

Department of Economics

**The Effects of International Trade on Economic Growth: An empirical
comparison between Portugal and the Netherlands**

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Abstract

According to growth theory, trade flows are an important determinant of a country growth rate since they allow technological progress, which is a crucial factor in productivity and competitiveness gains, fostering both economic performance and growth. The main goal of this Dissertation is to study the impact that international trade had on the economic growth of Portugal and the Netherlands in the period 1970-2010. Although both economies are small open economies the result registered is distinct. For Portugal both exports and imports play a significant role, as for the Netherlands only exports show a positive effect on GDP.

Keywords: Economic Growth, International Trade, Portugal, the Netherlands, Time Series.

JEL Classification: F43, C32, O49

Resumo

De acordo com a teoria do crescimento económico o comércio internacional desempenha um papel determinante na taxa de crescimento económico de cada país, porque permite a difusão de progresso tecnológico levando a ganhos de produtividade e competitividade, que por sua vez promovem tanto o desempenho económico como o crescimento económico. O propósito desta Dissertação é estudar o impacto do comércio internacional de Portugal e da Holanda sobre o seu crescimento económico entre 1970 e 2010. Apesar de ambas economias serem pequenas economias abertas o resultado obtido é diferente. Para Portugal tanto as exportações como as importações têm um papel crucial, já no caso da Holanda apenas as exportações mostram um impacto positivo sobre o PIB.

Palavras-Chave: Crescimento Económico, Comércio Internacional, Portugal, Holanda, Séries Temporais.

Classificação JEL: F43, C32, O49

Resumo alargado da Dissertação

Esta dissertação estuda o relacionamento entre o comércio internacional e o crescimento económico, fazendo uma comparação empírica entre Portugal e Holanda para o período 1970-2010.

O comércio internacional tem vindo a ter um papel mais preponderante na explicação do crescimento económico, isto porque possibilita uma maior e mais rápida acumulação e difusão de tecnologia entre economias. De salientar que, segundo as teorias do crescimento económico, o progresso tecnológico é um dos principais factores de crescimento. Devido a esta crescente importância alguns autores começaram a considerar a troca como factor explicativo do crescimento, caso de Grossman & Helpman (1991) e Dinopoulos & Segerstrom (2006).

Para pequenas economias abertas, como Portugal e Holanda, que não são pioneiras em avanços tecnológicos, o comércio internacional torna-se o principal canal de transmissão do progresso tecnológico, tal progresso leva a ganhos de produtividade e competitividade que por sua vez levam a um maior desempenho e crescimento económico.

No final dos anos 70 até meados dos anos 80 a economia portuguesa enfrentava um grande desafio, tinha acabado de vir de uma revolução que levou à troca de regime governativo, que trouxe profundas mudanças económico-sociais, e tinha estado sob tutela de dois pacotes de resgate por parte do Fundo Monetário Internacional (FMI) devido a diferentes factores, principalmente despoletados pelas duas crises petrolíferas. Porém com a entrada na Comunidade Económica Europeia (CEE), em 1986, Portugal passou por um período de expansão económica que durou até meados dos anos 90 e registou uma convergência para com os padrões europeus, tanto económicos como sociais, muito por força de um processo de terceirização da economia ocorrida nesse período. Contudo, após a entrada no Euro a economia portuguesa estagnou e assistiu a fortes quebras quer na produtividade quer na competitividade. Com a mais recente crise económica este fraco desempenho da economia portuguesa, aliado ao excessivo endividamento registado na última década,

acentuou-se e culminou com um pacote de resgate por parte do FMI, Banco Central Europeu e União Europeia tendo como objectivos primordiais a consolidação das finanças públicas e a implementação de reformas estruturais, de forma a promover a produtividade e a competitividade.

Em relação ao comércio internacional a estrutura das exportações de bens e serviços e das importações de bens e serviços portuguesas sofreu uma modificação significativa em relação àquela que se registava no início do período, por causa da (a) alteração da especialização produtiva dentro da indústria e terciarização acentuada da economia e (b) da crescente pressão competitiva imposta pelas economias emergentes, especializadas nos mesmo tipo de bens que a economia portuguesa mas com preços mais competitivos. Portugal começou, assim, a exportar e a importar bens com uma intensidade tecnológica superior. Os principais produtos exportados passaram de *Produtos Alimentares e Vestuário e Calçado* para produtos intermédios como *Veículos e Materiais de Transporte*. No caso das importações, *Maquinaria e Aparelhos Mecânicos e Veículos e Materiais de Transporte* tornaram-se dos bens mais importados. No caso dos serviços não houve grandes alterações, o *Turismo* continua a ser o bem mais procurado por estrangeiros, já *Transportes e Comunicações* são dos principais serviços importados. Em termos de mercado, com a integração económica Portugal focou-se muito para o mercado europeu tanto para exportação como para importação, por esta razão Espanha tornou-se o principal parceiro económico de Portugal.

Em relação à economia holandesa, no início do período analisado também não estava a ter um desempenho económico razoável devido a factores externos, principalmente as duas crises petrolíferas, e internos, devido ao aumento considerável dos custos unitários com o trabalho e aos níveis elevados de inflação registados. Porém, com a recessão que atingiu a economia no início dos anos 80 os governantes holandeses puseram em prática um conjunto de reformas estruturais que impulsionaram a competitividade internacional e trouxeram benefícios, quer para a economia interna quer para a economia externa, isto levou a que a economia holandesa registasse taxas de crescimento económico elevadas superando mesmo as taxas que se verificavam nos restantes países da União Europeia. O comércio internacional foi um dos pilares das várias expansões económicas registadas nos últimos anos na Holanda,

após a mais recente crise económica foi a procura externa que promoveu a recuperação da economia holandesa, visto que a economia interna ainda estava enfraquecida.

O comércio internacional holandês beneficia muito da sua posição geográfica e por causa disso tem-se assistido nas últimas décadas ao crescimento das reexportações, bens que são importados para um país que sofrem pouca ou nenhuma modificação e depois são novamente exportados para outros países. As exportações holandesas assentam muito nesta ideia e isso ajudou a impulsionar ainda mais esta rúbrica, neste caso os principais bens exportados são *Maquinaria e equipamentos de transporte e Produtos Químicos e derivados*. Por outro lado, as importações holandesas focam-se mais em bens de elevada intensidade tecnológica e de baixa intensidade tecnológica, devido ao aparecimento de novas tecnologias e ao papel crucial que a Holanda tem em comercializar e reexportar importantes mercadorias de baixa intensidade tecnológica, por esta razão as principais importações holandesas são de *Maquinaria e equipamentos de transporte e Combustíveis fósseis, lubrificantes e derivados*. O sector dos serviços, apesar de ser importante não tem tanto impacto nas exportações e importações holandesas como tem no caso português. No caso da economia holandesa o principal serviço, quer exportado quer importado, são *Serviços prestados a empresas*. Em termos de mercado, a crescente integração económica e a sua favorável posição geográfica faz com que os principais destinos das exportações holandesas sejam países europeus, com Alemanha e Bélgica a serem os principais destinos. Já o peso que Europa tem nas importações holandesas tem vindo a decrescer, porque com o aparecimento de novas economias emergentes, como a China, a Holanda começou a ser usada como um ponto de entrada prioritário dos seus produtos para a Europa, claro que esses produtos não são todos destinados à economia holandesa pois irão ser reexportados para os principais países de destino. Alemanha, Bélgica e China são neste momento os principais fornecedores da economia holandesa.

Nesta dissertação as exportações de bens e serviços e as importações de bens e serviços foram usadas como *proxy* do comércio internacional enquanto que o PIB medido pela óptica da despesa é a *proxy* do crescimento económico. Foram aplicados testes de raízes unitárias para inferir sobre a estacionaridade das séries, testes de cointegração para perceber se existe ou não uma relação de longo prazo entre as variáveis e foram aplicados os Modelos de Correção de Erros em cada país com o intuito de auferir não só o impacto de longo prazo mas também as dinâmicas de curto

prazo. Os testes de raízes unitárias confirmaram que as variáveis são não estacionárias, e os testes de cointegração aplicados confirmaram que existe uma relação de longo prazo entre as variáveis para ambas as economias. Ao aplicarmos os Modelos de Correção de Erros obtemos resultados distintos para Portugal e Holanda, no caso português tanto as exportações como as importações têm um impacto positivo sobre o crescimento económico no longo prazo, já no caso holandês as exportações têm um impacto positivo mas as importações têm um impacto negativo.

Estes resultados podem significar que, por um lado como Portugal passou por um período de especialização produtiva da sua indústria teve de importar bens tecnologicamente mais avançados inculcando esse progresso tecnológico na sua economia interna, que levou a um aumento na sua produtividade e competitividade internacional, ao mesmo tempo que, com a integração económica, passou a ter acesso a mercados mais amplos conseguindo alcançar economias de escala mais elevadas. Por outro lado no caso holandês, o impacto positivo das exportações explica-se pela forte política de abertura comercial implementada e pela crescente importância que as reexportações têm vindo a ter nesta economia. O impacto negativo das importações pode ser explicado pela grande quantidade de bens que são importados tendo como destino outros países europeus, isso pode não permitir que a economia interna tire benefícios desses bens, contudo os mesmos são registados como um défice na balança comercial. Esse impacto negativo também pode ser explicado pelo facto de a economia holandesa ter registado em expansões anteriores um elevado rendimento, que pode ter levado à preferência por bens estrangeiros mais competitivos, que poderá ter tido um efeito negativo sobre o crescimento económico.

Por fim, foram feitos testes de quebras de estrutura para testar a estabilidade e robustez das variáveis ao longo dos vários períodos de tempo, caso existam quebras de estrutura é preciso incluir uma variável *dummy* de modo a melhorar o modelo e perceber qual o seu impacto. Para Portugal o ano seleccionado foi 1986, porque foi o ano da entrada de Portugal na CEE. O teste aceitou a existência de quebra de estrutura, de seguida introduziu-se uma variável *dummy* mas tal variável não é estatisticamente significativa, o que nos leva a concluir que os problemas enfrentados pela economia portuguesa nesta última década sobrepuseram os efeitos positivos que a entrada na CEE teve nesta economia. Ou seja, as dificuldades de ajustamento ao Euro, as quebras de produtividade e competitividade, a fraca qualidade e quantidade dos factores

produtivos e as inadequadas políticas económicas adoptadas nesta última década suplantaram os efeitos positivos da entrada na CEE. Para a Holanda, o ano selecionado foi 1993, por ter sido o ano da última ronda do GATT, que levou à redução de algumas tarifas alfandegárias e promoveu uma abertura comercial entre países desenvolvidos e em desenvolvimento, e também foi no início dos anos 90 que as reexportações holandesas entraram em expansão. O teste confirma quebra de estrutura em 1993 mas a variável *dummy* introduzida não é estatisticamente significativa neste ano, contudo ao estudar outros anos em redor de 1993 percebemos que, em 1997, a variável *dummy* já é estatisticamente significativa, o que significa que os efeitos das medidas adoptadas em 1993 podem ter resultado, anos mais tarde, num aumento do comércio entre a Holanda e as economias em desenvolvimento.

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List of Contents

Abstract	i
Resumo alargado da Dissertação.....	ii
Acknowledgements	vii
I-Introduction	1
II-Literature review	3
II.1-Economic growth theory.....	3
II.2-Trade and Growth.....	5
III- Economic and trade evolution of Portugal and the Netherlands	
for the period 1970-2010.....	10
III.1-Economic Growth.....	11
III.2-International Trade	17
III.2.1-Exports of goods and services	17
III.2.2-Imports of goods and services	25
IV-Comparison between Portugal and the Netherlands:	
Empirical Models and Results.....	34
IV.1-Trend and Business Cycles analysis	34
IV.2-Empirical Model.....	40
IV.2.1-Unit root tests	40
IV.2.2-Cointegration tests.....	43
IV.2.3-Vector Error Correction Models Representation	44
IV.3-Structural breaks.....	49
V-Conclusion	55
VI-References.....	57
VII-Appendix	61

I- Introduction

The relationship between international trade and economic growth has been under scrutiny since the classics, Adam Smith and David Ricardo believed that trade positively influenced economic growth because the higher accumulation of technical progress and capital would improve productivity and would lead to higher welfare gains as well as to higher growth. Actually, economic growth has always been present throughout history, although its growth rate has shifted from slow and irregular to a more dynamic, rapid and continued rate, especially after the Industrial Revolution (Baines, 2003). Trade flows also suffered a serious boost after the Industrial Revolution, which would eventually lead some authors to introduce it as an explanatory phenomenon of economic growth. Nowadays this phenomenon plays an important part over the endogenous growth models. According to Grossman & Helpman (1991) and Afonso (2001) international trade became one of the main sources of growth, because it enabled technological transfers from the developed countries to the less developed.

For small open economies, like Portugal and the Netherlands, who are not leaders in world technological advancements, trade becomes the main facilitator of technological progress and is a key factor in productivity and competitiveness gains that foster economic performance and growth (Grossman & Helpman, 1991). It is important to mention that according to the economic growth models technological progress is the main driver of growth, meaning that countries must pursue technological breakthroughs in order to generate persistent gains.

The economies studied in this dissertation were Portugal and the Netherlands. For Portugal the adhesion to the European Economic Community (EEC) brought significant changes, both economical and structural, but structural fragilities arise with the entrance to the Euro and with the severe stagnation that occurred in the last decade. As for the Netherlands, it solved the main structural imbalances that it had in the beginning of 80's and started to experience buoyant economic growth rates with a

strong performance of foreign trade, especially exports, due to its strategically geographical position.

The main purpose of this dissertation is to study the effects that international trade had on economic growth of Portugal and the Netherlands in the period 1970-2010. Some studies only concentrate on the exports side but it is also important to account the imports effect as well. With this in mind, this dissertation uses both exports of goods and services and imports of goods and services to fully understand the impact of international trade on economic growth.

