.024860	-2.754243	0.0062
LGDP92	-0.518207	0.223200	-2.321712	0.0209
PSER	0.027493	0.008393	3.275646	0.0012
SSER	-1.11E-05	0.003903	-0.002833	0.9977
GCE	-0.047431	0.017449	-2.718264	0.0069
FER	1.488402	0.201035	7.403685	0.0000
HEXP	0.113274	0.055049	2.057690	0.0404
TRD	0.012598	0.001502	8.389031	0.0000
EXPIMP	2.948493	1.641343	1.796390	0.0734

R-squared	0.331532	Mean dependent var	2.765424
Adjusted R-squared	0.314446	S.D. dependent var	1.241111
S.E. of regression	1.027617	Akaike info criterion	2.919915
Sum squared resid	330.5272	Schwarz criterion	3.025415
Log likelihood	-461.1063	F-statistic	19.40432
Durbin-Watson stat	0.216822	Prob(F-statistic)	0.000000

5.3 RESULTS OF THE ANALYSIS OF THE SECOND GROUP OF COUNTRIES

This group consist of the initial 15 member countries of the European Union. The first regression for this group of countries examined the relationship between the dependent variable G9203 – the rate of change of economic growth against the independent variable LGDP92 – natural log of real GDP per capita in 1992 for these 15 countries. The results of this regression, as shown in Table 4, also confirm the convergence hypothesis as reflected by the negative and significant coefficient of the initial income.

Table 4: Group 2 Regression 1- The regression testing the convergence hypothesis for the initial 15 member countries of the European Union countries

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:15
Sample: 1 180
Included observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.732167	2.636287	3.691619	0.0003
LGDP92	-1.622021	0.607785	-2.668741	0.0083

R-squared	0.038473	Mean dependent var	2.701667
Adjusted R-squared	0.033071	S.D. dependent var	1.364802
S.E. of regression	1.342044	Akaike info criterion	3.437314
Sum squared resid	320.5927	Schwarz criterion	3.472791
Log likelihood	-307.3583	F-statistic	7.122177
Durbin-Watson stat	0.221583	Prob(F-statistic)	0.008317

The results of the second regression of this group which includes the additional five independent variables that affect growth also validates the convergence hypothesis, as shown in Table 5. The added five variables are; PSER-the Primary School Gross Enrolment Rate, SSER-the Secondary School Enrolment Rate, FR-the Fertility Rate, GCE-ratio of Real Government Consumption Expenditure to Real GDP, and the

HEXP-health expenditure. The coefficient of initial income is negative and significant in this regression too. The results of this regression also show that the effect of educational attainment both at primary school level and at the secondary level is positive. This means that both primary school and secondary school education is important to economic growth for this group. Moreover, the fertility rate is also an important factor that positively influences economic growth for this group as reflected by the positive coefficient. The government consumption and the health expenditure are the only variables with a negative coefficient for this group. This means that the allocation of resources and the public spending on health are not factors that positively influence economic growth for these countries.

Table 5: Group 2 Regression 2 - The regression testing the convergence hypothesis including the six independent variables for the initial 15 member countries of the European union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:17
Sample: 1 180
Included observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.965050	2.252835	0.872256	0.3843
LGDP92	-0.240052	0.433745	-0.553440	0.5807
PSER	0.020396	0.007490	2.723170	0.0071
SSER	0.003025	0.003460	0.874270	0.3832
GCE	-0.244284	0.023838	-10.24755	0.0000
FER	3.821984	0.290869	13.13990	0.0000
HEXP	-0.210932	0.059536	-3.542907	0.0005

R-squared	0.741773	Mean dependent var	2.701667
Adjusted R-squared	0.732817	S.D. dependent var	1.364802
S.E. of regression	0.705462	Akaike info criterion	2.178186
Sum squared resid	86.09816	Schwarz criterion	2.302357
Log likelihood	-189.0367	F-statistic	82.82549
Durbin-Watson stat	0.261672	Prob(F-statistic)	0.000000

The two indicators of openness, TRD- the trade ratio and EXPIMP-the ration of exports to the sum of imports and exports are introduced in this third regression of this group of countries. The results, as presented in Table 6, are in concurrence with the hypothesis that the openness ratchets up economic growth rates. This is reflected in the positive and significant coefficients of TRD and EXPIMP. The results of this regression show that economies of the countries included in the sample grew by an average of 10.40388 percentage point per annum over the sample period due to EXPIMP and only by 0.009313 percentage points per annum due to TRD. It is important to point out that the contribution of EXPIMP may have been affected by outliers. For instance the rate of change of economic growth for Ireland is over seven per cent for the sample period and also the values of the EXIMP variable average 0.5 per cent for this group of countries.

In this regression, the results reveal that all the variables that were added in the above regression have a negative coefficient save for the fertility rate. However, the emphasis for this regression is not on these variables but on the contribution of the two indicators of openness to economic growth.

Table 6: Group 2 Regression 3 – The regression testing the convergence hypothesis including the two variables that measure openness for the initial 15 member countries of the European Union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:19
Sample: 1 180
Included observations: 177

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.91717	2.613448	5.325214	0.0000
LGDP92	-4.064322	0.625219	-6.500636	0.0000
PSER	-0.001758	0.007188	-0.244630	0.8070
SSER	-0.002644	0.003149	-0.839461	0.4024
GCE	-0.173863	0.025557	-6.802854	0.0000
FER	3.147007	0.268179	11.73471	0.0000
HEXP	-0.069557	0.055207	-1.259937	0.2094
TRD	0.009313	0.001656	5.623886	0.0000
EXPIMP	10.40388	1.728236	6.019941	0.0000

R-squared	0.807755	Mean dependent var	2.676836
Adjusted R-squared	0.798600	S.D. dependent var	1.362802
S.E. of regression	0.611593	Akaike info criterion	1.904009
Sum squared resid	62.83971	Schwarz criterion	2.065509
Log likelihood	-159.5048	F-statistic	88.23543
Durbin-Watson stat	0.234713	Prob(F-statistic)	0.000000

5.4 RESULTS OF THE ANALYSIS OF THE THIRD GROUP OF COUNTRIES

This group comprise of the current twenty five member countries of the European Union. The first regression for this group of countries examined the relationship between the dependent variable G9203 – the rate of change of economic growth against the independent variable LGDP92 – natural log of real GDP per capita in 1992 for the current 25 European Union member countries. The convergence hypothesis is corroborated for this group of countries as well. This is reflected in the results of the regression, presented in Table 7, which shows that the coefficient of initial income is negative and significant.

Table 7: Group 3 Regression 1 -- The regression testing the convergence hypothesis for the current 25 member countries of the European Union countries

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:22
Sample: 1 300
Included observations: 300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.867725	0.712507	8.235318	0.0000
LGDP92	-0.716294	0.174987	-4.093420	0.0001

R-squared	0.053235	Mean dependent var	2.965000
Adjusted R-squared	0.050058	S.D. dependent var	1.233281
S.E. of regression	1.202016	Akaike info criterion	3.212523
Sum squared resid	430.5634	Schwarz criterion	3.237214
Log likelihood	-479.8784	F-statistic	16.75609
Durbin-Watson stat	0.216270	Prob(F-statistic)	0.000055

The convergence hypothesis is still validated even with the inclusion of the additional five variables that affect growth. This is reflected in the results of the second regression of this group of countries, as presented in Table 8. The added five variables are; PSER-the Primary School Gross Enrolment Rate, SSER-the Secondary School Enrolment Rate, FR-the Fertility Rate, GCE-ratio of Real Government Consumption

Expenditure to Real GDP, and the HEXP-health expenditure. This regression shows that both the primary education and the fertility rate are important factors in economic growth for this group as reflected by their positive coefficient. The coefficients of secondary education, government consumption and health expenditure are all negative reflecting the fact that they are not important factors in economic growth for this group of countries.

Table 8: Group 3 Regression 2 - The regression testing the convergence hypothesis including the six independent variables for the current 25 member countries of the European union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:23
Sample: 1 300
Included observations: 277

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.541008	0.945999	2.686056	0.0077
LGDP92	-0.295076	0.224034	-1.317105	0.1889
PSER	0.031216	0.008287	3.766987	0.0002
SSER	-0.001903	0.004002	-0.475475	0.6348
GCE	-0.080567	0.018328	-4.395875	0.0000
FER	1.771560	0.293910	6.027562	0.0000
HEXP	-0.337449	0.064645	-5.220052	0.0000

R-squared	0.395290	Mean dependent var	2.875331
Adjusted R-squared	0.381852	S.D. dependent var	1.241507
S.E. of regression	0.976103	Akaike info criterion	2.814448
Sum squared resid	257.2497	Schwarz criterion	2.906030
Log likelihood	-382.8011	F-statistic	29.41582
Durbin-Watson stat	0.307076	Prob(F-statistic)	0.000000

The results of the third regression for this group are shown in Table 9. This regression encompasses the two indicators of openness-TRD-the ratio of trade and EXPIMP- the ratio of exports to the sum of imports and exports. The results of this regression are in

coherent with the hypothesis that openness results in higher economic growth rates. These economies grew on average by 3.33 percentage points annually due to EXPIMP reflecting the fact that EXIMP is an important indicator of openness. This shows that the EXIMP plays a significant role in economic growth as compared with the TRD. The trade ratio only resulted in the economies growing by an average of 0.0083 percentage points annually.

Table 9: Group 3 Regression 3 - The regression testing the convergence hypothesis including the two variables that measure openness for the current 25 member countries of the European Union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:25
Sample: 1 300
Included observations: 274

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.587015	1.042138	0.563279	0.5737
LGDP92	-0.701525	0.234507	-2.991492	0.0030
PSER	0.028565	0.007837	3.645137	0.0003
SSER	0.000617	0.003783	0.163006	0.8706
GCE	-0.100272	0.017794	-5.635261	0.0000
FER	1.727756	0.282833	6.108751	0.0000
HEXP	-0.126752	0.069576	-1.821776	0.0696
TRD	0.008337	0.001445	5.768937	0.0000
EXPIMP	3.331176	1.624098	2.051093	0.0412

R-squared	0.473101	Mean dependent var	2.861192
Adjusted R-squared	0.457195	S.D. dependent var	1.240868
S.E. of regression	0.914214	Akaike info criterion	2.690790
Sum squared resid	221.4834	Schwarz criterion	2.809469
Log likelihood	-359.6382	F-statistic	29.74283
Durbin-Watson stat	0.312781	Prob(F-statistic)	0.000000

5.5 RESULTS OF THE ANALYSIS OF THE FOURTH GROUP OF COUNTRIES

This group is made up of the Eastern European countries that have joined the European Union. The first regression for this group of countries examined the relationship between the dependent variable G9203 – the rate of change of economic growth against the independent variable LGDP92 – natural log of real GDP per capita in 1992 for the Eastern European countries. The results of the first regression of this group, as presented in Table 10, shows that the convergence hypothesis is not validated in this group. This is reflected in the positive and statistically significant coefficient of initial income.

Table 10: Group 4 Regression 1 - The regression testing the convergence hypothesis for the Eastern European countries that have just joined the European Union countries

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:55
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.560268	1.817386	1.408764	0.1622
LGDP92	0.173486	0.511655	0.339068	0.7353

R-squared	0.001235	Mean dependent var	3.175702
Adjusted R-squared	-0.009505	S.D. dependent var	0.888872
S.E. of regression	0.893087	Akaike info criterion	2.632562
Sum squared resid	74.17714	Schwarz criterion	2.686327
Log likelihood	-123.0467	F-statistic	0.114967
Durbin-Watson stat	0.232338	Prob(F-statistic)	0.735323

The second regression of this group incorporates the other five variables that affect growth. The added five variables are; PSER-the Primary School Gross Enrolment

Rate, SSER-the Secondary School Enrolment Rate, FR-the Fertility Rate, GCE-ratio of Real Government Consumption Expenditure to Real GDP, and the HEXP-health expenditure. The results of this regression also show that the convergence hypothesis in not validated. The results of this regression, as presented in Table 11 reflect a positive and statistically significant coefficient of initial income. However, for this group, the results of the regression reveal that all the added variables are important for economic as reflected by their positive coefficients growth save for primary school education and health expenditure whose coefficients are negative. This can be interpreted to mean that for this group of countries all the five variables added to this regression play a significant role in their economic growth.

Table 11: Group 4 Regression 2 - The regression testing the convergence hypothesis including the six independent variables for the Eastern European countries that have just joined the European union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:58
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.528923	3.025862	-0.174801	0.8616
LGDP92	0.213746	0.661924	0.322916	0.7475
PSER	-0.042248	0.021337	-1.980068	0.0508
SSER	0.064551	0.012825	5.033063	0.0000
GCE	0.050932	0.022536	2.260054	0.0263
FER	0.497343	0.453687	1.096224	0.2760
HEXP	-0.081693	0.128786	-0.634332	0.5275

R-squared	0.260093	Mean dependent var	3.175702
Adjusted R-squared	0.209645	S.D. dependent var	0.888872
S.E. of regression	0.790224	Akaike info criterion	2.437829
Sum squared resid	54.95200	Schwarz criterion	2.626009
Log likelihood	-108.7969	F-statistic	5.155657
Durbin-Watson stat	0.349689	Prob(F-statistic)	0.000139

The third regression of this group, which adds the two indicators of openness to the regression, shows no clear evidence to support the hypothesis that openness results in high economic growth rates. The results of this regression, as shown in Table 12, shows that while the coefficient of TRD-the trade ratio is negative, the coefficient of EXPIMP-the ratio of exports to the sum of imports and exports is positive. The behaviour of the other five independent variables added in the above regression follow a very similar pattern in this regression. Their coefficients are all positive save for the primary school and health expenditure variables.

Table 12: Group 4 Regression 3 - The regression testing the convergence hypothesis including the two variables that measure openness for the Eastern European countries that have just joined the European Union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 15:00
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.591940	2.992504	-0.866144	0.3888
LGDP92	-0.286589	0.716730	-0.399856	0.6903
PSER	-0.035887	0.020887	-1.718119	0.0894
SSER	0.065720	0.012288	5.348158	0.0000
GCE	0.057962	0.023941	2.421049	0.0176
FER	0.191336	0.464801	0.411652	0.6816
HEXP	-0.003887	0.142920	-0.027195	0.9784
TRD	-0.002477	0.003013	-0.822023	0.4133
EXPIMP	6.424102	2.095630	3.065476	0.0029

R-squared	0.337345	Mean dependent var	3.175702
Adjusted R-squared	0.275703	S.D. dependent var	0.888872
S.E. of regression	0.756481	Akaike info criterion	2.369664
Sum squared resid	49.21460	Schwarz criterion	2.611610
Log likelihood	-103.5590	F-statistic	5.472627
Durbin-Watson stat	0.393116	Prob(F-statistic)	0.000014

5.6 RESULTS OF THE ANALYSIS OF THE FIFTH GROUP OF COUNTRIES

The group consist of the five countries that are not current members of the European Union. The first regression for this group of countries examined the relationship between the dependent variable G9203 – the rate of change of economic growth against the independent variable LGDP92 – natural log of real GDP per capita in 1992 for the Eastern European countries that are not current members of the European Union. The first regression of this group of countries shows that the convergence hypothesis is confirmed. The results, as presented in Table 13, reflects a negative and significant coefficient of initial income.

Table 13: Group 5 Regression 1 - The regression testing the convergence hypothesis for the five countries that are not members of the European Union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:28
Sample: 1 60
Included observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.73968	2.531287	5.032888	0.0000
LGDP92	-3.018281	0.785206	-3.843935	0.0003

R-squared	0.203032	Mean dependent var	3.048333
Adjusted R-squared	0.189291	S.D. dependent var	1.941579
S.E. of regression	1.748185	Akaike info criterion	3.987799
Sum squared resid	177.2568	Schwarz criterion	4.057610
Log likelihood	-117.6340	F-statistic	14.77583
Durbin-Watson stat	0.263124	Prob(F-statistic)	0.000303

The second regression of this group which contains the five variables that affect growth does not corroborate the hypothesis of convergence. The added five variables are; PSER-the Primary School Gross Enrolment Rate, SSER-the Secondary School Enrolment Rate, FR-the Fertility Rate, GCE-ratio of Real Government Consumption Expenditure to Real GDP, and the HEXP-health expenditure. The results of this

regression, as presented in Table 14, reflects a positive and significant coefficient of initial income. The results also show that the coefficients of all the five variables are positive, reflecting that these variables are important for economic growth. However, the coefficients of the government spending and health expenditure are negative, reflecting the fact that these variables are not important factors for economic growth in this group of countries.

Table 14: Group 5 Regression 2 - The regression testing the convergence hypothesis including the six independent variables for the five countries that are not members of the European union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:30
Sample (adjusted): 13 60
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-15.90195	0.609375	-26.09550	0.0000
LGDP92	4.919663	0.280240	17.55518	0.0000
PSER	0.003872	0.003648	1.061321	0.2948
SSER	0.004376	0.002084	2.099531	0.0420
GCE	-0.019044	0.005147	-3.700213	0.0006
FER	0.827797	0.062928	13.15466	0.0000
HEXP	-0.007226	0.015080	-0.479215	0.6343

R-squared	0.995239	Mean dependent var	2.218750
Adjusted R-squared	0.994543	S.D. dependent var	1.103611
S.E. of regression	0.081527	Akaike info criterion	-2.041737
Sum squared resid	0.272510	Schwarz criterion	-1.768853
Log likelihood	56.00168	F-statistic	1428.589
Durbin-Watson stat	1.045517	Prob(F-statistic)	0.000000

The third regression of this group is not in concurrence with the hypothesis that openness positively influences economic growth rates. The results of this regression, as shown in Table 15, reflect a negative and statistically insignificant coefficient of both TRD-the trade ratio and EXPIMP-the ratio of exports to the sum of imports and

exports. The performance of the five variables that were added in the above regression is still the same even in this regression.

Table 15: Group 5 Regression 3 - The regression testing the convergence hypothesis including the two variables that measure openness for the five countries that are not members of European Union

Dependent Variable: G9203
Method: Least Squares
Date: 11/01/06 Time: 14:32
Sample (adjusted): 13 60
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-16.48579	0.601598	-27.40335	0.0000
LGDP92	4.962685	0.261531	18.97555	0.0000
PSER	0.005374	0.003432	1.565654	0.1255
SSER	0.005003	0.002124	2.354876	0.0237
GCE	-0.015928	0.004909	-3.244285	0.0024
FER	0.752518	0.064052	11.74862	0.0000
HEXP	-0.006797	0.014051	-0.483711	0.6313
TRD	-0.002574	0.000973	-2.646959	0.0117
EXPIMP	1.131699	0.435396	2.599241	0.0131

R-squared	0.996083	Mean dependent var	2.218750
Adjusted R-squared	0.995280	S.D. dependent var	1.103611
S.E. of regression	0.075822	Akaike info criterion	-2.153504
Sum squared resid	0.224208	Schwarz criterion	-1.802653
Log likelihood	60.68409	F-statistic	1239.790
Durbin-Watson stat	1.414200	Prob(F-statistic)	0.000000

5.7 ANALYSIS OF THE REVERSE REGRESSION

The investigation of the relationship between openness and growth is the nucleus of this dissertation. The regression to tests the hypothesis that openness leads to growth has already been run. However, of equal importance is the reverse hypothesis that growth results in openness.

This section will deal with this reverse hypothesis. There will be two regressions for each group of countries. The first regression will have the TRD-the trade ratio variable as the dependent variable and the G9203 rate of change in GDP as the independent variable. The second regression will have the EXIMP as the dependent variable and the G9203 rate of change of GDP as the independent variable.

Tables 16-20 present the results for the regression where the TRD is the dependent variable and tables 21-25 present the results for the regression in which EXPIMP is the dependent variable.

Table 16: Regression 1 Group 1 – The regression testing the hypothesis that openness results in growth using the trade ratio as a dependent variable for the 30 countries

Dependent Variable: TRD
Method: Least Squares
Date: 11/01/06 Time: 15:05
Sample: 1 360
Included observations: 355

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	61.26007	5.144801	11.90718	0.0000
G9203	11.65653	1.585289	7.352936	0.0000

R-squared	0.132818	Mean dependent var	95.64408
Adjusted R-squared	0.130361	S.D. dependent var	43.34224
S.E. of regression	40.41855	Akaike info criterion	10.24207
Sum squared resid	576681.7	Schwarz criterion	10.26389
Log likelihood	-1815.968	F-statistic	54.06566
Durbin-Watson stat	0.197515	Prob(F-statistic)	0.000000

Table 17: Regression 1 Group 2 - The regression testing the hypothesis that openness results in growth using the trade ratio as a dependent variable for the initial 15 member countries of the European Union.

Dependent Variable: TRD
Method: Least Squares
Date: 11/01/06 Time: 15:08
Sample: 1 180
Included observations: 177

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	38.06009	6.351265	5.992521	0.0000
G9203	17.14235	2.115656	8.102614	0.0000

R-squared	0.272810	Mean dependent var	83.94734
Adjusted R-squared	0.268655	S.D. dependent var	44.72734
S.E. of regression	38.25025	Akaike info criterion	10.13741
Sum squared resid	256039.3	Schwarz criterion	10.17330
Log likelihood	-895.1610	F-statistic	65.65236
Durbin-Watson stat	0.153467	Prob(F-statistic)	0.000000

Table 18: Regression 1 Group 3 - The regression testing the hypothesis that openness results in growth using the trade ratio as a dependent variable for the current 25 member countries of the European Union.

Dependent Variable: TRD
Method: Least Squares
Date: 11/01/06 Time: 15:10
Sample: 1 300
Included observations: 297

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	48.34408	6.152289	7.857901	0.0000
G9203	16.89054	1.922977	8.783539	0.0000

R-squared	0.207310	Mean dependent var	98.21953
Adjusted R-squared	0.204623	S.D. dependent var	45.75995
S.E. of regression	40.81052	Akaike info criterion	10.26247
Sum squared resid	491322.0	Schwarz criterion	10.28734
Log likelihood	-1521.976	F-statistic	77.15056
Durbin-Watson stat	0.229416	Prob(F-statistic)	0.000000

Table 19: Regression 1 Group 4 - The regression testing the hypothesis that openness results in growth using the trade ratio as a dependent variable for the Eastern European countries that have just joined the European Union.

Dependent Variable: TRD
Method: Least Squares
Date: 11/01/06 Time: 15:16
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	114.4224	12.76601	8.963048	0.0000
G9203	-0.123426	3.872606	-0.031872	0.9746

R-squared	0.000011	Mean dependent var	114.0304
Adjusted R-squared	-0.010742	S.D. dependent var	33.19606
S.E. of regression	33.37387	Akaike info criterion	9.874252

Sum squared resid	103584.8	Schwarz criterion	9.928017
Log likelihood	-467.0269	F-statistic	0.001016
Durbin-Watson stat	0.588337	Prob(F-statistic)	0.974643

Table 20: Regression 1 Group 5 - The regression testing the hypothesis that openness results in growth using the trade ratio as a dependent variable for the five countries that are not members of the European Union

Dependent Variable: TRD
Method: Least Squares
Date: 11/01/06 Time: 15:11
Sample (adjusted): 3 60
Included observations: 58 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	83.11251	5.975081	13.90985	0.0000
G9203	-0.223754	1.721293	-0.129992	0.8970

R-squared	0.000302	Mean dependent var	82.45603
Adjusted R-squared	-0.017550	S.D. dependent var	24.10971
S.E. of regression	24.32035	Akaike info criterion	9.254378
Sum squared resid	33122.86	Schwarz criterion	9.325428
Log likelihood	-266.3770	F-statistic	0.016898
Durbin-Watson stat	0.279635	Prob(F-statistic)	0.897039

The results of the first regression, as presented in Tables 16-20, reflects a generally positive relationship between growth and openness when the TRD-trade ratio is used the dependent measure of openness. The results of the first, second and third groups shows that growth leads to openness as reflected in the positive coefficient of rate of change in economic growth.. However, for the fourth and fifth group the coefficient is negative reflecting that growth does not lead to openness in these two groups of countries.

The results of the second regression, as presented in Tables 21 and 25, reflects a negative relationship between growth and openness as reflected by the negative and

insignificant coefficient of the rate of change in economic growth.. This means that for the first and last group growth does not lead to openness.

However, the relationship between growth and openness is positive for the second, third and fourth group. The results of the regression for these groups, as presented in Tables 22-24 reflect a positive and significant coefficient of G9203.The results of these groups show that growth leads to openness.

Table 21: Regression 2 Group 1 - The regression testing the hypothesis that openness results in growth using the ratio of exports to the sum of imports and exports as a dependent variable for the 30 countries

Dependent Variable: EXPIMP
Method: Least Squares
Date: 11/01/06 Time: 15:17
Sample: 1 360
Included observations: 360

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.509578	0.006850	74.38664	0.0000
G9203	-0.006837	0.002089	-3.273105	0.0012

R-squared	0.029056	Mean dependent var	0.489211
Adjusted R-squared	0.026344	S.D. dependent var	0.055101
S.E. of regression	0.054370	Akaike info criterion	-2.980468
Sum squared resid	1.058283	Schwarz criterion	-2.958879
Log likelihood	538.4843	F-statistic	10.71322
Durbin-Watson stat	0.417846	Prob(F-statistic)	0.001167

Table 22: Regression 2 Group 2 - The regression testing the hypothesis that openness results in growth using the ratio of exports to the sum of imports and exports as a dependent variable for the initial 15 member countries of the European Union.

Dependent Variable: EXPIMP
Method: Least Squares
Date: 11/01/06 Time: 15:21
Sample: 1 180
Included observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.496001	0.006778	73.17929	0.0000
G9203	0.004528	0.002241	2.020921	0.0448

R-squared	0.022430	Mean dependent var	0.508234
Adjusted R-squared	0.016938	S.D. dependent var	0.041263
S.E. of regression	0.040912	Akaike info criterion	-3.543748
Sum squared resid	0.297932	Schwarz criterion	-3.508271
Log likelihood	320.9373	F-statistic	4.084121
Durbin-Watson stat	0.224474	Prob(F-statistic)	0.044786

Table 23: Regression 2 Group 3 - The regression testing the hypothesis that openness results in growth using the ratio of exports to the sum of imports and exports as a dependent variable for the current 25 member countries of the European Union.

Dependent Variable: EXPIMP
Method: Least Squares
Date: 11/01/06 Time: 15:24
Sample: 1 300
Included observations: 300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.491760	0.006178	79.60072	0.0000
G9203	0.002796	0.001924	1.453232	0.1472

R-squared	0.007037	Mean dependent var	0.500051
Adjusted R-squared	0.003705	S.D. dependent var	0.041112
S.E. of regression	0.041036	Akaike info criterion	-3.542092
Sum squared resid	0.501817	Schwarz criterion	-3.517400
Log likelihood	533.3137	F-statistic	2.111883
Durbin-Watson stat	0.430561	Prob(F-statistic)	0.147212

Table 24: Regression 2 Group 4 - The regression testing the hypothesis that openness results in growth using the ratio of exports to the sum of imports and exports as a dependent variable for the Eastern European countries that have just joined the European Union.