Unit root tests are used to study for stationarity on the data, and Cointegration tests plus Vector Error Correction Models (VECM) are used to examine the short-run and long-run effects of exports and imports on economic growth. Structural break tests are also employed to examine if the variables are stable across the various subsamples of the data.

Our findings show that in the Portuguese economy both exports and imports positively affect economic growth. Our intuition for this is, during this period Portugal passed through a phase of specialization within the industry and had to import more technological advanced goods, mainly intermediate capital goods that promoted growth. In the meantime, Portugal started to have access to big and broader markets that led to higher economies of scale and growth.

As for the Netherlands our empirical estimation suggests that only exports have a positive influence on growth. We interpret these results as, on one hand exports promote growth because the increased openness led to a substantial rise of re-exports¹ and the liberalized trade policy led to a better allocation of resources, which promoted productivity and growth. On the other hand imports do not have a positive effect on growth, because a large portion of the goods imported are intended to other European countries, so the domestic economy does not take advantage of the possible benefits. Also, the high level of income registered on previous expansions might have shifted internal demand towards foreign goods.

¹ Re-exports are goods imported into a country that suffer little or no modification at all and then are exported again to other countries.

The remaining of this Dissertation is structured as following; Chapter II makes a literature review focusing on the evolution of economic growth theory and the influence of international trade; Chapter III makes an economic description of growth and trade of Portugal and the Netherlands for the period analyzed; Chapter IV includes the empirical estimations and results and; Chapter V concludes.

II- Literature Review

In this chapter a literature review is presented with the focus on how economic growth theory evolved, while considering international trade as an explanatory variable of it.

II.1) Economic growth theory

Economic growth, as was already mentioned, began with the industrialization process and is much faster and persistent than the one registered before that period. Such growth started in the Western European countries and spread to the periphery mostly through trade (Baines, 2003).

Economic growth theory as we currently know evolved from the exogenous growth models to the endogenous ones. Solow (1956) introduced an exogenous growth model that was based on a production function, with constant population growth and constant returns to scale, relating output with three main production factors, capital, labor and knowledge. Solow's theory implies that the economy converges to a balanced growth path where the output per capita growth rate is determined by the rate of technological progress. Once the balanced growth path is reached technological progress enables capital to grow without decreasing its marginal productivity, allowing for sustained positive output growth. Despite Solow's breakthrough the theory provides a considerable fragility, the explanatory variable of the output growth rate is

not determined by the model² representing everything that is not explained by capital and labor, which can include potential payoffs arising from international trade.

With this line of thought new models appeared including technological progress as an explanatory variable of economic growth and tried to explain what Solow's model could not, such models are the endogenous growth models pioneered by Romer (1990), Grossman & Helpman (1991) and Aghion & Howitt (1992), among others³. Romer (1990) introduced in his model profit-seeking R&D efforts and imperfect competition in the capital goods sector⁴. In this case output is also a function of capital, labor and technology, but; there are two sectors, one that produces goods and other that focus on R&D; capital and labor are used by the two sectors; and both sectors use the full stock of technology available. The conclusions on Romer's model⁵ are identical to those on Solow's, for this reason the marginal productivity of capital is held constant allowing technological progress to overcome the diminishing returns of capital fostering output growth. The difference between the two stands on how the growth rate of technological progress is determined, in Romer's case it is endogenously determined and depends on how many people decide to work on the R&D sector.

Grossman & Helpman (1991) developed a model where growth is obtained by combining two conditions, production of differentiated goods and deliberate accumulation of knowledge. The authors presented a North-South trade model where the developed North engages in innovative R&D activities and then exports the goods produced to the less developed South, later on innovation from the North transforms into imitation from the South, enabling the northern manufacturers to move onto new production standards and new innovative goods. Hence, international trade is a fundamental factor for knowledge accumulation and economic growth. Because, as demonstrated in the model, when a country engages in world trade it gains access to a more advanced source of knowledge, and then uses that knowledge to accumulate new inputs and make productivity gains, which in turn leads to an increasing production of goods and services, thus becoming a stronger competitor. Dinopoulos & Segerstrom

² The technological progress is treated as a Residual in Solow's Growth Accounting function (Solow, 1957).

³ The works of Romer (1986), Lucas (1988) and Barro & Sala-i-Martin (1995) are also highly cited.

⁴ Firms intentionally engage in R&D activities with the intent of being compensated for successful innovations.

⁵ He assumes labor constant, population growth of zero and constant returns to scale in the production of output, thus being identical to Solow's model.

(2006) also developed a North-South trade model, their conclusions are similar to the ones found on the former, but these authors go a step further by analyzing the welfare implications of three aspects of globalization; increases in the size of the South, stronger intellectual property protection and lower trade costs.

In the work of Aghion & Howitt (1992) there is no capital accumulation, labor is constant and allocated between R&D and the production of capital goods, and innovation consists of inventing a new intermediate good that renders a previous one. They conclude that growth is generated by a random sequence of quality improving innovations that can arise from research activities, yielding positive externalities, such as the continued innovative progress that can occur, and a negative externality, which is the replacement of an old obsolete innovation by a new one.

Finally, for technical progress to fully have influence on economic growth it has first to be absorbed by the economy, so the technological absorption capacity also plays a role on the economic growth process and, according to several authors, it depends on the country's human capital resources. This factor can be seen as a complementary effect of the endogenous growth models previously presented. Nelson & Phelps (1966) related economic growth to the stock of human capital based on the hypothesis that education speeds the process of technology diffusion and the catch-up with more advanced economies. The authors state that the gap between the theoretical level of technology and the level of technology in practice can be shortened by increasing the educational attainment, which might indicate that countries would be able to reach a higher level of technology in practice and would be able to absorb technical progress more rapidly if they increase their educational attainment. However, for Benhabib & Spiegel (1994) the stock of human capital enters insignificantly on the per capita growth rates, unless it has influence on the total factor productivity's growth rate.

II.2) Trade and Growth

International trade plays a crucial role in the growth process as was first stressed by the classics, Adam Smith and David Ricardo. Adam Smith (1776) defended that broader markets would lead to higher accumulation of capital and higher

technological progress, thereby improving the division of labor and productivity, thus fostering economic growth. As for David Ricardo (1817), foreign markets could not only delay the eventual falls in the profit rates brought by higher wages and land limitations, but also countries would specialize on goods that had lowest opportunity costs and a stronger comparative advantage that would lead to larger welfare gains.

More presently international trade became one of the main subjects of study to explain economic growth, whether through trade liberalization and openness or through the export-led growth hypothesis. It is a fact that with the crescent globalization that occurred in recent decades both developed and developing countries increased their openness and lowered their barriers to trade, but they may have not benefited equally. Gries & Redlin (2012) study the short-run and long-run dynamics for 158 developed and developing economies, and find evidence of a positive relation between trade openness and economic growth in the long-run, meaning that in a longer term openness is a favorable strategy to promote growth. In the short-run, such relation is negative on low income countries and positive on high income countries, which could mean that low income countries may not reap benefits from international integration while in a short-run adjustment process. Other study that follows the same line of thought is Yanikkaya's (2003) paper, who studies the growth effects of several measures of trade openness for 100 developed and developing countries and comes to the conclusion that not only trade volumes affect growth positively but trade restrictions also have a significant and positive effect on growth. This is more likely to be true in developing countries that use trade restrictions to cause a reallocation of productive resources to sectors where the country has a comparative advantage. Attention is needed though to the measures of openness used, because as Rodriguez & Rodrik (2001) stressed, in their critique to several papers, there is a tendency to overstate the effects that trade openness has on economic growth, especially when the measures used are poor measures of trade barriers that lack robustness, which in Yanikkaya's case the use of a range array of openness measures may prove that his findings are sound. On a more theoretical approach Thirlwall (2000) realizes that generalized trade liberalization thus indeed improve growth performance and exports serve as a catalyst to that growth⁶, he also points out that the highest the technological intensity of the goods produced and traded in a country the more powerful is this

⁶ Similar conclusions can be found in Michaely (1977), Balassa (1978) and Krueger (1978).

catalyzer, in other words countries that produce and export primary goods grow at smaller rates than others that produce and trade manufactured products. Nonetheless Thirlwall also acknowledges that some forms of trade liberalization, like Customs Unions, may be welfare-reducing, if trade diversion supplants trade creation, so he leaves room for the implementation of some protection barriers, especially by African economies, that may help countries being more liberalized but at a more moderate pace.

It is an established fact that exports promote economic through several channels; exports enhance productivity due to greater economies of scale; exports allow the importation of key intermediate inputs that can lead to better productivity; exports can bring incentives to pursue technological advancements that can lead to spillover effects and improve overall economic performance and; exports promote a better allocation of resources through specialization on goods that have a better comparative advantage (Baharumshah & Rashid, 1999; Shirazi & Manap, 2005; Abu-Quarn & Abu-Bader, 2001; Afonso, 2001). These effects led to the so called export-led growth (ELG) hypothesis (McKinnon, 1964), where the dominant cause of economic growth is an increase in export activities, and was first proved to be true by Michaely (1977), Balassa (1978), Krueger (1978) and Feder (1983), among others.

The study of the ELG hypothesis was followed by several authors and applied to different economies. Ramos (2001) studies the ELG hypothesis for Portugal, Baharumshah & Rashid (1999) study it for Malaysia, Shirazi & Manap (2005) study the case of Pakistan, Abu-Quarn & Abu-Bader (2001) focus on the MENA region, Hatemi-J & Irandoust (2000) focus on the European Nordic economies, Awokuse (2007) studies the case of three Central and Eastern European countries and Tik (2009) also inquires for Malaysia. The first six studies follow a more empirical approach. Ramos detected bidirectional causality for output and exports as well for output and imports, therefore proving that ELG hypothesis stands; Baharumshah & Rashid and Shirazi & Manap came across similar results for the cases of Malaysia and Pakistan, respectively, and also found proof of the ELG hypothesis; Abu-Quarn & Abu-Bader did not find evidence of the ELG hypothesis when using total exports but they did find a positive causality running from manufactured exports to economic growth, except in the cases of Algeria, Egypt and Jordan; Hatemi-J & Irandoust found bidirectional causality for all Nordic economies except Denmark, which could mean that exports'

expansion is crucial for economic growth and; Awokuse found bidirectional causality between exports and economic growth for Bulgaria and one direction causality stemming from exports to growth in Czech Republic, thus proving the ELG hypothesis. The author also found causality running from imports to economic growth in Poland, but here no causality running from exports to economic growth was found. In Tik's case his study is more theoretical and he accepts that in the Malaysian case the ELG hypothesis still is the more viable growth strategy, because it increases the welfare of both consumers and producers through economies of scale and has spillover effects that benefit the overall economic performance, even being more vulnerable to business cycles' fluctuations.

Despite these results the ELG hypothesis may not always stand (see Jung & Marshall, 1985 and Dodaro, 1993). Yang (2008) explains that if the ELG hypothesis was the only cause of economic growth it should have been followed by real exchange rate appreciation as a result of the foreign exchange inflow, which did not occur, so he developed a model that studies the relationship between productivity improvements in the tradable and non-tradable sectors, economic growth and exports, and assessed that out of 71 high growth-high exports episodes only half of them are consistent with the ELG hypothesis, the other half is explained by a productivity rise in the non-tradable sector. Therefore, it is not just increased openness that can promote output growth, productivity improvements arising from structural reforms can also generate equally great payoffs (Rodriguez & Rodrik, 2001).

Cui et al (2009) and Lin & Li (2002) go a step further than the previous papers by studying the export effects on economic growth for China while considering for spillover effects on other indicators⁷, so they can assess the direct and indirect impact that exports have on the overall economy. The first paper finds that exports are very important to China's economic growth since not only exports have a strong direct relation with economic growth but also the spillover effects that exports have on other important indicators boost growth as well, they also acknowledge that due to this fact China's economic performance is very exposed to foreign demand fluctuations. As for the second paper, Lin & Li (2002) create a new model that includes both direct and indirect effects of exports on GDP, as opposed to the traditional one that only accounts

⁷ Cui et al (2009) analyze the exports effects on investment, employment, income and consumption. Lin & Li (2002) study the exports effects on consumption, investment, government expenditure and imports.

for the direct impact. The authors found evidence that the indirect impact of exports on growth is almost as important as the direct impact, which means that both domestic demand and international trade are important to stimulate economic growth. However there is a significant problem with this study as pointed out by the authors, the model lacks robustness because both the specification of the model and the selection of the estimation method can lead to different results and conclusions.

One aspect of international trade with impact over economic growth that is not often considered is imports. Among the previous empirical studies Ramos (2001), Baharumshah & Rashid (1999), Shirazi & Manap (2005), Abu-Quarn & Abu-Bader (2001), Awokuse (2007) and Lin & Li (2002) include imports in their analysis. It is important not to disregard imports, even though they have an adverse impact over the trade balance they actually can be as important as exports promoting growth, Riezman et al (1996) and Awokuse (2007) point out that if imports are overlooked that can lead to misleading results. Lee (1995), Humpage (2000) and Afonso (2001) stressed that importation, especially of capital goods, helps the transfer of technology from more developed countries to the least developed and encourages the pursue for new products and production processes, which would foster productivity, competitiveness and promote a faster catch-up from the least developed economies to the leaders. Imports also promote employment, directly and indirectly, and domestic competitiveness as well, that can lead to the reduction of essential production inputs (Shirazi & Manap, 2005).

This chapter made a literature review about the evolution of economic growth theory and the part that international trade has played. Economic growth theory evolved from the exogenous growth models to endogenous growth models. The first brought a considerable breakthrough on growth theory, but treated the growth rate of technological progress as exogenous representing everything that was not explained by capital and labor. Within this framework Romer (1990), Grossman & Helpman (1991) and Aghion & Howitt (1992) developed models where the growth rate of technological progress was determined within the model, thus giving the possibility to fully understand what impact does the growth rate of technological progress has on economic growth.