Dependent Variable: EXPIMP
Method: Least Squares
Date: 11/01/06 Time: 15:30
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.449872	0.015123	29.74724	0.0000

G9203	0.012782	0.004588	2.786156	0.0065

R-squared	0.077039	Mean dependent var	0.490463
Adjusted R-squared	0.067115	S.D. dependent var	0.040934
S.E. of regression	0.039536	Akaike info criterion	-3.602380
Sum squared resid	0.145368	Schwarz criterion	-3.548614
Log likelihood	173.1130	F-statistic	7.762663
Durbin-Watson stat	0.808457	Prob(F-statistic)	0.006465

Table 25: Regression 2 Group 5 - The regression testing the hypothesis that openness results in growth using the ratio of exports to the sum of imports and exports as a dependent variable for the five countries that are not yet members of the European Union.

Dependent Variable: EXPIMP
Method: Least Squares
Date: 11/01/06 Time: 15:26
Sample: 1 60
Included observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.512215	0.015238	33.61511	0.0000
G9203	-0.025326	0.004226	-5.992558	0.0000

R-squared	0.382392	Mean dependent var	0.435012
Adjusted R-squared	0.371744	S.D. dependent var	0.079519
S.E. of regression	0.063029	Akaike info criterion	-2.657681
Sum squared resid	0.230413	Schwarz criterion	-2.587869
Log likelihood	81.73043	F-statistic	35.91075
Durbin-Watson stat	0.916134	Prob(F-statistic)	0.000000

5.8 THE GRANGER TEST

A Granger causality test is a statistical test of causality in the sense of determining whether lagged observations of another variable have incremental forecasting power when added to a univariate autoregressive representation of a variable.

The test itself is just an F-test of the joint significance of the other variable in a regression that includes lags of the dependent variable. It is important to note that the Granger causality cannot establish causality in a theoretical sense, it may also be misleading if, for example, the processes determining the variables of interest involve expectations and it is not a test for strict exogeneity.

Hypothesis

Ho: x does not causes y

H_1: x cause y

Decision rule

If the F test statistic > F critical value Reject Ho

Table 26: The granger causality test for the 30 countries testing whether openness causes growth.

White Heteroskedasticity Test:

F-statistic	9.294306	Prob. F(44,277)	0.000000
Obs*R-squared	191.9700	Prob. Chi-Square(44)	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:38
Sample: 1 360
Included observations: 322

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	19.40463	23.28989	0.833178	0.4055
LGDP92	-10.95605	10.08411	-1.086466	0.2782
LGDP92^2	-3.128122	1.234319	-2.534289	0.0118
LGDP92*PSER	0.166940	0.080723	2.068056	0.0396
LGDP92*SSER	-0.118380	0.035902	-3.297343	0.0011
LGDP92*GCE	-0.080410	0.154119	-0.521740	0.6023
LGDP92*HEXP	2.114471	0.439056	4.815949	0.0000
LGDP92*FER	6.347507	1.546461	4.104538	0.0001
LGDP92*TRD	-0.002865	0.009593	-0.298640	0.7654
LGDP92*EXPIMP	9.429540	12.15780	0.775596	0.4386
PSER	-0.065440	0.240981	-0.271556	0.7862
PSER^2	-0.001019	0.001032	-0.987404	0.3243
PSER*SSER	-0.000212	0.001127	-0.188182	0.8509
PSER*GCE	-0.002507	0.005915	-0.423794	0.6720
PSER*HEXP	-0.036586	0.017485	-2.092468	0.0373
PSER*FER	-0.057933	0.067612	-0.856844	0.3923
PSER*TRD	-0.001267	0.000385	-3.290310	0.0011
PSER*EXPIMP	0.260410	0.348809	0.746570	0.4560
SSER	0.208271	0.152811	1.362926	0.1740
SSER^2	4.56E-06	0.000289	0.015781	0.9874
SSER*GCE	-0.001153	0.003217	-0.358307	0.7204
SSER*HEXP	0.003149	0.009757	0.322790	0.7471
SSER*FER	0.057133	0.034863	1.638789	0.1024
SSER*TRD	-3.72E-05	0.000154	-0.240789	0.8099
SSER*EXPIMP	0.469021	0.242409	1.934832	0.0540
GCE	0.794172	0.590811	1.344207	0.1800
GCE^2	-0.004136	0.006444	-0.641844	0.5215
GCE*HEXP	-0.015602	0.028928	-0.539357	0.5901
GCE*FER	-0.359652	0.127772	-2.814802	0.0052
GCE*TRD	-0.002261	0.001010	-2.237359	0.0261
GCE*EXPIMP	1.601585	0.913394	1.753444	0.0806
HEXP	0.752688	2.005357	0.375339	0.7077
HEXP^2	-0.135451	0.048766	-2.777588	0.0059
HEXP*FER	-0.032074	0.316291	-0.101405	0.9193
HEXP*TRD	0.012918	0.003785	3.412796	0.0007
HEXP*EXPIMP	-8.140124	2.785213	-2.922622	0.0038
FER	-33.53658	9.289274	-3.610248	0.0004
FER^2	4.276083	1.001517	4.269607	0.0000
FER*TRD	0.080133	0.011297	7.093322	0.0000
FER*EXPIMP	-3.884856	9.182596	-0.423067	0.6726

TRD	-0.030641	0.049321	-0.621246	0.5349
TRD^2	6.41E-05	6.16E-05	1.040768	0.2989
TRD*EXPIMP	-0.006627	0.091879	-0.072124	0.9426
EXPIMP	58.54761	49.21475	1.189635	0.2352
EXPIMP^2	-134.8832	40.80563	-3.305504	0.0011

R-squared	0.596180	Mean dependent var	1.026482
Adjusted R-squared	0.532035	S.D. dependent var	1.605413
S.E. of regression	1.098230	Akaike info criterion	3.154245
Sum squared resid	334.0920	Schwarz criterion	3.681745
Log likelihood	-462.8335	F-statistic	9.294306
Durbin-Watson stat	0.717951	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 9.294306. Since 9.294306 > 0.000000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 27: The granger causality test for the initial 15 member countries of the European Union testing whether openness causes growth.

White Heteroskedasticity Test:

F-statistic	10.40802	Prob. F(44,132)	0.000000
Obs*R-squared	137.3968	Prob. Chi-Square(44)	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:41
Sample: 1 180
Included observations: 177

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	46.22266	130.6406	0.353815	0.7240
LGDP92	-38.42766	57.96667	-0.662927	0.5085
LGDP92^2	7.534318	6.871473	1.096463	0.2749
LGDP92*PSER	0.139314	0.099916	1.394314	0.1656
LGDP92*SSER	0.032497	0.071248	0.456119	0.6491
LGDP92*GCE	0.803647	0.441146	1.821725	0.0708

LGDP92*HEXP	-2.907939	0.700115	-4.153515	0.0001
LGDP92*FER	-12.82502	4.021418	-3.189179	0.0018
LGDP92*TRD	-0.045632	0.027967	-1.631632	0.1051
LGDP92*EXPIMP	-28.11835	32.37867	-0.868422	0.3867
PSER	-0.404109	0.429479	-0.940929	0.3485
PSER^2	0.001520	0.000585	2.599517	0.0104
PSER*SSER	-0.001305	0.000592	-2.205726	0.0291
PSER*GCE	-0.000138	0.004122	-0.033555	0.9733
PSER*HEXP	-0.009748	0.008866	-1.099485	0.2736
PSER*FER	-0.050875	0.048791	-1.042711	0.2990
PSER*TRD	-0.000775	0.000227	-3.408355	0.0009
PSER*EXPIMP	-0.297716	0.305678	-0.973953	0.3319
SSER	0.051635	0.309908	0.166616	0.8679
SSER^2	-8.59E-05	0.000131	-0.657623	0.5119
SSER*GCE	0.007040	0.002654	2.652959	0.0090
SSER*HEXP	-0.014172	0.005153	-2.750237	0.0068
SSER*FER	-0.036775	0.021790	-1.687663	0.0938
SSER*TRD	-0.000105	0.000137	-0.765969	0.4451
SSER*EXPIMP	0.007979	0.137393	0.058077	0.9538
GCE	-3.232513	2.006455	-1.611057	0.1096
GCE^2	-0.030688	0.012568	-2.441872	0.0159
GCE*HEXP	0.042018	0.037786	1.111992	0.2682
GCE*FER	0.152468	0.184381	0.826921	0.4098
GCE*TRD	5.77E-06	0.001093	0.005282	0.9958
GCE*EXPIMP	-0.793834	0.916202	-0.866440	0.3878
HEXP	9.219638	2.563180	3.596952	0.0005
HEXP^2	0.039866	0.047608	0.837381	0.4039
HEXP*FER	0.688010	0.319975	2.150200	0.0334
HEXP*TRD	0.006665	0.001999	3.334884	0.0011
HEXP*EXPIMP	5.880055	2.340442	2.512370	0.0132
FER	40.18692	19.22321	2.090542	0.0385
FER^2	3.371665	1.127417	2.990610	0.0033
FER*TRD	0.024896	0.012442	2.000942	0.0474
FER*EXPIMP	7.723995	10.35908	0.745626	0.4572
TRD	0.214214	0.129846	1.649752	0.1014
TRD^2	0.000180	5.29E-05	3.393936	0.0009
TRD*EXPIMP	-0.094916	0.077953	-1.217611	0.2255
EXPIMP	40.43460	121.2859	0.333382	0.7394
EXPIMP^2	77.33401	50.40609	1.534220	0.1274

R-squared	0.776253	Mean dependent var	0.355027
Adjusted R-squared	0.701671	S.D. dependent var	0.428268
S.E. of regression	0.233918	Akaike info criterion	0.147432
Sum squared resid	7.222711	Schwarz criterion	0.954928
Log likelihood	31.95224	F-statistic	10.40802
Durbin-Watson stat	1.481940	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 10.40802. Since 10.40802 > 0.000000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 28: The granger causality test for the current 25 member countries of the European Union testing whether openness causes growth.

White Heteroskedasticity Test:

F-statistic	14.93194	Prob. F(44,229)	0.000000
Obs*R-squared	203.1810	Prob. Chi-Square(44)	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:44
Sample: 1 300
Included observations: 274

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-53.49855	31.81295	-1.681659	0.0940
LGDP92	30.45709	10.58088	2.878502	0.0044
LGDP92^2	-9.790903	1.267765	-7.722961	0.0000
LGDP92*PSER	0.023391	0.070849	0.330150	0.7416
LGDP92*SSER	0.003901	0.031656	0.123245	0.9020
LGDP92*GCE	-0.289676	0.158393	-1.828842	0.0687
LGDP92*HEXP	4.725593	0.635791	7.432617	0.0000
LGDP92*FER	1.886207	1.746706	1.079865	0.2813
LGDP92*TRD	0.020054	0.008860	2.263463	0.0245
LGDP92*EXPIMP	20.54095	11.46026	1.792364	0.0744
PSER	-0.022500	0.307066	-0.073273	0.9417

PSER^2	-1.19E-05	0.000873	-0.013623	0.9891
PSER*SSER	-0.002659	0.001046	-2.541829	0.0117
PSER*GCE	0.011923	0.005223	2.282593	0.0234
PSER*HEXP	-0.012562	0.017247	-0.728319	0.4672
PSER*FER	0.005393	0.085778	0.062867	0.9499
PSER*TRD	-0.001769	0.000314	-5.629783	0.0000
PSER*EXPIMP	0.384918	0.339436	1.133992	0.2580
SSER	0.508047	0.149543	3.397327	0.0008
SSER^2	-0.000967	0.000233	-4.153770	0.0000
SSER*GCE	0.006707	0.002960	2.265703	0.0244
SSER*HEXP	-0.007408	0.008534	-0.868058	0.3863
SSER*FER	0.034184	0.037150	0.920160	0.3585
SSER*TRD	-0.000469	0.000125	-3.754659	0.0002
SSER*EXPIMP	-0.238478	0.222738	-1.070668	0.2854
GCE	-0.050289	0.563857	-0.089188	0.9290
GCE^2	0.011141	0.005777	1.928541	0.0550
GCE*HEXP	-0.097950	0.036136	-2.710593	0.0072
GCE*FER	-1.027252	0.115665	-8.881249	0.0000
GCE*TRD	-0.004286	0.000839	-5.110017	0.0000
GCE*EXPIMP	2.739132	0.848538	3.228062	0.0014
HEXP	-6.416559	2.226983	-2.881279	0.0043
HEXP^2	-0.379321	0.096752	-3.920547	0.0001
HEXP*FER	0.887234	0.419717	2.113887	0.0356
HEXP*TRD	0.013208	0.003234	4.084685	0.0001
HEXP*EXPIMP	-10.53168	3.296614	-3.194695	0.0016
FER	-19.52703	10.83730	-1.801836	0.0729
FER^2	6.118339	1.477653	4.140578	0.0000
FER*TRD	0.064443	0.009693	6.648142	0.0000
FER*EXPIMP	0.207953	12.18497	0.017066	0.9864
TRD	0.228887	0.042958	5.328223	0.0000
TRD^2	0.000122	5.14E-05	2.368391	0.0187
TRD*EXPIMP	-0.393819	0.084812	-4.643436	0.0000
EXPIMP	-2.315547	52.43391	-0.044161	0.9648
EXPIMP^2	-41.63587	40.47613	-1.028652	0.3047

R-squared	0.741537	Mean dependent var	0.808334
Adjusted R-squared	0.691875	S.D. dependent var	1.417016
S.E. of regression	0.786571	Akaike info criterion	2.506794
Sum squared resid	141.6810	Schwarz criterion	3.100191
Log likelihood	-298.4308	F-statistic	14.93194

Durbin-Watson stat	0.971096	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 14.93194. Since 14.93194 > 0.000000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 29: The granger causality test for the Eastern European countries who have just joined the European Union testing whether openness causes growth.

White Heteroskedasticity Test:

F-statistic	7.764421	Prob. F(44,50)	0.000000
Obs*R-squared	82.87135	Prob. Chi-Square(44)	0.000355

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:46
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	139.5375	115.1254	1.212047	0.2312
LGDP92	2.627975	47.25132	0.055617	0.9559
LGDP92^2	-4.846159	5.204834	-0.931088	0.3563
LGDP92*PSER	-0.158446	0.250743	-0.631906	0.5303
LGDP92*SSER	0.134170	0.128209	1.046490	0.3004
LGDP92*GCE	0.488605	0.419101	1.165841	0.2492
LGDP92*HEXP	0.856779	1.451853	0.590128	0.5578
LGDP92*FER	30.09086	3.992308	7.537211	0.0000
LGDP92*TRD	0.073605	0.057930	1.270589	0.2098
LGDP92*EXPIMP	-52.96063	18.47299	-2.866922	0.0061
PSER	-2.066240	1.170755	-1.764879	0.0837
PSER^2	0.006500	0.005287	1.229451	0.2247
PSER*SSER	0.004128	0.003816	1.081501	0.2847
PSER*GCE	-0.002432	0.009042	-0.268929	0.7891
PSER*HEXP	0.084014	0.045534	1.845080	0.0710
PSER*FER	-0.054906	0.176570	-0.310958	0.7571
PSER*TRD	0.001466	0.001422	1.031124	0.3074

PSER*EXPIMP	0.906274	0.698202	1.298011	0.2002
SSER	0.328715	0.631950	0.520160	0.6052
SSER^2	-0.002550	0.001148	-2.220627	0.0309
SSER*GCE	-0.001312	0.005659	-0.231812	0.8176
SSER*HEXP	-0.031974	0.022021	-1.452013	0.1527
SSER*FER	-0.217784	0.096150	-2.265036	0.0279
SSER*TRD	-0.000682	0.000557	-1.224759	0.2264
SSER*EXPIMP	-0.303862	0.553345	-0.549137	0.5854
GCE	-1.157296	1.710782	-0.676472	0.5019
GCE^2	-0.001364	0.006061	-0.225016	0.8229
GCE*HEXP	0.012271	0.051378	0.238832	0.8122
GCE*FER	0.223871	0.180482	1.240406	0.2206
GCE*TRD	0.000663	0.001087	0.609421	0.5450
GCE*EXPIMP	-1.099846	0.992792	-1.107832	0.2732
HEXP	-4.765411	5.856434	-0.813705	0.4197
HEXP^2	-0.213535	0.139763	-1.527843	0.1329
HEXP*FER	-2.091172	0.723427	-2.890647	0.0057
HEXP*TRD	-0.009375	0.006279	-1.493104	0.1417
HEXP*EXPIMP	5.289247	3.234073	1.635475	0.1082
FER	-49.87085	19.60345	-2.543983	0.0141
FER^2	-6.745045	1.469262	-4.590769	0.0000
FER*TRD	-0.054011	0.020172	-2.677525	0.0100
FER*EXPIMP	8.835102	11.56614	0.763876	0.4485
TRD	-0.189765	0.150756	-1.258754	0.2140
TRD^2	-4.55E-05	9.59E-05	-0.474393	0.6373
TRD*EXPIMP	-0.042247	0.091545	-0.461483	0.6465
EXPIMP	31.54453	87.63921	0.359936	0.7204
EXPIMP^2	62.86887	34.11200	1.843013	0.0713

R-squared	0.872330	Mean dependent var	0.518048
Adjusted R-squared	0.759980	S.D. dependent var	0.591289
S.E. of regression	0.289683	Akaike info criterion	0.665455
Sum squared resid	4.195811	Schwarz criterion	1.875186
Log likelihood	13.39088	F-statistic	7.764421
Durbin-Watson stat	1.988390	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 7.764421. Since 7.764421 > 0.000000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 30: The granger causality test for the five Eastern European countries who have not yet joined the European Union testing whether openness causes growth.

White Heteroskedasticity Test:

F-statistic	6.817170	Prob. F(44,3)	0.068735
Obs*R-squared	47.52468	Prob. Chi-Square(44)	0.331119

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:48
Sample: 13 60
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.94505	19.62971	-0.608519	0.5858
LGDP92	2.508233	15.03103	0.166870	0.8781
LGDP92^2	2.016678	5.222797	0.386130	0.7252
LGDP92*PSER	-0.039096	0.097569	-0.400704	0.7155
LGDP92*SSER	-0.020760	0.015513	-1.338233	0.2732
LGDP92*GCE	-0.107535	0.139314	-0.771892	0.4964
LGDP92*HEXP	-0.555424	0.592619	-0.937235	0.4178
LGDP92*FER	-3.098959	3.777414	-0.820392	0.4721
LGDP92*TRD	-0.002232	0.006800	-0.328179	0.7643
LGDP92*EXPIMP	0.637287	4.756102	0.133994	0.9019
PSER	0.047260	0.132328	0.357142	0.7446
PSER^2	0.000206	0.000411	0.501600	0.6504
PSER*SSER	-9.59E-05	0.000406	-0.236387	0.8284
PSER*GCE	-0.000460	0.000937	-0.490876	0.6572
PSER*HEXP	0.005587	0.004305	1.297895	0.2851
PSER*FER	0.003576	0.026697	0.133949	0.9019
PSER*TRD	-5.27E-05	8.21E-05	-0.641573	0.5668
PSER*EXPIMP	0.053272	0.048283	1.103318	0.3504
SSER	-0.077088	0.146426	-0.526462	0.6350
SSER^2	0.000844	0.000723	1.167395	0.3274
SSER*GCE	0.000865	0.000610	1.418411	0.2511
SSER*HEXP	-0.002907	0.001216	-2.389814	0.0968
SSER*FER	0.027920	0.021377	1.306095	0.2826

SSER*TRD	2.67E-05	6.30E-05	0.423792	0.7003
SSER*EXPIMP	-0.049788	0.032429	-1.535304	0.2223
GCE	0.181815	0.207247	0.877287	0.4449
GCE^2	0.000238	0.000681	0.348998	0.7501
GCE*HEXP	0.007358	0.008703	0.845480	0.4599
GCE*FER	0.045393	0.042019	1.080286	0.3591
GCE*TRD	4.79E-05	0.000129	0.370286	0.7358
GCE*EXPIMP	0.041020	0.051470	0.796968	0.4837
HEXP	1.095653	1.285889	0.852059	0.4568
HEXP^2	0.016798	0.013863	1.211724	0.3124
HEXP*FER	0.095443	0.118371	0.806301	0.4791
HEXP*TRD	0.000362	0.000524	0.689871	0.5399
HEXP*EXPIMP	-0.145555	0.430682	-0.337965	0.7577
FER	4.744158	4.970969	0.954373	0.4103
FER^2	0.585514	0.774618	0.755875	0.5047
FER*TRD	0.003105	0.006692	0.463977	0.6743
FER*EXPIMP	-1.309070	2.137580	-0.612407	0.5836
TRD	-0.000404	0.022134	-0.018265	0.9866
TRD^2	1.34E-05	2.03E-05	0.659660	0.5566
TRD*EXPIMP	-0.002151	0.023517	-0.091472	0.9329
EXPIMP	-2.775248	15.98293	-0.173638	0.8732
EXPIMP^2	2.067137	6.481479	0.318930	0.7707

R-squared	0.990098	Mean dependent var	0.004671
Adjusted R-squared	0.844862	S.D. dependent var	0.014123
S.E. of regression	0.005563	Akaike info criterion	-8.442984
Sum squared resid	9.28E-05	Schwarz criterion	-6.688733
Log likelihood	247.6316	F-statistic	6.817170
Durbin-Watson stat	2.646681	Prob(F-statistic)	0.068735

The F test statistic for this group of countries is 6.817170. Since 6.817170 > 0.068735 we reject Ho and conclude that openness causes growth in this group of countries.

Table 31: The granger causality test for the 30 countries testing whether growth causes openness using the trade ratio as a measure of openness.

White Heteroskedasticity Test:

F-statistic	18.85462	Prob. F(2,352)	0.000000
Obs*R-squared	34.35068	Prob. Chi-Square(2)	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:50
Sample: 1 360
Included observations: 355

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1557.963	539.2803	-2.888966	0.0041
G9203	1767.182	312.4604	5.655699	0.0000
G9203^2	-192.7753	39.81653	-4.841588	0.0000

R-squared	0.096762	Mean dependent var	1624.456
Adjusted R-squared	0.091630	S.D. dependent var	2168.226
S.E. of regression	2066.502	Akaike info criterion	18.11352
Sum squared resid	1.50E+09	Schwarz criterion	18.14624
Log likelihood	-3212.149	F-statistic	18.85462
Durbin-Watson stat	0.295290	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 18.85462. Since 18.85462 > 0.00000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 32: The granger causality test for the initial 15 member countries of the European Union testing whether growth causes openness using the trade ratio as a measure of openness.

White Heteroskedasticity Test:

F-statistic	18.04511	Prob. F(2,174)	0.000000
Obs*R-squared	30.40584	Prob. Chi-Square(2)	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:51
Sample: 1 180
Included observations: 177

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4894.719	1072.516	-4.563774	0.0000
G9203	3717.556	630.7607	5.893766	0.0000
G9203^2	-400.5707	72.44021	-5.529673	0.0000

R-squared	0.171784	Mean dependent var	1446.550
Adjusted R-squared	0.162265	S.D. dependent var	2556.290
S.E. of regression	2339.718	Akaike info criterion	18.37025
Sum squared resid	9.53E+08	Schwarz criterion	18.42409
Log likelihood	-1622.767	F-statistic	18.04511
Durbin-Watson stat	0.205244	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 18.04511. Since 18.04511 > 0.00000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 33: The granger causality test for the current 25 member countries of the European Union testing whether growth causes openness using the trade ratio as a measure of openness.

White Heteroskedasticity Test:

F-statistic	15.11724	Prob. F(2,294)	0.000001
Obs*R-squared	27.69490	Prob. Chi-Square(2)	0.000001

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:52
Sample: 1 300
Included observations: 297

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1808.200	661.6418	-2.732899	0.0067
G9203	1849.163	372.6122	4.962702	0.0000
G9203^2	-195.1801	46.51374	-4.196183	0.0000

R-squared	0.093249	Mean dependent var	1654.283
Adjusted R-squared	0.087080	S.D. dependent var	2107.521
S.E. of regression	2013.669	Akaike info criterion	18.06335
Sum squared resid	1.19E+09	Schwarz criterion	18.10066
Log likelihood	-2679.408	F-statistic	15.11724
Durbin-Watson stat	0.401099	Prob(F-statistic)	0.000001

The F test statistic for this group of countries is 15.11724. Since 15.11724 > 0.00001 we reject Ho and conclude that openness causes growth in this group of countries.

Table 34: The granger causality test for the Eastern European countries who have just joined the European Union testing whether growth causes openness using the trade ratio as a measure of openness.

White Heteroskedasticity Test:

F-statistic	31.20318	Prob. F(2,92)	0.000000
Obs*R-squared	38.39611	Prob. Chi-Square(2)	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:53
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7444.448	1560.649	4.770097	0.0000
G9203	-5440.160	1083.361	-5.021559	0.0000
G9203^2	1005.097	176.1153	5.707038	0.0000

R-squared	0.404170	Mean dependent var	1090.367
Adjusted R-squared	0.391217	S.D. dependent var	1414.046
S.E. of regression	1103.303	Akaike info criterion	16.88107
Sum squared resid	1.12E+08	Schwarz criterion	16.96172
Log likelihood	-798.8510	F-statistic	31.20318
Durbin-Watson stat	0.842380	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 31.20318. Since 31.20318 > 0.00000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 35: The granger causality test for the Eastern European countries who have not yet joined the European Union testing whether growth causes openness using the trade ratio as a measure of openness.

White Heteroskedasticity Test:

F-statistic	2.203767	Prob. F(2,55)	0.120042

Obs*R-squared	4.303107	Prob. Chi-Square(2)	0.116303

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:55
Sample: 3 60
Included observations: 58

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	359.6724	274.9618	1.308081	0.1963
G9203	242.6093	187.1026	1.296665	0.2002
G9203^2	-41.52635	25.24117	-1.645183	0.1056

R-squared	0.074192	Mean dependent var	571.0837
Adjusted R-squared	0.040526	S.D. dependent var	627.8166
S.E. of regression	614.9636	Akaike info criterion	15.73134
Sum squared resid	20799915	Schwarz criterion	15.83792
Log likelihood	-453.2089	F-statistic	2.203767
Durbin-Watson stat	0.771852	Prob(F-statistic)	0.120042

The F test statistic for this group of countries is 2.203767. Since 2.203767 > 0.120042 we reject Ho and conclude that openness causes growth in this group of countries.