The effects of international trade on economic growth did not go unnoticed, with several authors focusing on the relationship between trade and growth. On one hand, some authors focused more on how trade liberalization can boost growth, they found that generalized trade openness can propel economic growth but, they also recognize that in some less developed countries a progressive economic liberalization with the implementation of trade barriers in key sectors, where the country has comparative advantage, might be welfare-improving. On the other hand, several authors pursued the export-led growth hypothesis and studied it for different economies, in some cases the hypothesis was verified (Ramos, 2001; Baharumshah & Rashid (1999); Shirazi & Manap (2005); Hatemi-J & Irandoust (2000), among others) and in others it was not (Jung & Marshall (1985); Dodaro (1993); Yang (2008)). Yang (2008) states that ELG hypothesis might not always stand because more than often what really happens is a productivity rise on the non-tradable sector instead of a substantial increase in exports activities. Last but not least, imports can also promote growth and should not be overlooked, because they facilitate access to more technological advanced intermediate goods that can increase productivity and competitiveness that will lead to a faster economic growth.

III-Economic and trade evolution of Portugal and the Netherlands for the period 1970-2010

The economies under study are Portugal and the Netherlands. These economies were selected because both are small open economies that had different trade patterns and different growth performances over the course of the period analyzed.

This chapter provides a description of Portuguese and Dutch economic performance for the period 1970-2010, with a focus on the economic growth and the international trade performance throughout. We begin by characterizing the economic growth of both economies and then analyze the behavior of exports and imports.

III.1) Economic growth:

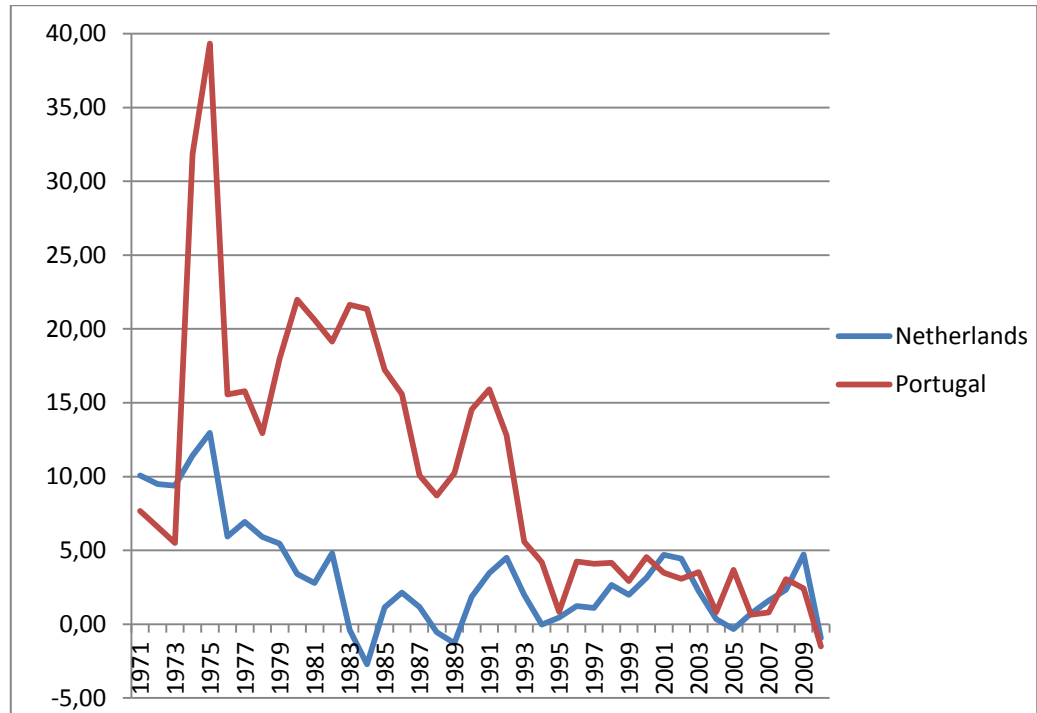
From the early 70's to the early 80's:

Throughout the 70's and early 80's both economies were not performing at their best due to a set of internal and external factors. In the Netherlands, according to the OECD (1998), internal factors such as high wages, an acceleration of inflation and a high pressure on the social security system led to a rise on unit labor costs larger than the rise in productivity contributing to a deterioration of the profit margins, international competitiveness and investment. On the external side, the most noticeable events were the two oil shocks that led to a deterioration of the trade balance, although it was smoothed by the natural gas exports.

In Portugal because of the external high energy dependence, the oil shocks registered led to a strong deterioration of both the terms of trade and the trade balance forcing the country to apply for two bailout packages with the IMF that accentuated the recessions already under way (Afonso & Aguiar, 2004). On the domestic front the political pressures on the dictatorial regime and the overseas war against the colonies came to a halt with the Revolution in 1974. After the Revolution the major industries were nationalized and there was a rise on wages that triggered a rise on unit labor costs much larger than the productivity registered. This allied to an economic standstill and to a political and financial instability caused an adverse impact on economic growth (Pereira & Lains, 2010).

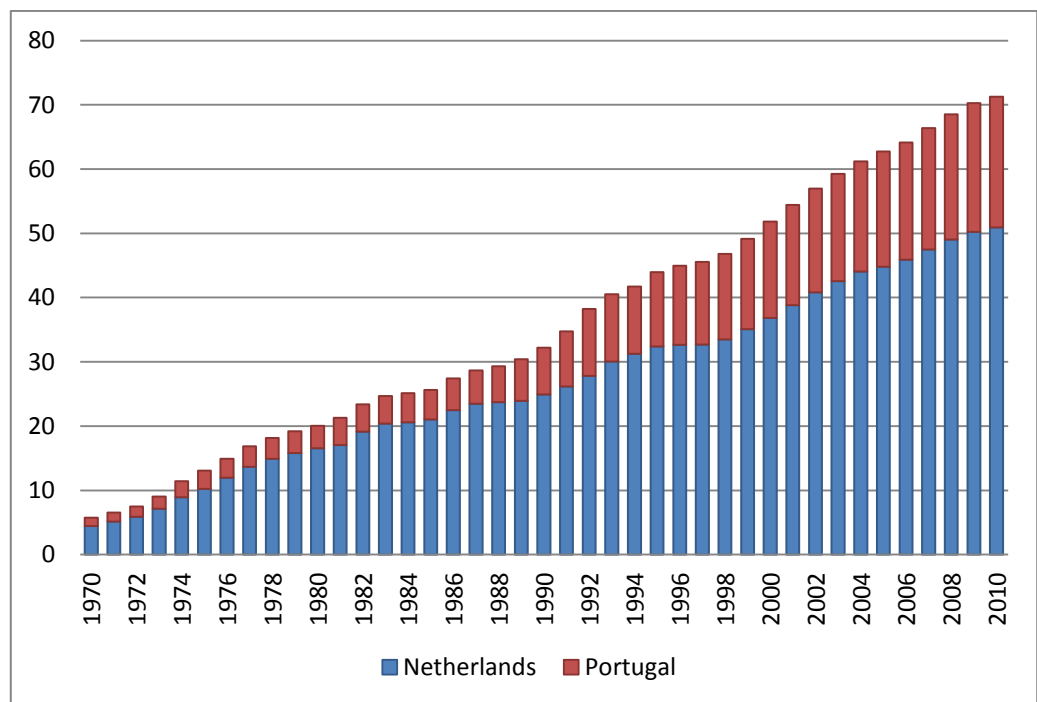
In Figure III.1 we have represented the growth rate of the unit labor costs between 1970 and 2010 for both countries, being very noticeable the spike that occurred in the mid 70's, especially in the Portuguese case, however we need to take into account the compensations per employee in each economy, given by Figure III.2. We can see that there were significant differences between the compensations received by the Portuguese employees and the Dutch employees, so at that time Portuguese authorities tried to shorten the gap between the wages practiced in Portugal and the ones practiced in the European core, where the Dutch economy was included. The problem with such measure was the fall short of the productivity performance.

Figure III.1: Growth rate of Unit labor costs between 1970 and 2010



Source: OECD

Figure III.2: Nominal compensation per employee between 1970 and 2010.



Source: AMECO

From 1980 to the turn of the century:

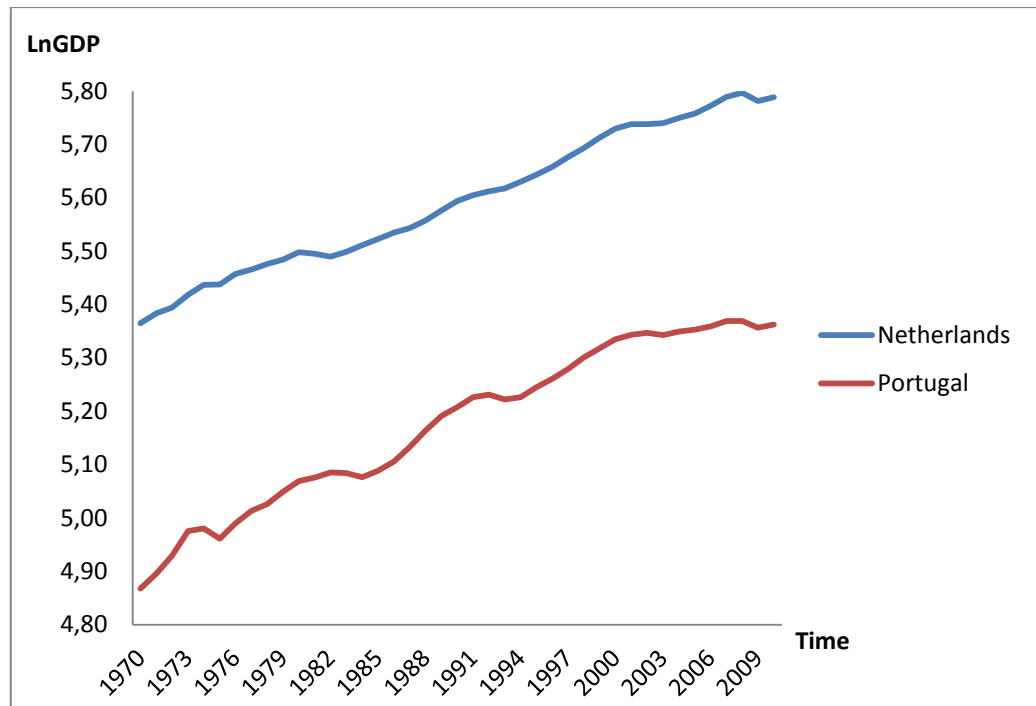
From this point on the economic performance of both countries was very distinct. With the recession that hit the economy in 1981/1982 the Dutch policymakers decided that a major change was needed to bring back the economy to a sustainable path. It was implemented a fiscal consolidation package and several structural and regulatory reforms, with the most significant one being the agreement between employers and trade unions on wage moderation, through a decrease of the minimum wage and of taxes, combined with reduced working time⁸. These reforms set in motion a period of strong international competitiveness, high profitability and investment and a rapid job creation. This generated an increase in private consumption, which boosted GDP growth enabling it to register a larger rate than the European Union average and enhance the terms of trade relative to its partners (OECD, 1998).

In fact structural reforms can explain how the performance of the two countries differs. According to Banco de Portugal (2009) the disappointing performance of the Portuguese economy can be explained by competitiveness problems resulting from structural imbalances, such as the low quantity and quality of the production factors which determines the economy's flexibility to adapt to new markets and new production standards. This prevented Portugal from reaping all benefits from the international technological progress and making productivity gains.

Figure III.3 and III.4 show the evolution of the GDP in logarithms and growth rates, respectively, for Portugal and the Netherlands between 1970 and 2010.

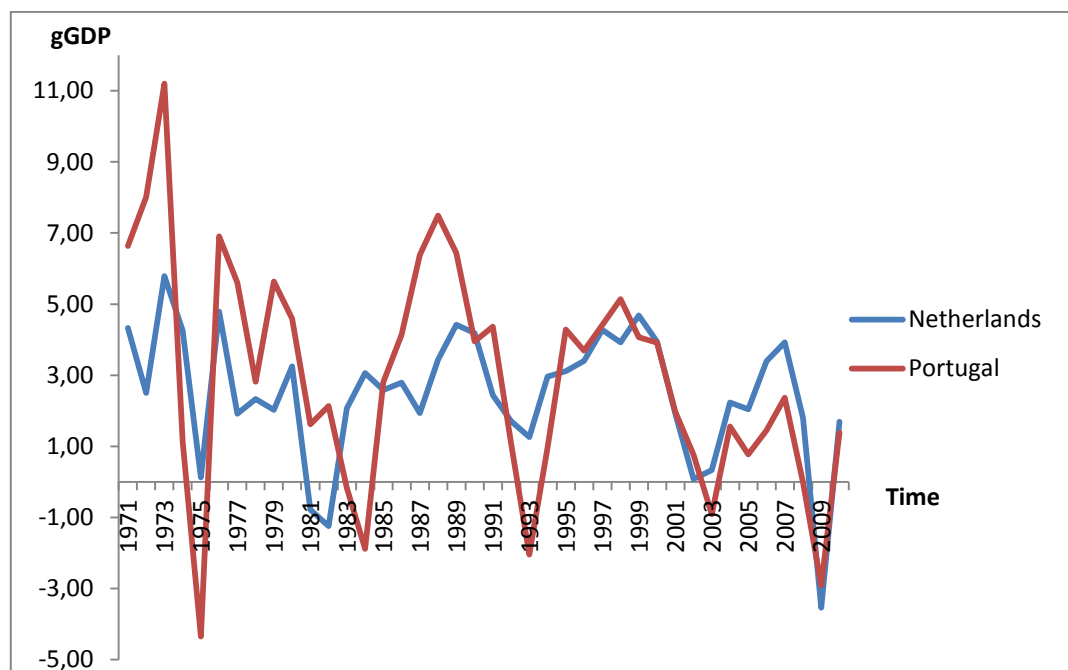
⁸ This agreement is often referred in the literature as the "Wasenaar agreement".

Figure III.3: Evolution of the GDP for the period 1970-2010.



Source: OECD

Figure III.4: Evolution of the GDP growth rate in the period 1970-2010.



Source: OECD

As we can see from the figures since the mid 80's to the end of the 90's there is a clear expansion period for both economies. In 1986 Portugal became member of the European Economic Community and experienced a buoyant period of economic growth.

After the adhesion there was a strong liberalization of markets and elimination of barriers that existed to both Foreign Direct Investment (FDI) and international trade (Banco de Portugal, 2009). As a result there were implemented several FDI projects in some key sectors. With a more open economy there was a positive impact of international trade on economic growth (Afonso & Aguiar, 2004) through both economies of scale, because of the access to big and broader markets, and a change in the production structure that enhanced productivity (Marques, 2002) and international competitiveness. These factors combined with a favorable domestic environment led to a period of economic convergence to European levels, despite of the less strong performance since the mid 90's, period where these factors were not as strong.

As for the Dutch economy, it started to reap the benefits from economic measures and reforms adopted in the early 80's and started to experience strong growth rates with a good performance from the international trade but a more impressive one either from the private consumption, that benefited from the increase in employment and the asset prices, either from the investment, through an increase in the utilization capacity, in the demand and a higher profitability (OECD, 1998).

In 1992 the Portuguese and Dutch authorities decided to use the Deutschmark as a Monetary Policy reference, in order to give more stability and credibility to their own monetary policies, however there was an exchange rate crisis at that time that affected the German economy penalizing both currencies and dragging them into a recession in 1993. Nevertheless, this was a still a period of economic expansion.

The last decade of the period analyzed:

The previous expansion period came to a halt with the turn of the century primarily because of external factors, such as the abrupt brake in the United States economy and a crash in the stock markets worldwide. OECD (2002) explains that these factors affected the Dutch economy particularly hard for two reasons, first the U.S. economy has a relative importance in Dutch exports and imports; and second private consumption and investment, that were the main drivers in the previous

expansion, suffered a major setback. On one hand the crash in the stock markets diminished the asset prices considerably decreasing household's wealth and consequently private consumption, on the other hand the rise in unit labor costs, in energy prices and the fall of the profit margins contributed to decrease investment substantially.

As we can see from Figure III.4 the Portuguese economy was also severely hit during this period and has not yet recovered. According to Banco de Portugal (2009) several factors have contributed to this outcome. First, the decrease in both domestic and foreign demand was combined with the recession occurred in the European Union (E.U.); second, an increase in international competition with the appearance of new entrants in world markets, such as the Central and East European countries and the Asian economies, and; third, structural rigidities, like the low quality of the production factors and the low flexibility of the labor and the products/services markets. These factors triggered a deceleration in productivity growth that not only led to a decrease in the economic performance at that time, but also took its toll throughout the decade.

The last period of economic expansion started in 2003/2004 and lasted until the global economic meltdown in 2008. The Netherlands had a more buoyant economic growth, the expansion was mainly due to a pickup in international trade that promoted exports, the Netherlands almost did not lose market share in this period and benefited from the stabilization of its competitiveness, as well as a raise up in investment, especially with a boost in the capacity utilization and lower interest rates (OECD, 2004). Despite the high productivity registered by the Netherlands its growth has been slow, mostly because of the lack of investment on ICT capital goods and the disappointing performance from the non-tradable services sector and the deceleration in the manufacturing services' productivity (OECD, 2004; OECD, 2008). In 2008 with the collapse of the stock markets and the international trade the Dutch economy stopped growing and entered into a recession, but with an expansionist fiscal policy, an ease monetary policy and a pickup in trade in 2009 the economy started to recover supported once again by foreign demand, since the domestic one was still depressed (OECD, 2010).

At last, the Portuguese economy almost stagnated in the last expansion, mainly because the reasons that affected the economy on the previous downturn were not fully resolved and the continued loss of productivity, of competitiveness and the adoption of

inadequate policies⁹ (Pereira & Lains, 2010) led to a divergence from the European Union average growth. When the 2008 crisis emerged Portugal like many other European countries adopted an expansionist fiscal policy but because of its levels of high indebtedness and the chronic problem of growth this led to a sovereign debt crisis which forced Portugal to apply for a new bailout package with the IMF, E.U. and European Central Bank (ECB), with the consolidation of public finances and the implementation of the so long needed structural reforms being the primary goal. Portugal registered some minor growth, though, in 2010 through the expansion of exports but still insufficient to put back the economy on a sustainable path (Banco de Portugal, 2011).

III.2) International trade

International trade was always one of the main factors behind economic growth in both economies, especially because since both Portugal and the Netherlands are small open economies that are not leaders in world technological advancements foreign trade becomes the main source of technological progress transmission leading to a better allocation of resources (Grossman & Helpman, 1991, Afonso & Aguiar, 2004, Afonso, 2001).

III.2.1) Exports of goods and services

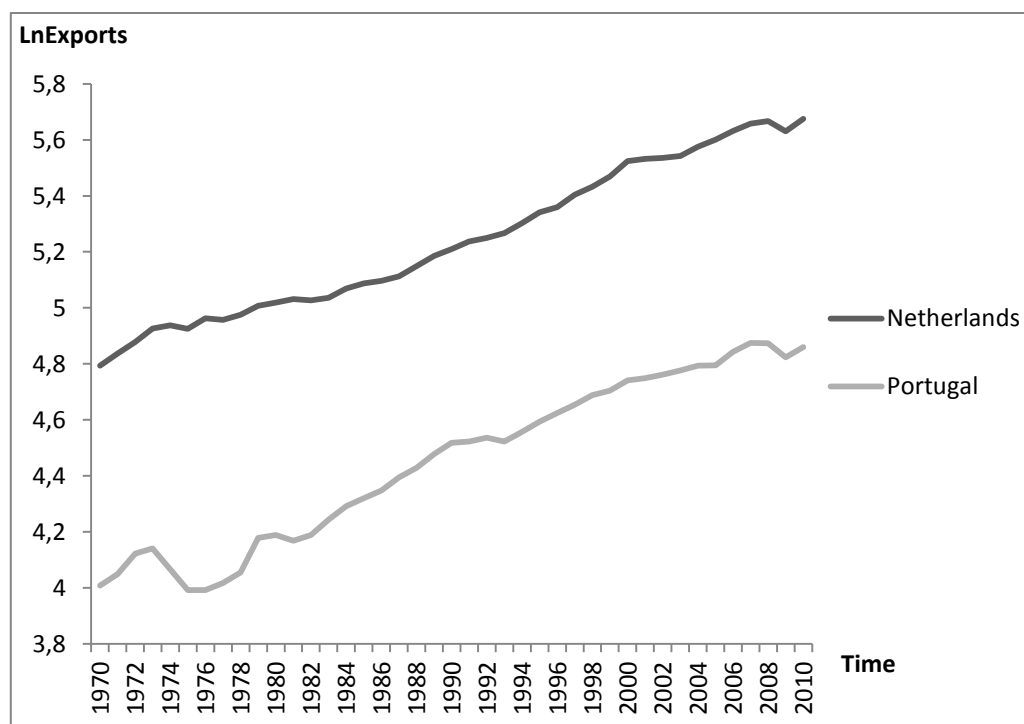
Exports overall performance:

From Figure III.5 we can see that the evolution of exports throughout the four decades is very different between the two countries. After the 80's Dutch exports suffered a boom while Portuguese exports experienced some significant changes over the course of the period. The Netherlands participated in all stages of the European integration process allowing for a high level of openness even in the beginning of the period, a process that contributed to an earlier access to bigger and broader markets

⁹ Aguiar- Conraria et al (2010) give the example of the excessive wage growth in the first years of the Economic and Monetary Union, which increased unit labor costs, and the pro-cyclical fiscal policy management.

that translated into economies of scale and a market share gain, boosting export and economic growth. Portugal did not take part in the first stages of European integration and did not have the same opportunities as the Dutch in the first decade or so of the period analyzed. However even after Portugal became a member of the EEC the performance of this indicator still did not match up, Portugal started to see some positive evolution and some market share gain until the beginning of 90's when the entrance of new emerging economies and the continuously loss of competitiveness caused by structural fragilities led to a considerable loss of market share in recent decades, that negatively affected export performance and economic growth (Banco de Portugal, 2009). At the same time the Dutch economy put in place several reforms that improved competitiveness allowing for a gain in market share and in the terms of trade serving as leverage for a sound export performance and growth (OECD, 1998; OECD, 2008).

Figure III.5: Evolution of Exports between 1970 and 2010.



Source: OECD

Evolution of the exports growth:

Figure III.6 illustrate the export growth performance, from there we can assess that evolution is very similar to the economic growth presented in Figure III.4. We can see the plunge on Portuguese exports occurred with the oil shocks and with the most recent economic crisis that implicated a severe decline in the terms of trade, especially because of the downturn in exports and the less severe downturn in imports, which drove the country to severe recessions obligating it to apply for bailout packages. We can also see that in 1993 export performance was not as strong because of the currency crisis that affected Germany and had spillover effects over the Portuguese economy.

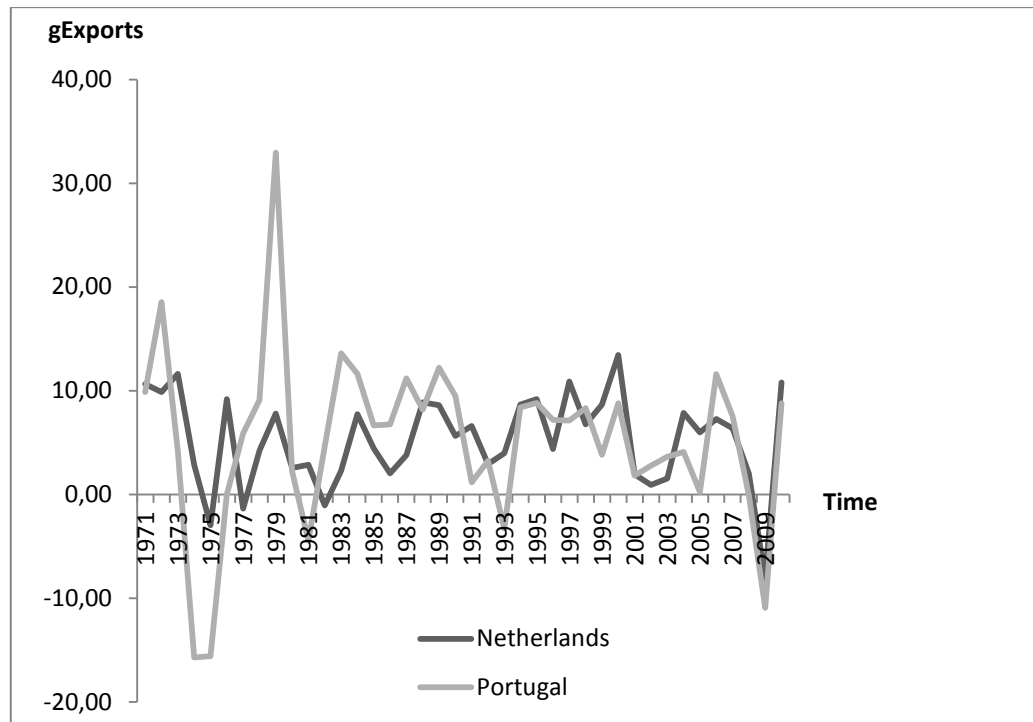
Such troughs are also visible in the Dutch economy; the first mainly because the disappointing performance in the first decade of the period and; the other two, one in the beginning of the last decade and the other with the recent economic crisis, because of the crash in world trade that collapsed Dutch exports.

There are also some booming periods, though, which are easily indentified. In the Portuguese case we can see that after the oil shocks and mainly until the mid 90's exports grew at very reasonable rates, the reason behind this is because after the oil shocks the stabilization policies conducted by the policymakers and the entrance to the EEC in 1986 contributed to a gain in market share, in competitiveness and in the terms of trade that led to a growth higher than the growth of world exports, first through low-tech goods where Portugal had a comparative advantage and then through the medium-high-tech sector after the implementation of important FDI projects¹⁰. As for the Dutch economy the more noticeable peaks occurred after the mid 80's throughout the 90's and into the early 00's mainly because after the implementation of the structural reforms and the strong economic performance registered there was a rise in both productivity and international competitiveness, that together with a sound domestic demand, especially investment, boosted export growth¹¹.

¹⁰ According to Banco de Portugal (2009) and Afonso & Aguiar (2004).

¹¹ According to OECD (1998) and OECD (2000).

Figure III.6: Export growth performance.



Source: OECD

There are three key factors that can explain the fluctuations across the period, first the market share of the country; second the types of goods and services exported; and third the main destinations of its exports.

Market share and its influence over the countries performance:

In the 90's with the entrance of new competitors with lower production costs and specialized in the same products as the Portuguese exporters there was a demand shift from Portuguese products to them that led to a considerable loss of market share. Even after Portugal started to change its productive structure towards products with a relatively higher technological intensity, countries from Central and Eastern Europe revealed a higher comparative advantage because of its abundant and more qualified work force and favorable geographical location. Consequently we started to assist to a reduction of FDI in Portugal from that point on and a delocalization of industries to those countries, in both the low-tech and the medium-high-tech sectors.

The Dutch case is different. Because of the limited size of the internal market the industrial sector has always been more focused towards the external markets and the agricultural sector is one of the leaders in the world market, so there was not a

considerable loss of market share since the new entrants were not specialized in these type of products. Also the re-exports share in total exports is considerably large in this country than in other European countries, thus helping stabilize the level of market share (Westerink, 2003; OECD, 2008). Furthermore, re-exports grew at a fast pace in the most recent decades, due to its strategic geographical position the Netherlands serves as a key entry point to Europe for goods coming from all parts of the world, thus being a major player in worldwide transactions (CBS, 2011).