Table 36: The granger causality test for the 30 countries testing whether growth causes openness using the ratio of exports to the sum of imports and exports as a measure of openness.

White Heteroskedasticity Test:

F-statistic	45.18173	Prob. F(2,357)	0.000000
Obs*R-squared	72.71681	Prob. Chi-Square(2)	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:56

Sample: 1 360
Included observations: 360

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004578	0.001816	2.521451	0.0121
G9203	-0.002996	0.001050	-2.854240	0.0046
G9203^2	0.000677	0.000133	5.078246	0.0000

R-squared	0.201991	Mean dependent var	0.002940
Adjusted R-squared	0.197520	S.D. dependent var	0.007800
S.E. of regression	0.006987	Akaike info criterion	-7.081108
Sum squared resid	0.017430	Schwarz criterion	-7.048724
Log likelihood	1277.599	F-statistic	45.18173
Durbin-Watson stat	0.908830	Prob(F-statistic)	0.000000

The F test statistic for this group of countries is 45.18173. Since 45.18173 > 0.000000 we reject Ho and conclude that openness causes growth in this group of countries.

Table 37: The granger causality test for the initial 15 member countries of the European Union testing whether growth causes openness using the ratio of exports to the sum of imports and exports as a measure of openness.

White Heteroskedasticity Test:

F-statistic	11.24649	Prob. F(2,177)	0.000025
Obs*R-squared	20.29513	Prob. Chi-Square(2)	0.000039

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:57
Sample: 1 180
Included observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003240	0.001127	-2.875196	0.0045
G9203	0.003037	0.000660	4.598663	0.0000

G9203^2	-0.000362	7.63E-05	-4.739622	0.0000

R-squared	0.112751	Mean dependent var	0.001655
Adjusted R-squared	0.102725	S.D. dependent var	0.002668
S.E. of regression	0.002527	Akaike info criterion	-9.106853
Sum squared resid	0.001130	Schwarz criterion	-9.053637
Log likelihood	822.6168	F-statistic	11.24649
Durbin-Watson stat	0.284083	Prob(F-statistic)	0.000025

The F test statistic for this group of countries is 11.24649. Since 11.24649 > 0.000025 we reject Ho and conclude that openness causes growth in this group of countries.

Table 38: The granger causality test for the current 25 member countries of the European Union testing whether growth causes openness using the ratio of exports to the sum of imports and exports as a measure of openness.

White Heteroskedasticity Test:

F-statistic	2.022596	Prob. F(2,297)	0.134130
Obs*R-squared	4.031148	Prob. Chi-Square(2)	0.133244

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:58
Sample: 1 300
Included observations: 300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000327	0.000782	0.418309	0.6760
G9203	0.000838	0.000440	1.904629	0.0578
G9203^2	-0.000110	5.50E-05	-2.006448	0.0457

R-squared	0.013437	Mean dependent var	0.001673
Adjusted R-squared	0.006794	S.D. dependent var	0.002400
S.E. of regression	0.002392	Akaike info criterion	-9.223582
Sum squared resid	0.001699	Schwarz criterion	-9.186544

Log likelihood	1386.537	F-statistic	2.022596
Durbin-Watson stat	0.906593	Prob(F-statistic)	0.134130

The F test statistic for this group of countries is 2.022596. Since 2.022596 > 0.134130 we reject Ho and conclude that openness causes growth in this group of countries.

Table 39: The granger causality test for the Eastern European countries who have just joined the European Union testing whether growth causes openness using the ratio of exports to the sum of imports and exports as a measure of openness

White Heteroskedasticity Test:

F-statistic	0.377603	Prob. F(2,92)	0.686560
Obs*R-squared	0.773482	Prob. Chi-Square(2)	0.679267

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 21:59
Sample: 1 95
Included observations: 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001815	0.003966	0.457584	0.6483
G9203	-0.000542	0.002753	-0.197012	0.8443
G9203^2	0.000132	0.000448	0.295653	0.7682

R-squared	0.008142	Mean dependent var	0.001530
Adjusted R-squared	-0.013420	S.D. dependent var	0.002785
S.E. of regression	0.002804	Akaike info criterion	-8.884660
Sum squared resid	0.000723	Schwarz criterion	-8.804011
Log likelihood	425.0213	F-statistic	0.377603
Durbin-Watson stat	1.640560	Prob(F-statistic)	0.686560

The F test statistic for this group of countries is 0.377603. Since 0.377603 < 0.686560 we do not reject Ho and conclude that openness does not cause growth in this group of countries.

Table 40: The granger causality test for the Eastern European countries who have not yet joined the European Union testing whether growth causes openness using the ratio of exports to the sum of imports and exports as a measure of openness

White Heteroskedasticity Test:

F-statistic	11.53095	Prob. F(2,57)	0.000062
Obs*R-squared	17.28305	Prob. Chi-Square(2)	0.000177

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/20/06 Time: 22:00
Sample: 1 60
Included observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002254	0.002595	0.868361	0.3888
G9203	-0.001195	0.001758	-0.679652	0.4995
G9203^2	0.000402	0.000234	1.717990	0.0912

R-squared	0.288051	Mean dependent var	0.003840
Adjusted R-squared	0.263070	S.D. dependent var	0.006778
S.E. of regression	0.005819	Akaike info criterion	-7.406780
Sum squared resid	0.001930	Schwarz criterion	-7.302063
Log likelihood	225.2034	F-statistic	11.53095
Durbin-Watson stat	0.959096	Prob(F-statistic)	0.000062

The F test statistic for this group of countries is 11.53095. Since 11.53095 < 0.000062 we do not reject Ho and conclude that openness does not cause growth in this group of countries.

5.9 CONCLUSION

The results of the econometric analysis have been presented in the chapter. The results show that the convergence hypothesis is validated in four groups of countries, the exception being the fourth group. Moreover, the results show that there is a positive relationship between openness and growth in the first three groups. However, the fifth group reflected a negative relationship between the openness and growth, while the fourth group did not reflect any clear evidence about the effect of openness on growth.

CHAPTER 6

DISCUSSIONS AND CONCLUSIONS

6.1 INTRODUCTION

The political and economic dispensations of the 1990's have resulted in significant changes in the economies of the Eastern European countries. Furthermore, the market reforms and prerequisites for accession to the European Union have resulted in the change of the trade patterns for these countries. This development coupled with the expansion of the European Union has altered the economic spheres of these countries as well as that of the European Union.

This has resulted in the growth of interest in many researchers who have taken particular interest in the investigation of the relationship between openness and growth.

This dissertation contributes to the existing literature on the relationship between openness and trade by specifically focusing on testing the hypothesis of convergence as well as testing the hypothesis that openness leads to trade.

The main thrust of this section will be the summary of both the theoretical and empirical findings of this dissertation. The proposition of possible areas of further research will also form part of this section.

6.2 MAIN RESULTS OF THE DISSERTION

The literature on the relationship between openness and growth can be categorised into two strata. The first strata consist of literature that advocate for the proposition of the existence of a positive relationship between openness and trade. The second strata comprise of literature that do not assert the existence of a positive relationship between openness and trade.

However, the focal divergence in literature is the choice of measures of openness. Sachs and Warner (1995) use an openness index constructed by five elements. Edwards (1998) uses nine indicators of trade openness, while Wacziarg (1998) uses

an index of openness constricted by three elements. Frankel and Romer (1999) uses measure of openness that depend on geographical characteristics.
Dollar and Kraay (2002) use the trade to GDP ratio as a measure of openness. Leamer's openness index, growth rate of exports and collected tariff ratios are measure that are also used for measuring openness.
This dissertation uses two approaches. The first approach uses the panel estimation of groups of countries. This econometric analysis tests two hypotheses, namely, the convergence hypothesis and the hypothesis that openness leads to growth. The second approach is an econometric analysis to test whether average growth is higher or lower after liberalisation.

The main findings of the this dissertation are;

The convergence hypothesis is validated for all groups but one. The exception is the group of Eastern European countries that have just joined the European Union. The relationship between openness and growth is positive for the first three groups of countries while it is negative for the fifth group. There is no clear evidence about the effect of openness on growth in the fourth group of countries.
Since education and fertility play a major role in economic growth, the positive effects of fertility and educational attainment are expected results. However, the negative effect of government consumption expenditure is an unexpected result. The negative relationship between government consumption expenditure and change in GDP may be attributed to inefficient allocation of resources. The negative effect of the health means that the funds spent of health in these economies have not resulted in the increase of the growth rate.

The reverse relationship, that growth leads to openness has also been analysed in this dissertation. It has been validated in groups one, two and three where trade share has been used as a dependent variable. The proposition that growth results in openness has also been validated in groups two, three and four where the ratio of exports to the sum of exports and imports has been used as a dependent variable. There is a need for a careful interpretation of the nature of the relationship between openness and growth as a result of the existence of this reverse relationship that growth causes trade.

The granger causality test results show that for all the groups openness causes growth and also that growth causes openness. However, there is only one exceptional case, for the fourth group-the Eastern European countries that have just joined the European Union growth does not result for openness when the ratio of exports to the sum of imports and exports as a measure of openness.

6.3 AREAS OF FUTURE RESEARCH

The main aim of this study was to examine the effect of openness on growth. However, it is equally important to note that some aspects that are relevant to the research of the relationship between trade and growth were external to the compass of this study. It goes without saying that the inclusion of these aspects will significantly enrich to the study of the relationship between openness and growth.
The relationship between the quality of institutions and growth could be a useful approach. This could also incorporate the measure of the quality of institutions. An index of democracy, political rights, rule of law and indicators of political stability could be added to the analysis of the effect of openness on growth. With the inclusion of quality of institutions and an analysis of openness indicators, it would also be possible to examine how openness leads to the eradication of poverty by specifying the measures of poverty reduction.

6.4 THE RESERCHER'S PERSPECTIVE

This dissertation has attempted to identify the effect of openness on growth. The analysis shows that there is a positive effect of trade on growth in the European Union as well as in Eastern European countries. The analysis further demonstrates that the market reforms and trade liberalisation undertaken by these economies has generated positive growth and the enhancement of economic welfare.
However, economic growth is a complex matter, which is determined by numerous factors. It for that reason, that caution should be exercised, by taking into consideration many factors when analysing the effect of openness on growth. While openness is crucial constituent in the attainment of higher economic growth rates it is important to point out that it is not a panacea for high economic growth rates.

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COUNTRY	COUNTRYID	YEARS	G9203	LGDP92	SSER	PSER	FER	HEXP	GCE	TRD	EXPIMP
AUSTRIA	1	1992	2.066667	4.453134	106.6	103.2	1.49	7.53	19.59	74.44	0.5079
AUSTRIA	1	1993	2.066667	4.453134	106.21	102.28	1.48	7.93	20.41	71.48	0.5069
AUSTRIA	1	1994	2.066667	4.453134	105.34	101.58	1.44	7.92	20.5	73.4	0.50
AUSTRIA	1	1995	2.066667	4.453134	104.32	101.02	1.4	8.55	20.44	77.04	0.4948
AUSTRIA	1	1996	2.066667	4.453134	103.26	100.15	1.42	8.69	20.29	80.3	0.4956
AUSTRIA	1	1997	2.066667	4.453134	95.54	100.16	1.36	7.95	19.67	87.02	0.4962
AUSTRIA	1	1998	2.066667	4.453134	95.59	100.37	1.34	8.03	19.63	87.62	0.5006
AUSTRIA	1	1999	2.066667	4.453134	97.14	103.75	1.31	8.17	19.85	90.66	0.5019
AUSTRIA	1	2000	2.066667	4.453134	99	104	1.34	8	20	101.98	0.50
AUSTRIA	1	2001	2.066667	4.453134	99	103	1.33	8	19	105.96	0.50
AUSTRIA	1	2002	2.066667	4.453134	99.34	103.63	1.4	8	19	105.88	0.51
AUSTRIA	1	2003	2.066667	4.453134	99.62	103.17	1.39	8	19	106.33	0.50
BELGIUM	2	1992	2.083333	4.42176	141.8	103.19	1.56	7.93	21.01	132.9	0.5105
BELGIUM	2	1993	2.083333	4.42176	144.43	102.67	1.61	8.12	21.53	126.93	0.5103
BELGIUM	2	1994	2.083333	4.42176	146.23	102.68	1.55	7.95	21.45	132.47	0.5130
BELGIUM	2	1995	2.083333	4.42176	146.32	102.94	1.57	8.75	21.47	136.16	0.5148
BELGIUM	2	1996	2.083333	4.42176	147.09	102.92	1.55	8.99	21.76	138.09	0.5158
BELGIUM	2	1997	2.083333	4.42176	147.21	103.23	1.6	8.62	21.28	146.93	0.5180
BELGIUM	2	1998	2.083333	4.42176	147.34	102.74	1.6	8.61	21.18	147.5	0.5129
BELGIUM	2	1999	2.083333	4.42176	146.68	104.63	1.61	8.78	21.4	149.3	0.5146
BELGIUM	2	2000	2.083333	4.42176	147.43	105	1.61	8.7	21.25	172.7	0.515
BELGIUM	2	2001	2.083333	4.42176	154	105	1.64	8.9	22	176.95	0.51
BELGIUM	2	2002	2.083333	4.42176	154	104.48	1.62	8.8	21	184.06	0.51
BELGIUM	2	2003	2.083333	4.42176	154.83	105.68	1.61	8.9	21	177.08	0.51
BOSNIA AND HERZEGOVINA	3	1992	6.366667	2.737018	65.72	70.78	1.6	..	..	..	0.50
BOSNIA AND HERZEGOVINA	3	1993	6.366667	2.737018	66.31	71.42	1.6	..	..	..	0.47
BOSNIA AND HERZEGOVINA	3	1994	6.366667	2.737018	67.07	72.16	1.6	..	..	101.85	0.1518
BOSNIA AND HERZEGOVINA	3	1995	6.366667	2.737018	67.94	72.93	1.6	..	..	91.88	0.2221
BOSNIA AND HERZEGOVINA	3	1996	6.366667	2.737018	68.87	73.7	1.6	..	..	107.12	0.2240
BOSNIA AND HERZEGOVINA	3	1997	6.366667	2.737018	68.95	73.35	1.6	..	..	102.3	0.2777
BOSNIA AND HERZEGOVINA	3	1998	6.366667	2.737018	69.46	74.16	1.6	..	..	98.34	0.3072
BOSNIA AND HERZEGOVINA	3	1999	6.366667	2.737018	69.29	74.74	1.6	..	..	86.55	0.3055

BOSNIA AND HERZEGOVINA	3	2000	6.366667	2.737018	70	74.36	1.6	4.5	..	84.99	0.3275
BOSNIA AND HERZEGOVINA	3	2001	6.366667	2.737018	70.27	75.52	1.3	4.7	..	84.23	0.43
BOSNIA AND HERZEGOVINA	3	2002	6.366667	2.737018	71.52	75	1.3	4.7	..	85.04	0.30
BOSNIA AND HERZEGOVINA	3	2003	6.366667	2.737018	70	76.96	1.3	4.7	..	80.55	0.3
BULGARIA	4	1992	1.141667	3.172407	72.36	92.29	1.54	5.64	20.33	100.06	0.47
BULGARIA	4	1993	1.141667	3.172407	70.1	88.59	1.45	5.19	18.85	84.03	0.454
BULGARIA	4	1994	1.141667	3.172407	72.21	88.91	1.37	4.34	17.19	90.73	0.4965
BULGARIA	4	1995	1.141667	3.172407	78	96.79	1.23	3.98	15.27	90.92	0.491
BULGARIA	4	1996	1.141667	3.172407	76.78	98.85	1.24	3.86	11.87	122.71	0.5126
BULGARIA	4	1997	1.141667	3.172407	87.11	104.4	1.09	4.33	12.83	118.25	0.5267
BULGARIA	4	1998	1.141667	3.172407	86.84	100.97	1.11	3.76	15.09	98.96	0.4824
BULGARIA	4	1999	1.141667	3.172407	90.75	101.46	1.23	4.12	15.86	96.03	0.4568
BULGARIA	4	2000	1.141667	3.172407	94	103	1.27	3.9	17.68	122.53	0.4768
BULGARIA	4	2001	1.141667	3.172407	94	99	1.24	4.8	16	122.28	0.5
BULGARIA	4	2002	1.141667	3.172407	94	100.26	1.21	4.8	18	118.49	0.50
BULGARIA	4	2003	1.141667	3.172407	94.28	101.95	1.23	4.7	18	124.59	0.49
CROATIA	5	1992	3.083333	3.577837	77.04	85.65	1.48	11.29	23.78	113.8	0.5
CROATIA	5	1993	3.083333	3.577837	82.84	86.97	1.52	13.09	23.48	105.96	0.49
CROATIA	5	1994	3.083333	3.577837	78.21	86.2	1.47	9.85	29.43	91.76	0.49
CROATIA	5	1995	3.083333	3.577837	81.85	86.22	1.58	10.08	29.39	88.06	0.4380
CROATIA	5	1996	3.083333	3.577837	81.8	87.13	1.67	10.92	27	89.86	0.4449
CROATIA	5	1997	3.083333	3.577837	82.11	91.29	1.69	9.63	25.99	97.91	0.4080
CROATIA	5	1998	3.083333	3.577837	83.49	92.46	1.45	9.73	26.63	88.84	0.4294
CROATIA	5	1999	3.083333	3.577837	83.56	93.47	1.38	9.82	27.78	89.44	0.4379
CROATIA	5	2000	3.083333	3.577837	84.94	93.37	1.39	10	26.48	95.64	0.4484
CROATIA	5	2001	3.083333	3.577837	88	96	1.45	9	24	100.87	0.46
CROATIA	5	2002	3.083333	3.577837	88	96.58	1.45	9.73	22	99.33	0.45
CROATIA	5	2003	3.083333	3.577837	87.62	97	1.45	9.48	22	102.25	0.4
CYPRUS	6	1992	4.166667	4.04483	79.15	87.79	2.49	..	19.04	110.1	0.44
CYPRUS	6	1993	4.166667	4.04483	81.09	86.97	2.27	4.51	16.87	95.42	0.49
CYPRUS	6	1994	4.166667	4.04483	83.01	85.63	2.23	..	16.66	95.78	0.49
CYPRUS	6	1995	4.166667	4.04483	83.56	84.35	2.13	..	16.08	96.6	0.48
CYPRUS	6	1996	4.166667	4.04483	83.56	83.8	2.08	..	17.98	100	0.4
CYPRUS	6	1997	4.166667	4.04483	83.42	83.26	2	..	18.78	99.11	0.47
CYPRUS	6	1998	4.166667	4.04483	83.04	82.71	1.92	..	19.27	94.63	0.45

CYPRUS	6	1999	4.166667	4.04483	83.84	82.56	1.92 ..		17.5	93.01	0.47
CYPRUS	6	2000	4.166667	4.04483	84	83.85	1.91 ..		18	101.2	0.4
CYPRUS	6	2001	4.166667	4.04483	84	84.74	1.9		19	99.9	0.47
CYPRUS	6	2002	4.166667	4.04483	84.59	85	1.9		17	90.81	0.45
CYPRUS	6	2003	4.166667	4.04483	85	84.82	1.9		18	88.15	0.4
CZECH REPUBLIC	7	1992	1.875	3.667827	89.6	98.32	1.72	5.42	21.52	108.57	0.5350
CZECH REPUBLIC	7	1993	1.875	3.667827	91.81	101.43	1.67	7.16	21.9	108.9	0.5185
CZECH REPUBLIC	7	1994	1.875	3.667827	95.46	102.41	1.44	7.31	21.6	103.64	0.4882
CZECH REPUBLIC	7	1995	1.875	3.667827	98.68	104.01	1.28	7.29	19.92	112.03	0.4787
CZECH REPUBLIC	7	1996	1.875	3.667827	91.43	102.23	1.18	7.06	19.94	111.48	0.4672
CZECH REPUBLIC	7	1997	1.875	3.667827	81.75	103.74	1.17	7.07	19.8	119.02	0.4697
CZECH REPUBLIC	7	1998	1.875	3.667827	82.26	103.52	1.16	7.09	18.86	118.57	0.4758
CZECH REPUBLIC	7	1999	1.875	3.667827	88.45	103.56	1.13	7.16	19.71	123.18	0.477
CZECH REPUBLIC	7	2000	1.875	3.667827	95	104	1.15	7.2	19.6	146.62	0.4778
CZECH REPUBLIC	7	2001	1.875	3.667827	95	104	1.14	7.4	20	153.25	0.49
CZECH REPUBLIC	7	2002	1.875	3.667827	95	103.96	1.17	7.4	21	143	0.49
CZECH REPUBLIC	7	2003	1.875	3.667827	96.49	104.12	1.18	7.5	21	148.6	0.49
DENMARK	8	1992	2.225	4.507454	111.89	97.42	1.76	8.45	25.81	66.43	0.5502
DENMARK	8	1993	2.225	4.507454	115.03	99.32	1.75	8.76	26.76	63.98	0.553
DENMARK	8	1994	2.225	4.507454	118.76	100.08	1.81	8.53	25.92	65.61	0.5411
DENMARK	8	1995	2.225	4.507454	121.08	101.49	1.81	8.2	25.78	66.71	0.530
DENMARK	8	1996	2.225	4.507454	124.91	100.75	1.75	8.28	25.88	66.6	0.5325
DENMARK	8	1997	2.225	4.507454	124.02	103.54	1.75	8.22	25.49	69.39	0.5188
DENMARK	8	1998	2.225	4.507454	126.31	103.25	1.72	8.29	25.7	68.76	0.5067
DENMARK	8	1999	2.225	4.507454	127.47	102.36	1.74	8.4	25.48	70.08	0.5245
DENMARK	8	2000	2.225	4.507454	128	102	1.74	8.3	24.71	79.47	0.5235
DENMAR	8	2001	2.225	4.507454	128	102	1.75	8.4	26	78	0.52

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DENMARK	8	2002	2.225	4.507454	128	102.63	1.72	8.4	26	80.1	0.52
DENMARK	8	2003	2.225	4.507454	129	102.38	1.76	8.46	26	75.64	0.52
ESTONIA	9	1992	4.283333	3.519879	94.22	104.51	1.69	4.23	15.91	114.61	0.65
ESTONIA	9	1993	4.283333	3.519879	93.94	102.69	1.45	5.83	20.7	144.94	0.4934
ESTONIA	9	1994	4.283333	3.519879	95.9	103.6	1.37	7.19	22.94	162.92	0.4734
ESTONIA	9	1995	4.283333	3.519879	103.7	91.25	1.32	6.51	25.43	152.78	0.4736
ESTONIA	9	1996	4.283333	3.519879	103.75	94.05	1.34	6.48	24.09	145.7	0.4610
ESTONIA	9	1997	4.283333	3.519879	105.12	97.82	1.24	6.89	22.11	167.74	0.4621
ESTONIA	9	1998	4.283333	3.519879	104.35	101.03	1.21	6.69	21.82	170.27	0.4621
ESTONIA	9	1999	4.283333	3.519879	96.73	101.64	1.23	6.57	23.68	159.61	0.4726
ESTONIA	9	2000	4.283333	3.519879	92	103	1.24	6.1	20.7	172.16	0.4721
ESTONIA	9	2001	4.283333	3.519879	110	103	1.34	5.5	20	178.27	0.52
ESTONIA	9	2002	4.283333	3.519879	110	103.84	1.37	5.52	20	166.75	0.51
ESTONIA	9	2003	4.283333	3.519879	110.63	103.47	1.35	5.4	20	171.43	0.52
FINLAND	10	1992	2.733333	4.380896	118.01	99.38	1.85	9.11	25.44	51.88	0.5219
FINLAND	10	1993	2.733333	4.380896	118.41	99.64	1.81	8.34	24.3	60.03	0.5571
FINLAND	10	1994	2.733333	4.380896	115.9	99.44	1.85	7.76	23.39	64.28	0.5579
FINLAND	10	1995	2.733333	4.380896	115.91	99.19	1.81	7.53	22.83	66.16	0.5598
FINLAND	10	1996	2.733333	4.380896	117.55	98.54	1.76	7.66	23.15	67.51	0.5583
FINLAND	10	1997	2.733333	4.380896	117.57	98.66	1.75	7.3	22.44	69.98	0.5645
FINLAND	10	1998	2.733333	4.380896	120.87	99.07	1.7	6.93	21.67	68.76	0.5656
FINLAND	10	1999	2.733333	4.380896	124.58	99.85	1.74	6.81	21.52	66.78	0.5719
FINLAND	10	2000	2.733333	4.380896	126	102	1.74	6.6	20.55	74.83	0.582
FINLAND	10	2001	2.733333	4.380896	126	102	1.73	7	21	70.79	0.57
FINLAND	10	2002	2.733333	4.380896	126	102.73	1.72	7	22	68.22	0.5
FINLAND	10	2003	2.733333	4.380896	127.94	102.49	1.76	7.2	22	66.34	0.5
FRANCE	11	1992	1.8	4.421286	101.67	105.66	1.73	9.11	23.09	42.48	0.5082
FRANCE	11	1993	1.8	4.421286	110.1	106.08	1.65	9.5	24.47	39.96	0.5176
FRANCE	11	1994	1.8	4.421286	111.21	106.03	1.65	9.44	24.14	41.63	0.5163
FRANCE	11	1995	1.8	4.421286	111.25	106.14	1.71	9.6	23.87	43.64	0.5157
FRANCE	11	1996	1.8	4.421286	111.4	105.04	1.73	9.56	24.19	44.5	0.5202
FRANCE	11	1997	1.8	4.421286	111.23	105.04	1.73	9.42	24.21	48.02	0.5315
FRANCE	11	1998	1.8	4.421286	110.59	104.92	1.76	9.35	23.44	49.58	0.52
FRANCE	11	1999	1.8	4.421286	108.36	105.42	1.79	9.33	23.4	49.69	0.5223
FRANCE	11	2000	1.8	4.421286	108	105	1.89	9.5	23.29	55.9	0.5186
FRANCE	11	2001	1.8	4.421286	108	105	1.89	9.6	23	54.71	0.51
FRANCE	11	2002	1.8	4.421286	108	105.23	1.88	9.6	24	50.97	0.51
FRANCE	11	2003	1.8	4.421286	108.59	105.38	1.89	9.7	24	49	0.51
GERMANY	12	1992	1.383333	4.471402	105.54	100.34	1.29	9.67	19.76	49.32	0.5056
GERMANY	12	1993	1.383333	4.471402	105.66	99.63	1.28	9.69	19.87	45.36	0.5058
GERMANY	12	1994	1.383333	4.471402	104.66	100.43	1.24	9.8	19.72	46.84	0.5063
GERMANY	12	1995	1.383333	4.471402	104.02	101.9	1.25	10.2	19.81	48.33	0.5066
GERMANY	12	1996	1.383333	4.471402	103.69	103.9	1.3	10.61	19.94	49.57	0.5114
GERMANY	12	1997	1.383333	4.471402	98.33	105.68	1.35	10.5	19.45	54.33	0.5180
GERMANY	12	1998	1.383333	4.471402	98.21	105.34	1.35	10.29	19.09	56.21	0.5143
GERMANY	12	1999	1.383333	4.471402	98.62	104.65	1.36	10.48	19.04	57.92	0.5071