Main goods and services exported by each country:

In Tables III.1 and III.2 we can see the share of total exports of goods of the major exports of goods for Portugal and the Netherlands in 2010, respectively. In the first decade and a half or so of the period in analysis the main exports of goods in Portugal were *Textiles, clothing and footwear* and *Food Products*, however with the entrance of the emerging markets specialized in low-tech goods, especially in *Textiles, clothing and footwear*, with an abundant work force and lower costs of production and with the liberalization of the textiles sector in the European Union there was an increasing pressure over the Portuguese market. It was clear at this point that a change was needed, so Portugal shifted its productive tissue towards a more technological intensive sectors taking advantage of the FDI projects that occurred in the 80's and 90's. The medium-high-tech sector started to have a larger importance in total exports, with emphasis on *Vehicles and other transport equipment*, which led to a convergence of the Portuguese manufacturing sector exports to the world exports. However Portugal was not able to specialize further in high-tech products and still has a considerable important share of low-tech goods in total exports which can also explain the depressed growth experienced in the last decade (Banco de Portugal, 2009).

The Dutch economy benefited from the export oriented manufacturing sector and the strong agricultural sector to specialize in those products, in fact when compared with other western economies the agricultural sector has a higher importance which explains the large share of food related products in total exports (Westerink, 2003). Also according to the CBS (2011), Dutch exports started to shift their product specialization towards high-tech goods, especially after 1997,

representing 31% of the export value¹² in 2010, mainly at the expenses of the medium-high-tech and medium-low-tech goods. Of course, here re-exports also had an important role not only in the development but also in the performance over the course of the years.

Table III.1: Portuguese main exports of goods in 2010

Item	Share in total exports of goods
Machinery and mechanical appliances	15%
Vehicles and other transport equipment	12%
Base Metals	8%
Plastics and Rubber	7%
Mineral Fuels	7%

Source: INE (2011)

Table III.2: Dutch main exports of goods in 2010

Item	Share in total exports of goods
Machinery and transport equipment	29%
Chemicals and related products	19%
Mineral fuels, lubricants and related products	14%
Food and live animals	12%
Miscellaneous manufactured articles	9%

Source: CBS (2011)

In the case of services this sector has a larger importance in Portugal's exports than in many other European countries, an importance that was accentuated in 2009

¹² It represents the highest export value among all segments of technological intensity.

because of the fall of the exports of goods. For geographical and climate reasons *Tourism* is still the dominant service, but we have been assisting to a substantial rise in *Other business services* and *Computer and R&D services* (GEE and GPEARI, 2011a). In the Dutch case, services have not such a high importance in total exports, mainly because since the service needs to be consumed at the point of production very few can cross borders and the Dutch economy plays a more distributor role to Continental Europe and can more easily trade goods than services (CBS, 2011), notwithstanding the service sector represents almost 75% of GDP. Table III.3 and III.4 show the main services exports in 2010.

Table III.3: Portuguese main exports of services in 2010

Item	Share in total exports of services
Travel and Tourism	42%
Transportation and Communication	30%
Other Business services	18%
Computer and R&D services	5%

Source: GEE and GPEARI (2011a)

Table III.4: Dutch main exports of services 2010

Item	Share in total exports of services
Other Business services	31%
Transportation	21%
Royalties and license fees	20%
Travel	11%

Source: CBS (2011)

Main exports destinations of Portugal and the Netherlands:

The third factor considered is the destination of exports. In both cases we can see that the European market represents the core market to where both Portugal and the Netherlands ship their products, a circumstance that has to do with the European integration process that allowed for a liberalization of markets and a fall in transportation costs and trade barriers that highly promoted intra-E.U. trade (Banco de Portugal, 2009)¹³.

Portugal had a larger trade share with the ex-colonies in the 1970s, however with the Revolution and the disappearance of the political dependency this trade relationship came to halt and Portugal started to focus on Europe. After joining EEC Portugal assisted to an increase in the share of its exports with the European partners and especially with Spain. It was after this period that the Spanish market became the most important destination of Portuguese exports (Banco de Portugal, 2009; Afonso & Aguiar, 2004). This can also explain the shy performance of exports in two ways, first Portugal has become too exposed to fluctuations that can occur in the European Union economy and especially in the Spanish economy and; second the share that the U.S. economy has on Portuguese exports is still insignificant and Portugal has not taken advantage of the booming Chinese market over the last decades. It is also important to refer the substantial export growth to Angola in the most recent years making it the major extra-E.U. market, according to GEE & GPEARI (2011b) this market grew from 11% of extra-E.U. exports in 1993 to 21% in 2010.

Geographical and historical factors plus an increased European integration explain the fact that Dutch exports are also focused towards Europe. In the case of the Netherlands, being able to participate in all stages of European integration allowed it to have more strong and durable relations with the other European countries. CBS (2011) mentions that this economy has already a relatively large trade flow with the U.S. economy, since it represents the largest extra-E.U. destination. It is also important to notice that the share of re-exports on total exports is considerably large, representing up to 45% of total exports in 2010. Most of these re-exports come from emerging markets to European countries using the Netherlands as a gateway.

¹³ The European market represented in 2010 75% of Portuguese and Dutch exports (INE, 2011; CBS, 2011).

Table III.5: Portuguese main exports destinations in 2010

Item	Share in total destinations
Spain	27%
Germany	13%
France	12%
United Kingdom	6%
Angola	5%

Source: INE (2011)

Table III.6: Dutch main exports destinations in 2010

Item	Share in total destinations
Germany	24%
Belgium	11%
France	9%
United Kingdom	8%
Italy	5%

Source: CBS (2011)

III.2.2) Imports of goods and services

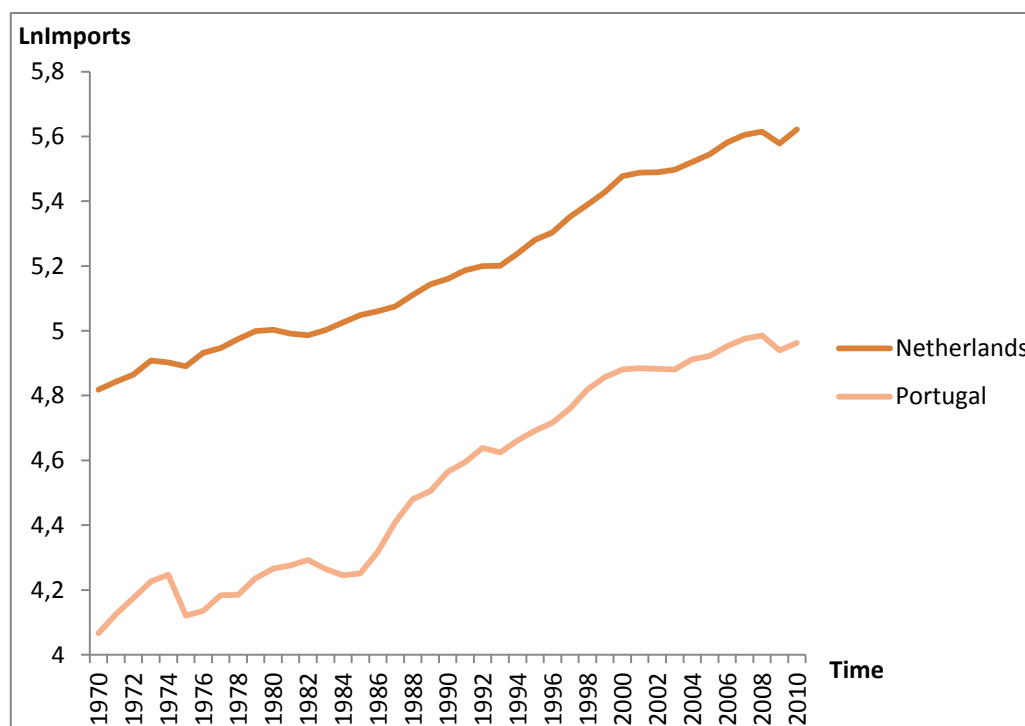
The imports boom:

Figure III.7 illustrates the evolution of imports for both economies in the last four decades. In this case we can also notice the boom suffered by the Netherlands from the early 80's onwards and from Portuguese imports since the late 80's.

The main reasons for the boom on Dutch imports was the continued rise on the re-exports share in total exports and the relevance of the Chinese economy over time. As mentioned before the Netherlands is perfectly positioned to act as a gateway to Europe, so there was a crescent surge of products coming into the Netherlands destined to other European countries, in the meantime the Chinese economy was appearing into the world markets with more competitive products and saw the Netherlands as a strategic port of access to Continental Europe (CBS, 2011) using it to deliver its products more efficiently and rapidly.

As for the Portuguese economy the adhesion to the EEC led to an increased openness and to an implementation of important FDI projects, this implied a focus on trade with more technological advanced economies and a large importation of goods that were not produced domestically, such as capital goods. Also being Portugal an importer of energetic goods the constant rise on prices increased imports as well.

Figure III.7: Evolution of Imports between 1970 and 2010.



Source: OECD

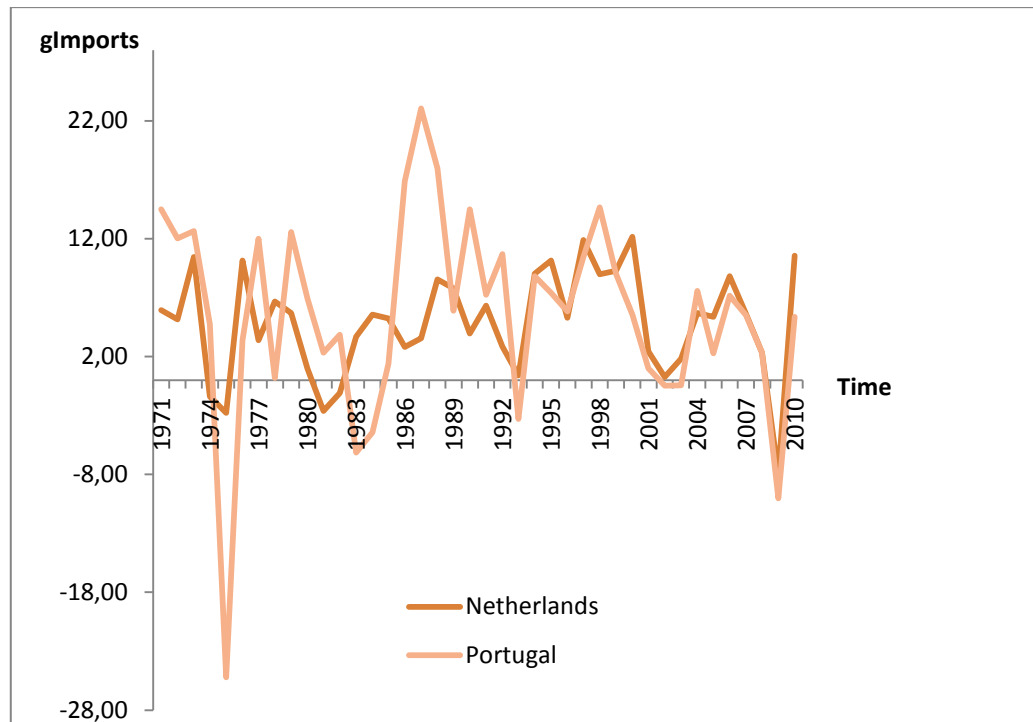
Evolution of the imports growth:

Figure III.8 portrays the imports growth performance across the period analyzed. Through this figure we can point out the peaks and troughs that both economies suffered. Portuguese imports suffered a rise especially in the mid 80's and mid 90's, the first one mainly due to the importation of capital goods from more industrialized economies, in order to incorporate the technological advancements and begin the specialization process within the industry (Afonso & Aguiar, 2004), and the second one because of the crescent demand for durable goods, especially in the years that preceded the adhesion to the Euro area. Moreover exports were booming in these periods, and since exports are used to finance the purchase of new goods/services this led to a rise in imports as well. As for the Dutch economy such peaks were caused not only by the sound domestic demand registered after the reforms implemented in the beginning of 80's but also with the strong export performance occurred in those periods as well (OECD, 1998).

The troughs are also coincident with those of exports. For the Portuguese economy the causes of the troughs were the oil shocks and the recent economic crisis, as a consequence there was a severe downturn in both exports and domestic demand that affected import performance. In 1993, though, the cause was the already referred currency crisis in Germany.

The Dutch economy also experienced a crash on imports with the oil shocks, but the sluggish performance occurred during that period also contributed to it. The sharp decline in the domestic demand and in exports performance caused both troughs during the 00's (OECD, 2002; OECD, 2010).

Figure III.8: Imports growth performance



Source: OECD

On imports we can also identify three factors that can explain the performance throughout the period, first the weaknesses of the economies; second, the type of goods and services imported; and third, the main suppliers.

Main weaknesses of each economy:

Regarding the first factor, and apart from the already mentioned structural fragilities and low productivity, Portugal registers a low level of capital accumulation when compared to its partners, in fact Portugal had been one of the most FDI attractive European countries during the 80's but such capacity to continue to attract FDI has been much smaller (Marques, 2002) and nowadays the level of investment only represents 25% of that registered in the beginning of the 00's (Banco de Portugal, 2011). Moreover Portugal registers a high energetic dependence (GEE & GPEARI, 2011) since it imports the totality of the fossil fuels that it consumes, also even though the Portuguese economy passed through a process of crescent specialization within the industry after the adhesion to the EEC, its industry, though, is not yet very

internationally competitive, because of the still relative importance of low and medium-low-tech goods in the productive structure (Banco de Portugal, 2009).

The main weaknesses of the Netherlands relate to the lack of raw materials that are essential in the first stages of the industrialization process, making the manufacturing sector highly import dependent (Westerink, 2003), additionally according to the OECD (2004; 2008) the productivity growth in the Netherlands has been low, this has to do with fact that the capital services' performance has been weak since the investment in the ICT capital goods is not up to par with other OECD countries. Moreover this economy shows an overexposure to the international trade flows that can either generate overexpansion periods or overcooling periods, which can prevent the economy to grow at a sustainable and a satisfactory rate in the long term if it lacks the support of the domestic economy.

Main imports of goods and services of each economy:

Tables III.7 and III.8 show the share of total imports of goods of the major imports of goods for Portugal and the Netherlands in 2010, respectively. Portuguese imports, just like its exports, suffered a structure mutation across the period, after the mid 80's the relevance of the medium-high¹⁴ and medium-low-tech goods decreased while the relevance of the high and low-tech goods increased. This is because from that moment onwards the Portuguese productive structure started to specialize in medium-high and medium-low-tech goods shifting the consumers' needs towards other types of commodities (Banco de Portugal, 2009), however the demand of fossil fuels has not changed across time since its consumption comes entirely from importation.

¹⁴ Nonetheless this still represents the most important sector of Portuguese imports.

Table III.7: Portuguese main imports of goods in 2010

Item	Share in total exports of goods
Machinery and mechanical appliances	16%
Mineral Fuels	15%
Vehicles and other transport equipment	14%
Chemicals	10%
Agricultural products	10%

Source: INE (2011)

As for the Dutch economy, according to the CBS (2011) imports started to focus more in high and medium-low-tech goods¹⁵. The development of new technologies and the role that the Netherlands has trading and re-exporting important low-tech commodities, such as fossil fuels, explain the focus on this type of products.

Table III.8: Dutch main imports of goods in 2010

Item	Share in total exports of goods
Machinery and transport equipment	30%
Mineral fuels, lubricants and related products	18%
Chemicals and related products	15%
Miscellaneous manufactured articles	11%
Manufactured goods classified by materials	10%

Source: CBS (2011)

¹⁵ These sectors represented up to 64% of import value in 2010, with the medium-low-tech segment representing 33% of it.

Tables III.9 and III.10 represent main imports of services for the Portuguese and Dutch economies, respectively. Portuguese imports of services have not changed in the last years, while in the Dutch case the only change occurred was the continued rise in the *Royalties and license fees* making it the second most important item.

Table III.9: Portuguese main imports of services in 2010

Item	Share in total exports of services
Transportation and Communication	33%
Travel and Tourism	28%
Other Business services	20%
Computer and R&D services	5%

Source: GEE and GPEARI (2011a)

Table III.10: Dutch main imports of services in 2010

Item	Share in total exports of services
Other Business services	31%
Royalties and license fees	18%
Travel	18%
Transportation	18%

Source: CBS (2011)

Main imports suppliers of Portugal and the Netherlands:

The last key factor is the source of imports, demonstrated in Table III.11 for Portugal and Table III.12 for the Netherlands. Just like in exports we can see that the main suppliers of both economies belong to the European Union¹⁶.

In the case of Portugal, the intra-E.U. share of imports is very large and if we take into account the exports share as well we conclude that Portuguese economy is overexposed towards the European market and to its fluctuations, in particular towards Spain.

The Dutch case is different, although the European market represents a considerable share in Dutch imports it is not as high as it was several years ago¹⁷, making this economy less exposed to fluctuations that can occur in the European Union. The reason for such decline is the rise of China and other emerging economies in world trade, according to Creusen & Lejour (2009) China alone grew from a 0.6% import share in 1990 to a 9% share in 2007. However these imports are not all destined to the Netherlands, they are destined to other European countries as well.

Table III.11: Portuguese main imports suppliers in 2010

Item	Share in total destinations
Spain	31%
Germany	14%
France	7%
Italy	6%
Netherlands	5%

Source: INE (2011)

¹⁶ The European market represented in 2010 almost 76% of Portuguese imports and 53% of Dutch imports (INE, 2011; CBS, 2011).

¹⁷ According to the CBS (2011) the E.U. market represented 65% of Dutch imports in 1996 falling to the current 53%.

Table III.12: Dutch main imports suppliers in 2010

Item	Share in total destinations
Germany	17%
Belgium	10%
China	9%
USA	8%
United Kingdom	7%

Source: CBS (2011)

To sum up both Portugal and the Netherlands have seen substantial growth increases after the mid 80's. As for Portugal the adhesion to the EEC brought significant changes, both economic and structural, and allowed to boost performance and growth. However in the last decade the Portuguese economy stagnated because of the loss of productivity, competitiveness and the difficult adjustment to the Economic and Monetary Union that along with high levels of indebtedness ended up with a bailout package with the IMF, E.U. and ECB. As for the Netherlands the structural reforms implemented brought on buoyant economic growth rates that, with some punctual exceptions, lasted until the recent economic crisis.

International trade was one of the main drivers of the growth experienced by both economies, but has been more relevant in the Dutch one mainly because of the re-exports phenomenon, that played an important role in the evolution of both trade and growth. Portuguese exports of goods saw a significant change in its productive structure and a change in their destinations, Europe is the dominant market to both Portugal and the Netherlands. However in the imports case the European market in the Dutch economy does not represent a large share as it does in the Portuguese one, because of the crescent trade flows that Dutch economy has experienced with the other important economies, mainly China, that use the Netherlands as gateway to the European Continent.

IV- Comparison between Portugal and the Netherlands: Empirical Models and Results

In this section we will analyze the impact of international trade on economic growth for both Portugal and the Netherlands.

The exports of goods and services and imports of goods and services are the proxies for trade and the GDP measured by the expenditure approach is the proxy for growth. The series are annually and were extracted from the Annual National Accounts from the OECD Statistics Database for the period 1970-2010, they are measured in US\$, constant prices, constant PPPs, using 2005 as a base year. The series were, then, converted into logarithms.

This chapter is organized as following, first it was performed a brief study about the trend and business cycles' behavior of the variables for both economies. Secondly, we will study the stationarity of the series and the existence of cointegration. Thirdly, we will represent the VECM for Portugal and the Netherlands in order to assess not only the long-run impact that trade has in the economic growth of each country but also the short-run dynamics that can occur. In the end of this chapter we will study the existence of structural breaks.

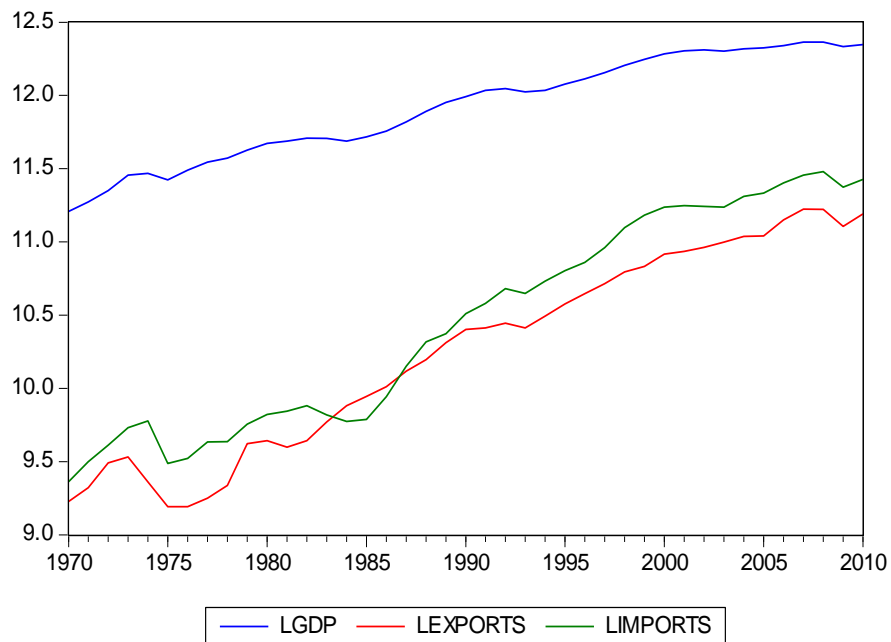
IV.1) Trend and Business Cycles analysis:

Being LGDP, LExports and LImports the logarithms of GDP, Exports and Imports, respectively, we can acknowledge that both Portugal and Netherlands show a positive trend growth in the period 1970-2010. In the Portuguese case Figure IV.1 shows the evolution of the variables. As we can see exports and imports share a very similar path which is an indicator that a rise in exports will, generally, be accompanied by a rise in imports. This happens because exports are used to import goods that are necessary and are domestically unavailable, such as capital goods.

Regarding GDP, the evolution is also positive, however there are certain periods that register some punctual recessions that occurred along these four decades,

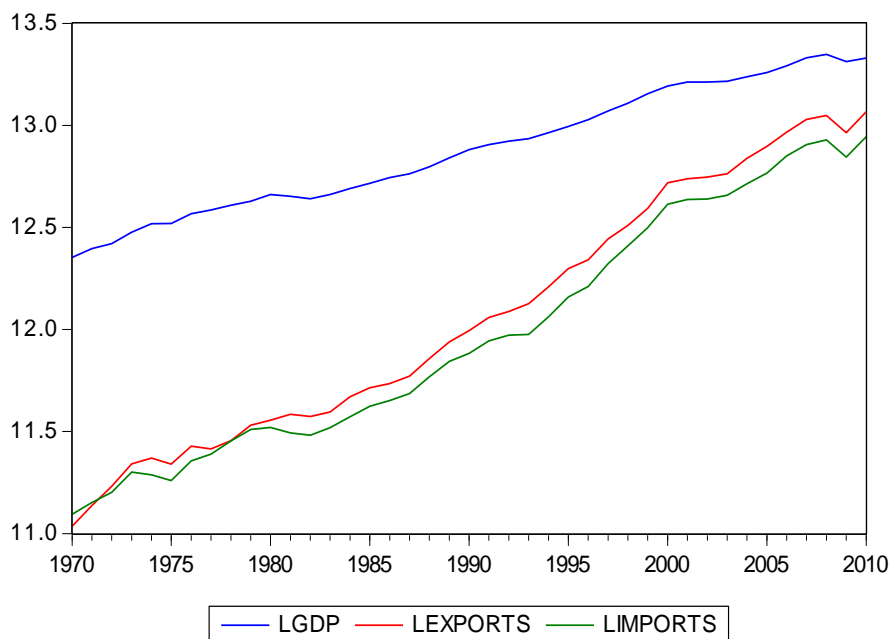
for example the crisis in the oil prices in the mid 70's and 80's and the most recent one that started with the sovereign debt crises in 2008/2009.

Figure IV.1: Evolution of Portuguese GDP, Exports and Imports in the period 1970-2010.



As for the Dutch economy we can acknowledge from Figure IV.2 that the evolution of the variables shows that exports and imports share an almost identical path, but it also illustrates a very similar behavior between exports and the GDP. This may be due to the fact that exports are so important to the Dutch economy that are responsible for a large share of this country's product, actually exports share to GDP increased from 27% in 1970 to 77% in 2010.

Figure IV.2: Evolution of the Dutch GDP, Exports and Imports in the period 1970-2010.



In order to have a more detailed perception on the behavior of the countries' economic performance, the Hodrick-Prescott filter was used to separate the trend from the business cycles of the variables in analysis.

Figure IV.3 and Figure IV.4 represent respectively the trend and business cycles for the variables studied concerning the Portuguese economy. By analyzing the graphs we acknowledge that exports and imports share a similar trend and business cycle. This happens because in a country that highly depends on foreign capital goods to generate technological and growth advancements imports' penetration on exports should be elevated, since exports are used to finance the purchase of new inputs.

Regarding business cycles there are some significant conclusions. First, we can see that the trade variables are both pro-cyclical and leading variables, which means that not only exists a positive correlation between their deviations from trend and GDP's deviation from trend but also their peaks and troughs tend to precede those of GDP. Second, we see that the frequency and amplitude of the business cycles follow a stable outline, because generally the peaks and troughs of all variables in this economy

do not go longer than four years with the fifth year being the turning period, and their amplitude is not too volatile throughout.

Third, we can point out the periods where the Portuguese economy was booming and the ones that were not, the periods of expansion were characterized by technological advancements and productivity and competition enhancements through importation of foreign goods and services that improved exports performance and boosted growth.

Figure IV.3: Portuguese GDP, Exports and Imports trend.

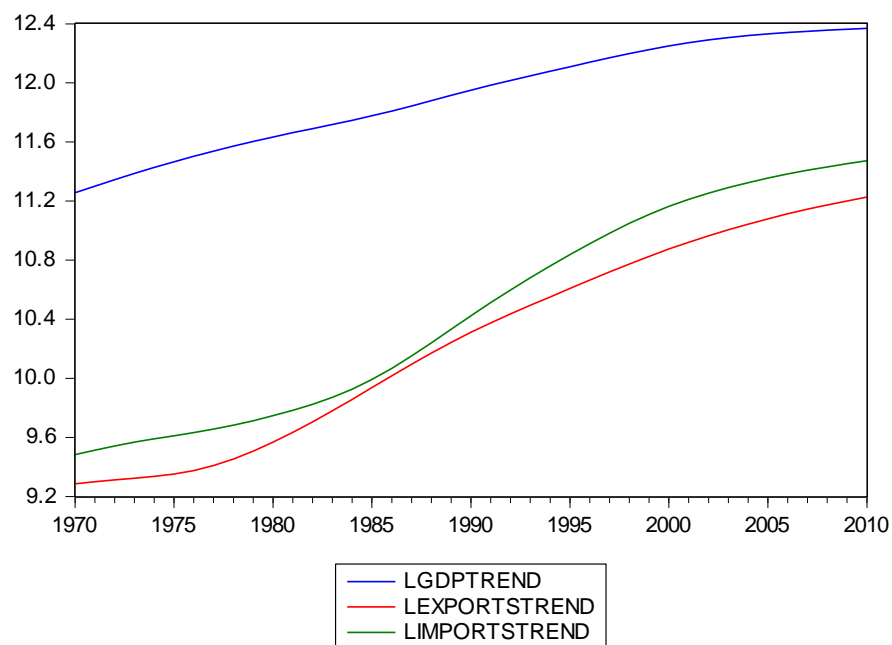


Figure IV.4: Portuguese GDP, Exports and Imports business cycles.