GERMANY	12	2000	1.383333	4.471402	99	104	1.35	10.6	18.87	66.33	0.5139
GERMANY	12	2001	1.383333	4.471402	99	103	1.3	10.8	19	67.89	0.51
GERMANY	12	2002	1.383333	4.471402	99	103.15	1.34	10.85	19	66.33	0.52
GERMANY	12	2003	1.383333	4.471402	99.51	103.53	1.34	10.9	19	66.91	0.52
GREECE	13	1992	2.85	4.04589	92.91	94.57	1.38	7.21	13.74	44.51	0.4219
GREECE	13	1993	2.85	4.04589	94.45	94.34	1.34	8.06	14.3	42.43	0.414
GREECE	13	1994	2.85	4.04589	94.58	95.81	1.36	8.88	13.77	41.53	0.4277
GREECE	13	1995	2.85	4.04589	95.32	93.9	1.32	8.88	15.33	42.56	0.414
GREECE	13	1996	2.85	4.04589	95.44	93.23	1.3	8.85	14.52	43.02	0.4059
GREECE	13	1997	2.85	4.04589	95.88	95.06	1.32	8.71	15.16	46.41	0.4148
GREECE	13	1998	2.85	4.04589	95.55	96.69	1.3	8.36	15.35	48.75	0.4028
GREECE	13	1999	2.85	4.04589	97.47	98.35	1.28	8.41	15.03	48.74	0.4088
GREECE	13	2000	2.85	4.04589	98	99	1.32	8.3	15	56.77	0.41
GREECE	13	2001	2.85	4.04589	96	97	1.25	9.4	15	46.29	0.42
GREECE	13	2002	2.85	4.04589	96	97.43	1.27	9.4	16	44.03	0.41
GREECE	13	2003	2.85	4.04589	97.69	98.53	1.27	9.42	16	46.46	0.39
HUNGARY	14	1992	2.708333	3.619632	84.22	94.24	1.77	7.82	11.43	63.16	0.5202
HUNGARY	14	1993	2.708333	3.619632	94.33	102.34	1.69	7.81	13.85	61.02	0.4476
HUNGARY	14	1994	2.708333	3.619632	95.6	102.98	1.64	8.25	12.08	64.32	0.458
HUNGARY	14	1995	2.708333	3.619632	97.76	103.23	1.57	7.48	11	75.79	0.4916
HUNGARY	14	1996	2.708333	3.619632	100.55	102.49	1.46	7.11	10.21	78.8	0.496
HUNGARY	14	1997	2.708333	3.619632	95.94	102.73	1.38	6.84	10.55	90.96	0.5001
HUNGARY	14	1998	2.708333	3.619632	97.89	102.62	1.33	6.84	10.16	103.34	0.4875
HUNGARY	14	1999	2.708333	3.619632	99.14	101.86	1.29	6.83	10.15	108.48	0.4891
HUNGARY	14	2000	2.708333	3.619632	99	102	1.29	6.8	9.75	129.2	0.4906
HUNGARY	14	2001	2.708333	3.619632	98	102	1.31	6.8	11	123.17	0.50
HUNGARY	14	2002	2.708333	3.619632	98.62	102.58	1.3	6.8	11	110.71	0.4
HUNGARY	14	2003	2.708333	3.619632	99	102.18	1.3	6.72	11	108.24	0.49
IRELAND	15	1992	7.15	4.195791	111.33	103.74	2.02	7.64	17.76	114.03	0.528
IRELAND	15	1993	7.15	4.195791	113.49	104.02	1.93	7.62	17.56	121.38	0.5337
IRELAND	15	1994	7.15	4.195791	115.03	104.23	1.86	7.67	17.39	131.67	0.5
IRELAND	15	1995	7.15	4.195791	115.85	103.77	1.87	7.34	16.44	141.55	0.5404
IRELAND	15	1996	7.15	4.195791	117.6	104.5	1.91	7.09	15.77	143.74	0.5399
IRELAND	15	1997	7.15	4.195791	109.08	140.72	1.92	6.95	15.19	147.01	0.5413
IRELAND	15	1998	7.15	4.195791	109.11	141.29	1.93	6.75	14.52	162.2	0.5326
IRELAND	15	1999	7.15	4.195791	110.48	128.68	1.88	6.71	13.95	161.38	0.5409
IRELAND	15	2000	7.15	4.195791	112	119	1.85	6.7	14	177.05	0.55
IRELAND	15	2001	7.15	4.195791	112.85	119	1.94	6.5	13	169.68	0.5
IRELAND	15	2002	7.15	4.195791	111.95	121.74	1.97	6.53	15	150.92	0.56
IRELAND	15	2003	7.15	4.195791	112.49	122	1.98	6.48	15	124.14	0.56
ITALY	16	1992	1.375	4.267346	86.38	104.96	1.3	8.42	20.05	38.19	0.
ITALY	16	1993	1.375	4.267346	91.12	102.35	1.25	8.48	19.94	41.26	0.5303

ITALY	16	1994	1.375	4.267346	92.79	100.86	1.22	8.29	19.13	44.23	0.5341
ITALY	16	1995	1.375	4.267346	93.92	100.92	1.18	7.9	17.86	50	0.5397
ITALY	16	1996	1.375	4.267346	94.65	100.62	1.21	7.99	18.07	46.7	0.5430
ITALY	16	1997	1.375	4.267346	94.59	100.66	1.22	8.25	18.17	48.7	0.5345
ITALY	16	1998	1.375	4.267346	95.43	102.47	1.2	8.19	17.94	49.36	0.5218
ITALY	16	1999	1.375	4.267346	95.68	101.65	1.23	8.19	18.1	49.03	0.5095
ITALY	16	2000	1.375	4.267346	96	101	1.23	8.1	17.97	55.59	0.5140
ITALY	16	2001	1.375	4.267346	96	101	1.26	8.4	18	55.47	0.52
ITALY	16	2002	1.375	4.267346	96.73	102.24	1.26	8.36	19	53.18	0.52
ITALY	16	2003	1.375	4.267346	96	101.62	1.29	8.41	19	49.94	0.5
LATVIA	17	1992	3.333333	3.340946	87.16	87	1.73	3.58	12.48	153.01	0.4992
LATVIA	17	1993	3.333333	3.340946	86.99	82.77	1.51	5.04	22.09	129.48	0.561
LATVIA	17	1994	3.333333	3.340946	86.58	82.88	1.39	5.53	20.1	90.28	0.59
LATVIA	17	1995	3.333333	3.340946	84.98	88.69	1.25	6.68	22.21	96.15	0.4874
LATVIA	17	1996	3.333333	3.340946	83.75	95.79	1.16	6.41	21.64	109.89	0.4708
LATVIA	17	1997	3.333333	3.340946	85.45	100.32	1.11	6.03	19.12	110.41	0.4852
LATVIA	17	1998	3.333333	3.340946	86.55	102.75	1.09	6.7	21.4	116.12	0.4537
LATVIA	17	1999	3.333333	3.340946	89.83	102.63	1.16	6.36	20.53	97.97	0.4506
LATVIA	17	2000	3.333333	3.340946	91	100	1.16	5.9	18.91	100.08	0.4687
LATVIA	17	2001	3.333333	3.340946	93	99	1.21	6.4	22	101.94	0.57
LATVIA	17	2002	3.333333	3.340946	93.73	99.87	1.23	6.42	21	104.87	0.57
LATVIA	17	2003	3.333333	3.340946	93.84	100.48	1.29	6.4	21	111.97	0.57
LITHUANIA	18	1992	1.916667	3.343562	83.12	91.84	1.89	4.35	13.06	43.28	0.53
LITHUANIA	18	1993	1.916667	3.343562	80.94	92.55	1.67	4.33	15.53	172.9	0.441
LITHUANIA	18	1994	1.916667	3.343562	81.6	94.7	1.54	5.58	19.63	116.77	0.4338
LITHUANIA	18	1995	1.916667	3.343562	84.2	95.85	1.49	4.45	19.7	117.72	0.4499
LITHUANIA	18	1996	1.916667	3.343562	86.32	97.97	1.43	4.98	18.9	116.53	0.4419
LITHUANIA	18	1997	1.916667	3.343562	87.58	98.65	1.39	6.03	18.98	119.58	0.4292
LITHUANIA	18	1998	1.916667	3.343562	90.19	100.52	1.36	6.32	24.38	106.25	0.4147
LITHUANIA	18	1999	1.916667	3.343562	92.63	100.48	1.35	6.42	22.17	89.8	0.4061
LITHUANIA	18	2000	1.916667	3.343562	95	101	1.27	6	21.33	96.72	0.4249
LITHUANIA	18	2001	1.916667	3.343562	98	104	1.3	6	16	109.86	0.43
LITHUANIA	18	2002	1.916667	3.343562	98.73	104.27	1.24	6.12	21	115.84	0.43
LITHUANIA	18	2003	1.916667	3.343562	98	104.36	1.25	6.2	21	113.91	0.43
LUXEMBOURG	19	1992	4.166667	4.597479	71.96	97.77	1.67	6.15	17.38	200.77	0.5207
LUXEMBOURG	19	1993	4.166667	4.597479	74.26	104.68	1.69	6.29	17.11	202.81	0.5206
LUXEMBOURG	19	1994	4.166667	4.597479	80.52	98.93	1.72	6.04	16.67	200.23	0.5316
LUXEMBOURG	19	1995	4.166667	4.597479	84.92	99.72	1.68	6.3	17.67	199.21	0.5330
LUXEMBOURG	19	1996	4.166667	4.597479	87.8	99.44	1.76	6.39	18.24	199.11	0.5330
LUXEMBOURG	19	1997	4.166667	4.597479	89.44	99.09	1.71	5.93	17.28	203.52	0.5355

LUXEMBOURG	19	1998	4.166667	4.597479	97.27	104.46	1.67	5.98	16.77	208.78	0.5392
LUXEMBOURG	19	1999	4.166667	4.597479	98.46	106.48	1.73	6.11	17.74	210.75	0.5317
LUXEMBOURG	19	2000	4.166667	4.597479	100.14	105.79	1.78	6.28	17.04	218.39	0.540
LUXEMBOURG	19	2001	4.166667	4.597479	101	106.38	1.66	6.3	17		0.52
LUXEMBOURG	19	2002	4.166667	4.597479	101.73	105.97	1.63	6.32	18		0.5
LUXEMBOURG	19	2003	4.166667	4.597479	100.93	106	1.63	6.26	17		0.52
MALTA	20	1992	3.933333	3.87773	87.15	106.31	2.12 ..		18.78	190.91	0.48
MALTA	20	1993	3.933333	3.87773	87.08	106.23	2.01 ..		20.1	200.37	0.48
MALTA	20	1994	3.933333	3.87773	87.86	105.6	1.89 ..		20.37	203.54	0.48
MALTA	20	1995	3.933333	3.87773	86.36	106.69	1.83 ..		20.53	201.3	0.46
MALTA	20	1996	3.933333	3.87773	89.03	107.48	1.83 ..		21.63	188	0.4
MALTA	20	1997	3.933333	3.87773	91.38	107.62	1.83 ..		20.5	178.57	0.48
MALTA	20	1998	3.933333	3.87773	92.22	107.17	1.81 ..		19.74	180.85	0.49
MALTA	20	1999	3.933333	3.87773	94.75	108.03	1.81 ..		18.72	187.04	0.49
MALTA	20	2000	3.933333	3.87773	96	107.86	1.81 ..		18.66	216.67	0.48
MALTA	20	2001	3.933333	3.87773	97.63	106.84	1.72		19	173.33	0.48
MALTA	20	2002	3.933333	3.87773	96.37	107.94	1.46		18	177.14	0.44
MALTA	20	2003	3.933333	3.87773	96.28	107	1.41		19	171.33	0.46
NETHERLANDS	21	1992	2.375	4.40986	122.77	97.34	1.59	8.86	24.39	109.17	0.5214
NETHERLANDS	21	1993	2.375	4.40986	140.12	107.55	1.57	9.02	24.78	103.71	0.5302
NETHERLANDS	21	1994	2.375	4.40986	139.26	107.37	1.57	8.82	24.12	105.12	0.5300
NETHERLANDS	21	1995	2.375	4.40986	137.42	107.36	1.53	8.91	24.03	108.96	0.5272
NETHERLANDS	21	1996	2.375	4.40986	131.52	107.76	1.53	8.84	23.13	110.08	0.5277
NETHERLANDS	21	1997	2.375	4.40986	129.11	108.24	1.53	8.66	22.95	116.29	0.5277
NETHERLANDS	21	1998	2.375	4.40986	124.93	108.13	1.57	8.7	22.96	116.26	0.5247
NETHERLANDS	21	1999	2.375	4.40986	124.45	108.69	1.65	8.72	23.15	116.38	0.5236
NETHERLANDS	21	2000	2.375	4.40986	124	108	1.7	8.1	23	133	0.52
NETHERLANDS	21	2001	2.375	4.40986	124	108	1.71	8.9	23	124.98	0.52
NETHERLANDS	21	2002	2.375	4.40986	124.74	108.83	1.73	8.9	24	120.91	0.52
NETHERLANDS	21	2003	2.375	4.40986	124.83	109.16	1.75	8.95	24	118.89	0.52
POLAND	22	1992	4.308333	3.452564	92.29	99.73	1.93	6.63	25.19	45.87	0.5462
POLAND	22	1993	4.308333	3.452564	93.88	99.28	1.85	6.36	20.44	44.9	0.5232
POLAND	22	1994	4.308333	3.452564	95.62	98.5	1.8	6.01	17.63	45.38	0.5272
POLAND	22	1995	4.308333	3.452564	96.32	98.15	1.61	5.99	16.8	48.39	0.5242
POLAND	22	1996	4.308333	3.452564	96.29	98.42	1.58	6.4	16.37	50.13	0.4909
POLAND	22	1997	4.308333	3.452564	97.25	97.7	1.5	6.12	16.02	55.3	0.4712
POLAND	22	1998	4.308333	3.452564	98.32	97.38	1.4	6.41	15.44	61.56	0.4622
POLAND	22	1999	4.308333	3.452564	99.64	98.76	1.4	6.19	16.5	58.64	0.4532
POLAND	22	2000	4.308333	3.452564	101	100	1.4	6	16.38	61.8	0.4740
POLAND	22	2001	4.308333	3.452564	101	100	1.29	6.1	17	60.3	0.45