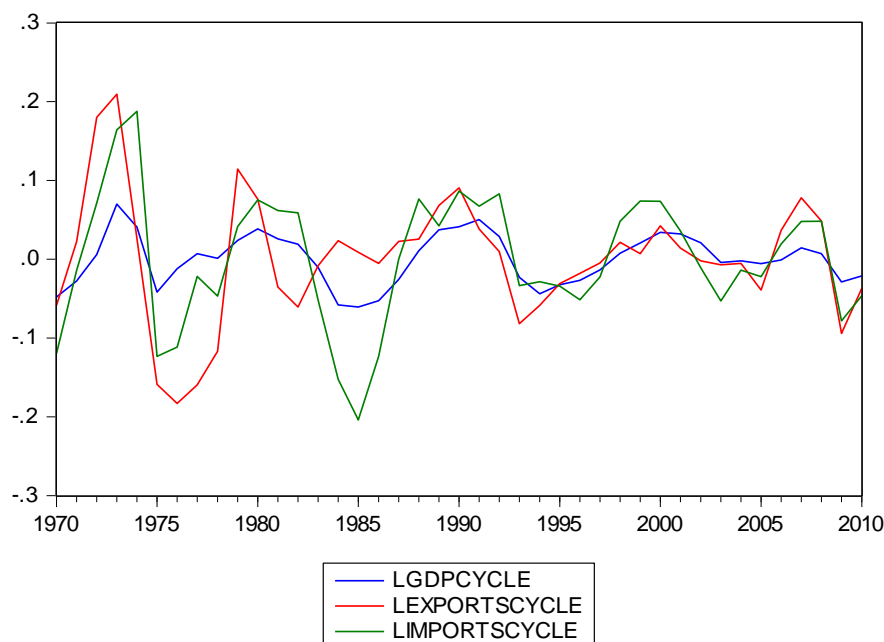


Figure IV.5 and IV.6 illustrate respectively the trend and business cycles for the variables studied concerning the Dutch economy. In this economy the pattern followed by the trend and business cycles of both exports and imports are very similar, in fact trends in exports are almost identical to the trends in imports as shown by Figure IV.5. There are two explanations for this. First, just like the Portuguese economy, import's penetration on exports and exports' financing of imports explain part of it and; second, the re-exports phenomenon in the last few decades also had an important impact, since some imports will be exported to other countries the trend of the variables will undoubtedly be related.

As for business cycles the conclusions on this economy do not differ much from the previous economy. First, in this case the trade variables are also pro-cyclical and leading variables when compared to GDP. Second, the frequency and amplitude also follow a stable outline, but in this case some of the cycles last three to four years as opposed to four or five in the previous economy, which can be related to the fluctuations occurred in international trade and being the Netherlands a very open economy such fluctuations have an almost immediate impact in its economic performance. Also such fluctuations explain why the amplitudes are more volatile here

than in the Portuguese case, especially regarding exports and imports, because when international trade booms the Dutch economy experiences very positive deviations from trend but when it crashes the reverse happens.

Third, we can also point out the booming periods. The most recent ones are related to the huge expansion of the international trade not only with the appearance of the emergent economies but also as a consequence of the European economic integration that happened. In addition it was in this period that re-exports started to arise.

Figure IV.5: Dutch GDP, Exports and Imports trend.

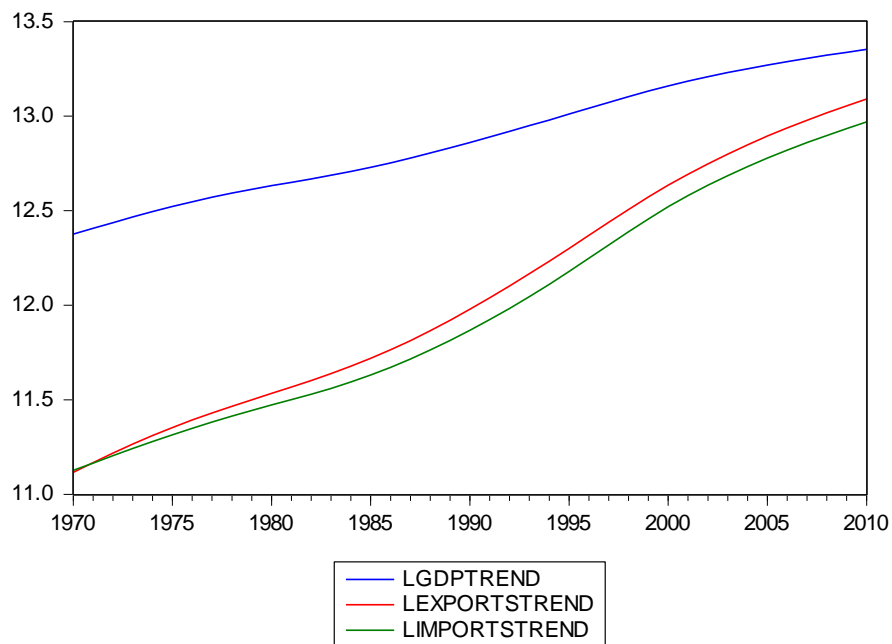
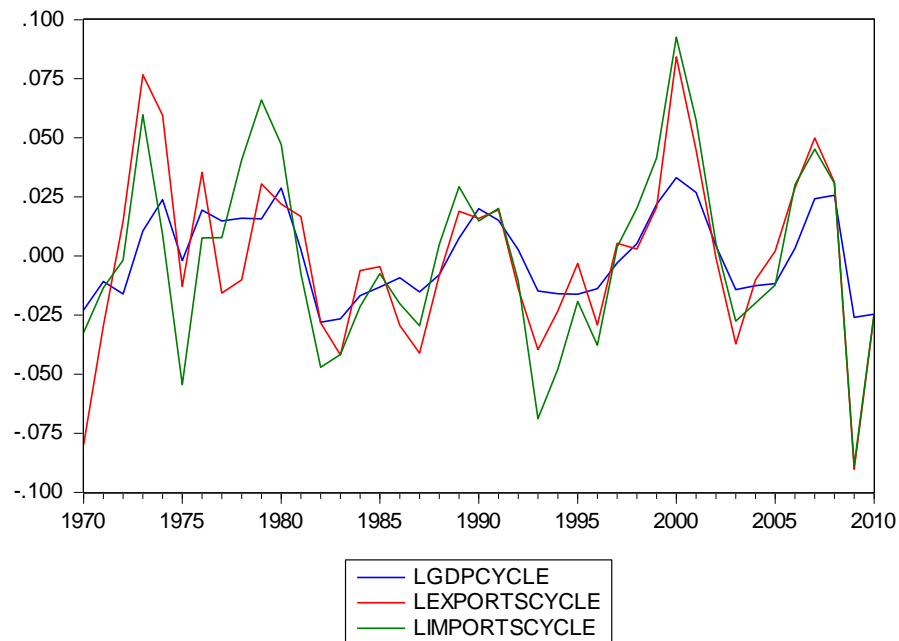


Figure IV.6: Dutch GDP, Exports and Imports business cycles.



IV.2) Empirical Model:

This subsection presents the empirical estimations for Portugal and the Netherlands with the intention of acknowledging the effects that international trade has on economic growth. First, unit root tests are conducted to test for stationarity. Second, cointegration tests will be performed to see if the series have a long term relation between them. Third, the models for each economy that study the effects on GDP are presented. And fourth, a structural break analysis is introduced to assess if the variables are stable across the period analyzed.

IV.2.1) Unit Root Tests:

Before we study for the existence of cointegration between GDP, Exports and Imports, we first have to study the series stationarity and to do so we apply the unit root tests.

The unit root testes used were the ADF and Phillips-Perron tests, with constant and with constant and trend. The ADF¹⁸ and the Phillips-Perron test accept the non-stationary condition if the null hypothesis cannot be rejected and the stationary condition if the alternative hypothesis is not rejected.

In Table IV.1 and Table IV. 2 we have the results for Portugal and the Netherlands, respectively:

Table IV.1: Unit Root Tests for Portugal.

Variables	ADF				Philips-Perron			
	Constant		Constant and Trend		Constant		Constant and Trend	
	Test Statistic	Critical value a 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%
LGDP	-2.285847	2.945842	-2.224465	-3.529757	-2.865250	-2.936942	-1.609944	-3.526609
LExports	0.092008	-2.941145	-1.863620	-3.526609	-0.583496	-2.936942	-1.886329	-3.526609
LImports	-0.482293	-2.938987	-2.411085	-3.529758	-0.701440	-2.936942	-1.545661	-3.526609

¹⁸ The lag length was determined automatically by using the Schwartz Information Criterion.

Table IV.2: Unit Root Tests for the Netherlands.

Variables	ADF				Phillips-Perron			
	Constant		Constant and Trend		Constant		Constant and Trend	
	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%
LGDP	-0.918619	-2.938987	-2.261056	-3.529758	-1.413456	-2.936942	-1.784409	-3.526609
LExports	-0.402903	-2.936942	-1.664437	-3.526609	-0.404301	-2.936942	-1.764387	-3.526609
LImports	0.272644	-2.936942	-1.954177	-3.529758	0.225451	-2.936942	-1.724365	-3.526609

For both countries the tests do not reject the condition of non-stationarity, because the test statistic falls in the acceptance region of the null hypothesis, which means that in levels the LGDP, the LExports and the LImports are non-stationary. This means that the series have to be differenced so we can assess the order of integration, for that reason the tests were performed again for the 1st differences¹⁹, and in this case all the variables are I (1) for the two countries analyzed.

The reason that the tests were conducted using a constant and a trend is to assess if the series are a Difference Stationarity Process (DSP) with a constant or a Trend Stationarity Process (TSP), because they have some identical properties between them. The first process has a stochastic trend, once the trend is removed it yields a stationary stochastic process, in this case shocks that might affect the system will have a permanent effect. As for the second process the trend is deterministic, after the trend has been estimated and removed the residual series become a stationary stochastic process, here shocks that might affect the system do not influence the long run trend and will eventually be eliminated.

¹⁹ As shown in Appendix, by Table VII.1 for Portugal and by Table VII.2 for the Netherlands.

As we can see by the tables all the variables for both Portugal and the Netherlands are a DSP with a constant.

IV.2.2) Cointegration Tests

Now that we have concluded that the variables are non-stationary we can proceed to test for cointegration among them and evaluate if there is a long term relationship.

Two or more variables are said to be cointegrated of order 1 if there is a stationary linear combination, $I(0)$, among them. There are two methods to study for cointegration, the Engle and Granger cointegration tests and the Johansen maximum likelihood estimators, the method used was the second one because it solves the problems of the first.

The Engle and Granger cointegration test is a two step method, whereas the first step assesses the order of integration of the variables through unit root tests, the second step tests the order of integration for the residuals. In this method errors committed in the first step are carried out to the next and therefore can lead to wrong conclusions. The Johansen maximum likelihood estimator being a one step method solves the errors that can be committed in the Engle and Granger test providing a more correct conclusion.

The Johansen method carries out two tests, the maximum eigenvalue test and the trace test in order to determine the cointegrating rank (r^*). If the rank is equal to 0 there is no cointegration among the variables, but if the rank is equal to r^{20} it means that cointegration exists and there is r cointegrating relations in the model. After having established the cointegrating rank we need to determine the trend specification model that is present in our data, so we choose the one that minimizes the information criteria, such as the Akaike Information Criterion (AIC) and the Schwartz Information Criterion (SBC). SBC is the one used since it has better properties, thus leading to a more accurate solution.

²⁰ r is larger than zero but smaller than the number of variables in the system.

By performing the Johansen maximum likelihood estimators to our variables for both Portugal and the Netherlands there is a cointegration relationship among the variables for both countries between 1970 and 2010²¹. According to the SBC for both economies there is one cointegration relationship among the three variables. Regarding the Portuguese economy the model selected is model 4 that incorporates a constant and a trend in the cointegrating vector, as for the Dutch economy model 3 was selected incorporating only a constant in the cointegrating vector.

IV.2.3) Vector Error Correction Model (VECM) Representation:

The Error Correction Models are a restricted VAR for non-stationary series that are cointegrated. This type of representation separates the long-term convergence from short-run adjustment dynamics. In the ECM the cointegration term is the error correction term, because the long run equilibrium deviation is corrected gradually through short-run adjustments.

Table IV.3 displays the VECM representation for Portugal. As was mentioned above, the model selected was model 4 with a constant and a trend in the cointegrating vector. We can see that both exports and imports play a significant role in the economic growth process. In this case a 1% increase in exports will translate into a 0.47% increase in growth and a 1% increase in imports will have a 0.31% growth increase.

²¹ As shown in Appendix, Figure VII.1 for Portugal and Figure VII.2 for the Netherlands.

Table IV.3: VECM representation for Portugal.

Dependent Variable	Independent variables			
	Constant	LExports	LImports	Trend
LGDP	4.250871	0.471515 (0.16147) [-2.92006]	0.312506 (0.13374) [-2.33659]	-0.020026 (0.00815) [2.45593]

Note: Standard errors are represented in () and t-statistics in [].

This is because in the Portuguese case the international trade as a whole plays a crucial role in its growth process, so both exports and imports have positive influence over GDP. On one hand the exports case it is well documented across the literature, it fosters economic growth by promoting higher productivity and a better allocation of resources through greater economies of scale and technological improvement. It also allows for a higher accumulation of foreign exchange reserves that can be used to import high quality inputs, such as capital goods, that can be utilized to enhance productivity, increase the production of domestic goods and promote employment, especially in the export sector (Baharumshah & Rashid, 1999; Shirazi & Manap, 2005; Abu-Qarn & Abu-Bader, 2001; Afonso, 2001).