POLAND	22	2002	4.308333	3.452564	101.69	101	1.25	6.2	19	65.16	0.46
POLAND	22	2003	4.308333	3.452564	101.28	101.39	1.24	6.17	19	75.23	0.47
PORTUGAL	23	1992	2.358333	4.019437	94.4	125.36	1.48	7.03	18.21	63.27	0.4514
PORTUGAL	23	1993	2.358333	4.019437	101.81	127.65	1.53	7.33	18.83	60.66	0.4507
PORTUGAL	23	1994	2.358333	4.019437	106.26	127.98	1.44	7.34	18.5	63.73	0.4502
PORTUGAL	23	1995	2.358333	4.019437	110.71	127.59	1.38	7.65	18.59	66.62	0.4533
PORTUGAL	23	1996	2.358333	4.019437	110.7	127.59	1.43	7.62	18.9	66.07	0.4583
PORTUGAL	23	1997	2.358333	4.019437	113.38	126.19	1.46	7.49	19.03	68.57	0.451
PORTUGAL	23	1998	2.358333	4.019437	112.57	123.89	1.46	7.68	18.99	70.71	0.4383
PORTUGAL	23	1999	2.358333	4.019437	112.87	123.72	1.49	7.83	19.72	70.29	0.4256
PORTUGAL	23	2000	2.358333	4.019437	114	121	1.51	8.2	20.48	74.69	0.4289
PORTUGAL	23	2001	2.358333	4.019437	114	121	1.42	9.2	21	72.42	0.40
PORTUGAL	23	2002	2.358333	4.019437	115.84	122.28	1.42	9.4	21	68.08	0.41
PORTUGAL	23	2003	2.358333	4.019437	114.28	121.82	1.42	9.61	21	64.35	0.42
ROMANIA	24	1992	1.133333	3.138975	82.55	86.51	1.52	5.39	14.28	63.99	0.4016
ROMANIA	24	1993	1.133333	3.138975	79.44	87.49	1.44	4.74	12.34	51	0.4167
ROMANIA	24	1994	1.133333	3.138975	77.82	94.64	1.41	4.15	13.77	51.87	0.4526
ROMANIA	24	1995	1.133333	3.138975	77.9	99.89	1.34	4.6	13.69	60.83	0.454
ROMANIA	24	1996	1.133333	3.138975	78.42	103.48	1.3	4.5	13.1	64.71	0.4382
ROMANIA	24	1997	1.133333	3.138975	78.71	104.94	1.32	4.04	12.26	65.42	0.4471
ROMANIA	24	1998	1.133333	3.138975	80.02	102.92	1.32	4.64	14.21	55.02	0.4164
ROMANIA	24	1999	1.133333	3.138975	80.74	100.62	1.3	4.16	12.74	62.44	0.4443
ROMANIA	24	2000	1.133333	3.138975	82	99	1.31	2.9	12.51	73.93	0.4341
ROMANIA	24	2001	1.133333	3.138975	82	99	1.27	6.5	6	78.71	0.43
ROMANIA	24	2002	1.133333	3.138975	83.41	100.26	1.26	6.7	7	81.37	0.
ROMANIA	24	2003	1.133333	3.138975	82.38	100	1.27	6.8	7	85.72	0.44
SLOVAKIA	25	1992	3.491667	3.506682	88.06	100.98	1.98	5.62	25.58	144.6	0.5270
SLOVAKIA	25	1993	3.491667	3.506682	88.56	101.29	1.92	6.54	23.45	122.12	0.4803
SLOVAKIA	25	1994	3.491667	3.506682	89.97	100.89	1.66	7.19	19.97	118.45	0.5220
SLOVAKIA	25	1995	3.491667	3.506682	93.75	102.82	1.52	6.97	19.45	117.78	0.5075
SLOVAKIA	25	1996	3.491667	3.506682	94.05	101.81	1.47	7.52	20.36	120.58	0.475
SLOVAKIA	25	1997	3.491667	3.506682	82.68	101.67	1.43	7.39	21.24	125.79	0.4792
SLOVAKIA	25	1998	3.491667	3.506682	85.52	100.99	1.38	7.2	21.5	133.37	0.4626
SLOVAKIA	25	1999	3.491667	3.506682	85.68	102.74	1.33	6.5	19.46	128.41	0.4865
SLOVAKIA	25	2000	3.491667	3.506682	87	103	1.34	5.9	19.01	149.56	0.4992
SLOVAKIA	25	2001	3.491667	3.506682	87	103	1.2	5.7	21	159.9	0.54
SLOVAKIA	25	2002	3.491667	3.506682	87.59	103.26	1.19	5.75	21	156.09	0.55

A											
SLOVAKI	25	2003	3.491667	3.506682	88	102	1.17	5.83	21	166.52	0.56
A											
SLOVENI	26	1992	3.583333	3.920684	90.78	101.41	1.34	7.25	20.34	119.33	0.5551
A											
SLOVENI	26	1993	3.583333	3.920684	90.31	98.43	1.34	7.83	21.09	116.42	0.5163
A											
SLOVENI	26	1994	3.583333	3.920684	91.06	98.22	1.32	7.72	20.2	115.2	0.5159
A											
SLOVENI	26	1995	3.583333	3.920684	90.54	97.67	1.29	7.86	20.19	112.41	0.4909
A											
SLOVENI	26	1996	3.583333	3.920684	91.67	97.94	1.28	7.46	20.23	112.54	0.4946
A											
SLOVENI	26	1997	3.583333	3.920684	92.19	98.1	1.25	7.46	20.47	115.71	0.493
A											
SLOVENI	26	1998	3.583333	3.920684	98.73	97.67	1.23	7.55	20.35	114.81	0.485
A											
SLOVENI	26	1999	3.583333	3.920684	97.57	99.73	1.21	7.69	20.24	109.47	0.4699
A											
SLOVENI	26	2000	3.583333	3.920684	98.46	100	1.22	8.6	20.84	121.81	0.4850
A											
SLOVENI	26	2001	3.583333	3.920684	106	100	1.21	8.4	21	123.23	0.47
A											
SLOVENI	26	2002	3.583333	3.920684	104.85	100.42	1.22	8.47	21	119.92	0.47
A											
SLOVENI	26	2003	3.583333	3.920684	106	101	1.22	8.5	21	119.52	0.47
A											
SPAIN	27	1992	2.975	4.159194	112.06	109.04	1.32	7.08	18.48	36.1	0.454
SPAIN	27	1993	2.975	4.159194	115.74	109.1	1.27	7.25	19	37.39	0.4883
SPAIN	27	1994	2.975	4.159194	118.31	108.73	1.2	7.12	18.3	42.12	0.5001
SPAIN	27	1995	2.975	4.159194	122.11	109.03	1.18	7.02	18.07	45.39	0.4979
SPAIN	27	1996	2.975	4.159194	119.6	108.51	1.15	7.05	17.95	47.26	0.5033
SPAIN	27	1997	2.975	4.159194	110.53	108.18	1.15	7.02	17.57	52.57	0.5078
SPAIN	27	1998	2.975	4.159194	113.17	107.74	1.16	7.01	17.51	54.64	0.4963
SPAIN	27	1999	2.975	4.159194	115.75	107.83	1.2	7.28	17.33	55.99	0.4843
SPAIN	27	2000	2.975	4.159194	116	105	1.23	7.7	17.07	62.15	0.4851
SPAIN	27	2001	2.975	4.159194	114	107	1.24	7.5	17	62.5	0.47
SPAIN	27	2002	2.975	4.159194	115.87	108.46	1.26	7.7	18	59.76	0.46
SPAIN	27	2003	2.975	4.159194	114	107.84	1.26	7.6	18	56.62	0.46
SWEDEN	28	1992	2.25	4.417421	120.83	104.43	2.09	8.59	28.26	54.42	0.5076
SWEDEN	28	1993	2.25	4.417421	127.38	104.56	2	8.63	28.37	62	0.5330
SWEDEN	28	1994	2.25	4.417421	131.95	105.06	1.88	8.21	27.37	68.37	0.5371
SWEDEN	28	1995	2.25	4.417421	136.51	105.87	1.73	8.13	26.35	74.13	0.5464
SWEDEN	28	1996	2.25	4.417421	140.39	106.51	1.6	8.36	27.11	71.43	0.54
SWEDEN	28	1997	2.25	4.417421	157.09	111.42	1.52	8.13	26.54	78.03	0.5500
SWEDEN	28	1998	2.25	4.417421	161.04	110.59	1.51	7.92	26.73	81.15	0.5438
SWEDEN	28	1999	2.25	4.417421	158.42	109.95	1.53	8.46	26.9	81.54	0.547
SWEDEN	28	2000	2.25	4.417421	149	110	1.55	8.4	26.33	89.48	0.5480
SWEDEN	28	2001	2.25	4.417421	149	110	1.57	8.7	27	84.64	0.56
SWEDEN	28	2002	2.25	4.417421	148.79	109.94	1.64	8.73	28	82.36	0.57
SWEDEN	28	2003	2.25	4.417421	149.15	109.69	1.71	8.8	28	81.57	0.57
TURKEY	29	1992	3.516667	3.428179	51.75	100.41	2.84	3.78	12.86	31.74	0.4560
TURKEY	29	1993	3.516667	3.428179	53.41	101.56	2.76	3.71	13.02	33.02	0.3993
TURKEY	29	1994	3.516667	3.428179	56.32	104.52	2.69	3.61	11.65	41.75	0.4950
TURKEY	29	1995	3.516667	3.428179	56.95	106.74	2.65	3.37	10.79	44.24	0.4496
TURKEY	29	1996	3.516667	3.428179	58.22	107.4	2.61	3.9	11.57	48.99	0.4552
TURKEY	29	1997	3.516667	3.428179	60.32	99.57	2.55	4.21	12.26	54.97	0.4484
TURKEY	29	1998	3.516667	3.428179	69.68	99.74	2.61	4.83	12.7	52.25	0.4708

TURKEY	29	1999	3.516667	3.428179	64.74	101.82	2.62	4.79	15.2	50.08	0.4619
TURKEY	29	2000	3.516667	3.428179	58	101	2.36	5	13.94	55.77	0.4156
TURKEY	29	2001	3.516667	3.428179	76	94	2.52	6.9	14	68.11	0.53
TURKEY	29	2002	3.516667	3.428179	77.81	96.48	2.46	6.8	13	64.79	0.52
TURKEY	29	2003	3.516667	3.428179	78.35	97	2.43	6.6	13	65.58	0.52
UNITED KINGDOM	30	1992	2.733333	4.24777	127.26	113.38	1.79	6.91	21.25	48.34	0.47
UNITED KINGDOM	30	1993	2.733333	4.24777	130.45	113.72	1.82	6.94	20.55	51.75	0.4782
UNITED KINGDOM	30	1994	2.733333	4.24777	133.6	114.17	1.74	6.99	20.13	53.44	0.4872
UNITED KINGDOM	30	1995	2.733333	4.24777	133.06	115.11	1.71	6.94	19.76	57.09	0.4965
UNITED KINGDOM	30	1996	2.733333	4.24777	128.96	115.7	1.72	7.02	19.41	58.83	0.4927
UNITED KINGDOM	30	1997	2.733333	4.24777	129.23	101.28	1.73	6.7	18.43	56.88	0.4913
UNITED KINGDOM	30	1998	2.733333	4.24777	155.78	101.53	1.72	6.83	18.17	53.88	0.4766
UNITED KINGDOM	30	1999	2.733333	4.24777	156.18	101.83	1.71	6.91	18.52	53.53	0.4669
UNITED KINGDOM	30	2000	2.733333	4.24777	156	99	1.68	7.3	18.63	56.32	0.4643
UNITED KINGDOM	30	2001	2.733333	4.24777	158	101	1.64	7.6	19	55	0.46
UNITED KINGDOM	30	2002	2.733333	4.24777	157.93	102.17	1.63	7.8	20	52.06	0.45
UNITED KINGDOM	30	2003	2.733333	4.24777	158.64	101	1.64	7.9	20	50.34	0.45