On the other hand imports play an important part in a country's economic growth, because a country can only generate persistent gains if it makes technological advances and imports facilitate the transfer of technology helping to enhance the productive process and the productivity, which will foster the growth rate of the economy, especially when that country imports capital goods (Shirazi & Manap, 2005); moreover it helps improve the population standards of living since it gives the consumers a wider choice of goods (Humpage, 2000).

The former statement is true for economies that are highly dependent and need to import certain types of goods/services in order to promote growth. Portugal is one of

those cases, by looking to Table IV.4 the Coverage rate of Imports by Exports²² is below one hundred, which means that Portugal shows an external dependency. For that reason, Portugal imported goods, like capital goods, that embody technological progress and fostered productivity and competitiveness, and promoted growth.

Table IV.4: Growth rate and Coverage rate of Imports by Exports of Portugal for selected years.

Years	Coverage ratio of Imports by Exports (%)	Growth Rate (%)
1971	84	6.63
1980	84	4.59
1990	90	3.95
2000	73	3.92
2010	79	1.38

Source: The Coverage ratio was calculated by the author using OECD data; OECD

So, in the period analyzed the economic changes that occurred in Portugal²³ helped to improve its exports and imports allowing for, first an access to bigger and broader markets that generated greater technological advancements and second better productivity and higher economies of scale that fostered economic growth.

Table IV.5 represents the VECM for the Netherlands. As mentioned above the model chosen is model 3 with a constant in the cointegrating vector. In this representation we see that international trade has mixed effects on growth, here a 1% increase in exports will have a 1.14% increase on growth whereas a 1% increase in imports will have a 0.72% decrease on growth.

²² This indicator shows what percentage of imports is covered by exports.

²³ The entrance to the EEC in 1986 and being a member-country of the Euro area in 1999 are the most noticeable examples of economic integration and openness in the period 1970-2010.

Table IV.5: VECM representation for the Netherlands.

Dependent Variable	Independent variables		
	Constant	LExports	LImports
LGDP	7.675594	1.142677 (0.13332) [-8.57079]	-0.716452 (0.14047) [5.10036]

Note: Standard errors are represented in () and t-statistics in [].

Increased openness and re-exports explain the bulk of the exports' elasticity. The continued process of European integration intensified trade with the existing partners and the rise of new European and Asian economies increased the number of destinations, furthermore the liberalized trade policy promoted a better allocation of production factors and a better diffusion of knowledge that resulted in a higher productivity and consequently a higher growth (Creusen & Lejour, 2009). Also this increased openness led to the re-exports phenomenon, which was more expressive in the last two decades (Creusen & Lejour, 2009) and nowadays represents a large share of total exports being a valuable activity for the Netherlands trade as well as to its growth (CBS, 2011).

Imports on the other hand have an adverse effect on growth, contrary to that observed in the Portuguese case. In fact one would expect a positive effect of imports on growth as well, since imports *per se* do not hinder economic growth (Humpage, 2000) and may even promote it.

The high level of openness to trade can also explain this, since a large portion of Dutch imports are intended to other European countries the domestic economy does not take full advantage of the benefits that imports might have in its economic performance, nevertheless imports still enter as a balance deficit lowering GDP growth in the process. Moreover, the importance that the domestic demand had on previous

expansions and the high level of income registered²⁴ may have shifted the demand of local goods and services towards more competitive foreign ones, thus reducing economic performance and growth.

Furthermore the Coverage rate of Imports by Exports in the Netherlands is positive so the country has an external surplus, in other words the indicator is above one hundred, as shown by Table IV.6. This means that the goods/services imported may not be the pivotal ones to induce a better economic performance and growth, which eventually may lead to a decrease in both.

Table IV.6: Growth rate and Coverage rate of Imports by Exports of the Netherlands for selected years.

Years	Coverage ratio of Imports by Exports (%)	Growth Rate (%)
1971	99	4.33
1980	104	3.25
1990	112	4.18
2000	111	3.94
2010	113	1.69

Source: The Coverage ratio was calculated by the author using OECD data; OECD

²⁴ Creusen & Lejour (2009) clarify that income explains more than 85% of growth in trade. Humpage (2000) states that when income rises or if a country has a high level of income it will import more.

IV.3) Structural breaks

Structural breaks are shifts in time series that can affect the behavior of the variables. It is common that in a time series analysis including large periods of time to exist some type of structural break, so it is important to study the existence of these because it determines if the parameters are stable and robust across the various subsamples of the data.

From an economic point of view structural breaks can occur when policymakers decide to put in place new policies, for example when several economies replaced imports-substitution policies by exports-promotion policies or when interest rates replaced money supply as a Monetary Policy instrument, or when an important economic event takes place, for example the oil shocks occurred or the most recent global economic crisis.

The equation for both economies in this section will be:

$$LGDP_t = C + \beta_1 LExports_t + \beta_2 LImports_t + u_t \quad (1)$$

If structural breaks exist in a time series we need to introduce a dummy variable in order to assess its impact and improve the model. If the dummy variable introduced is significant the explanatory variables can have a different impact on the dependent variable, which may lead to different conclusions. Thus, the equation including the dummy variable is:

$$LGDP_t = C + \beta_1 LExports_t + \beta_2 LImports_t + \beta_3 LExports_t * Dummy + \beta_4 LImports_t * Dummy + u_t \quad (2)$$

Table IV.7 shows the representation of the model for the Portuguese economy. All independent variables are significant and can influence the dependent variable.

When studying for structural breaks it is important to perform a Stability Diagnosis test, in our case the test performed was the Chow Breakpoint test²⁵. The year 1986 was chosen as a breakpoint because it was Portugal's adhesion date to the EEC,

²⁵ The Chow Breakpoint Test separates the sample and studies for significant differences in each subsample. If such differences stand it indicates a structural change in the relationship.

which was a turning point in the country's economic history that allowed for a more open, internationally integrated and competitive economy, but years surrounding this date are also taken into account since the effects may not have occurred specifically in 1986.

Table IV.7: Portuguese model for structural break study.

Dependent Variable	Independent variables		
	Constant	LExports	LImports
LGDP	6.781437* (0.158331) [42.83078]	0.259178* (0.090324) [2.869414]	0.237112* (0.086243) [2.749346]

Note: Standard errors are represented in () and t-statistics in [], * denotes significance at 5% level.

The Chow Test rejects the null hypothesis, thus accepting the existence of a break in 1986, therefore we include a binary dummy variable that takes the value 0 from 1970 to 1986 and the value 1 from 1987 to 2010, Table IV.8 represents this model.

Table IV.8: Portuguese model including the dummy variable in 1986.

Dependent Variable	Independent Variables				
	Constant	LExports	LImports	LExports*Dummy	LImports*Dummy
LGDP	6.504334* (0.519241) [12.52661]	0.221487* (0.103703) [2.135778]	0.302685* (0.123094) [2.458973]	0.248295 (0.309828) [0.801397]	-0.246536 (0.307951) [-0.800569]

Note: Standard errors are represented in () and t-statistics in [], * denotes significance at 5% level.

Despite the Chow test accepts the hypothesis of a break, the dummy variable introduced is insignificant. This might indicate that the problems faced by the Portuguese economy in the last decade²⁶ may have overpowered the effects that the adhesion to the EEC had on the country's economy.

In light of these results the years 1985 and 1990 were studied to see if the break could have occurred before or after 1986, even though the Chow test recognizes a structural break on both dates the dummy variables are insignificant²⁷.

As for the Netherlands, Table IV.9 displays the model for structural breaks study. The model shows that the independent variables are significant and can influence the dependent variable.

The year selected as breakpoint was 1993, because this was the year of last GATT round that led to a major reduction on tariffs, especially on the textile and agricultural sectors, and promoted trade openness between countries, especially between developed and developing economies. Moreover, it was in the beginning of 90's that re-exports boomed and became one of the main sources of Dutch exports. Once again, years surrounding 1993 were considered to account for possible effects that may have occurred after that date.

²⁶ The problems referred are the already mentioned loss of productivity, the difficult adjustment to the euro that led to loss of international competitiveness, the low quality and quantity of production factors and the inadequate economic policies (Pereira & Lains, 2010; Banco de Portugal, 2009).

²⁷ As shown in Appendix, by Figure VII.7 for 1985 and Figure VII.8 for 1990.

Table IV.9: Dutch model for structural break study.

Dependent Variable	Independent variables		
	Constant	LExports	LImports
LGDP	7.174681* (0.090032) [79.68998]	0.726432* (0.105097) [6.912016]	-0.255331* (0.110803) [-2.304372]

Note: Standard errors are represented in () and t-statistics in [], * denotes significance at 5% level.

The Chow test also rejects the null hypothesis thus accepting the existence of a break in 1993. So we introduce a binary dummy variable that takes the value 0 from 1970 to 1993 and the value 1 from 1994 to 2010.

Table IV.10 presents the model with the dummy variable, where is clear that the variable is statistically insignificant. The years 1995 and 1997 were selected in order to assess if the break occurred after 1993. In 1995 the results are identical to the ones in 1993²⁸; however in 1997 the results differ, as shown by Table IV.11.

Table IV.10: Dutch model including the dummy variable in 1993.

Dependent Variable	Independent Variables				
	Constant	LExports	LImports	LExports*Dummy	LImports*Dummy
LGDP	6.906190* (0.197470) [34.97340]	0.709983* (0.118737) [5.979484]	-0.215292 (0.130677) [-1.647514]	-0.200947 (0.405885) [-0.495083]	0.200411 (0.410203) [0.488565]

Note: Standard errors are represented in () and t-statistics in [], * denotes significance at 5% level.

²⁸ As shown in Appendix, by Figure VII.11.

Table IV.11 displays the model including the dummy variable for 1997, all variables, except imports, are statistically significant and influence the dependent variable. There are two main results relevant to discuss, first the imports variable influenced by the dummy variable has a positive sign and second the exports variable influenced by the dummy variable has a negative sign.

Regarding the first result, the measures adopted in the last GATT round led to an increased trade flow between the Dutch economy and the new emergent economies, actually, as mentioned on previous chapters, emergent economies have come to have a larger importance in Dutch imports since they use the Netherlands as an entryway to Europe. The second result, however, does not have the expected sign, once one would expect a positive sign due to the impact that exports have on Dutch's GDP, nonetheless this negative sign can indicate that trade with the new emergent economies is more import-oriented than export-oriented, which might be true because the Dutch economy re-exports goods coming from developing economies to the developed economies and not the opposite.

Table IV.11: Dutch model including the dummy variable in 1997.

Dependent Variable	Independent Variables				
	Constant	LExports	LImports	LExports*Dummy	LImports*Dummy
LGDP	6.584817* (0.184497) [35.69069]	0.502003* (0.112321) [4.469347]	0.021465 (0.125740) [0.170712]	-1.708205* (0.516562) [-3.306877]	1.719009* (0.520934) [3.299856]

Note: Standard errors are represented in () and t-statistics in [], * denotes significance at 5% level.

In summary, there is cointegration among the variables for Portugal and the Netherlands in the period between 1970 and 2010. Exports of goods and services and imports of goods and services play a positive significant role on Portuguese GDP growth across the period analyzed, due to imports of technological advanced goods, that led to an increased productivity and a greater economic integration, allowing

access to big and broader markets, as well as to more competitive exports, that helped achieve higher economies of scale.

The liberalized trade policy and the increased importance of re-exports across time explain the reason why exports of goods and services have a positive influence over Dutch GDP growth. Imports of goods and services, however, appear to hamper growth, due to the large portion of imports that are destined to other European countries, the high level of income registered on previous expansions, and the type of goods/services imported.

There is also existence of structural breaks in both economies, but while in the Portuguese economy the dummy variable introduced is statistically insignificant, on the Dutch economy the variable introduced is significant, which indicates that measures undertaken on the last GATT round led to a trade increase between the Netherlands and the developing economies.

V- Conclusion

The main purpose of this study was to explain the effects that international trade has on economic growth, while studying for such effects in Portugal and the Netherlands in the period 1970-2010.

The relation between international trade and economic growth has been subject to a lot of scrutiny by the literature. Exports have an important role in this relation by allowing countries to incorporate technological advancements and to get access to big and broader markets, that in turn will lead to a better allocation of resources plus higher productivity gains, which will boost growth, in addition exports allow a higher accumulation of foreign exchange reserves that can be used to import high quality inputs. Imports also have an important role since is through them that technological advancements are embodied in the production of domestic goods, leading to new products and production standards, that will improve productivity and competitiveness.

Portugal and the Netherlands are both small open economies and international trade was one of the main drivers of the growth experienced by them. For Portugal the adhesion to the EEC allowed a boost in performance and in growth, plus its exports of goods saw a significant change in its productive structure and a change in their destinations, however in the last decade the Portuguese economy stagnated because of the loss of productivity, competitiveness and the difficult adjustment to the Economic and Monetary Union. As for the Netherlands structural reforms implemented and the re-exports phenomenon in these last decades brought on strong economic growth rates that, with some punctual exceptions, lasted until the recent economic crisis.

The empirical analysis performed showed a curious conclusion, for Portugal both exports and imports have a positive influence over GDP, whereas in the Dutch economy only exports promote economic growth. This may be due to the fact that in this period Portugal started to trade with more developed and industrialized countries and imported goods that embodied greater technological advancements that raised productivity and led to higher economies of scale and higher economic growth. In the Netherlands case, imports do not have a positive effect on growth since the high level of income registered might have shifted the demand towards foreign goods and the large portion of goods imported that are intended to other European countries may not

enable the domestic economy to take advantage of its benefits, nonetheless imports still enter as balance deficit. Moreover the Dutch economy registers an external surplus which could indicate that the goods/services imported may not be the pivotal ones to promote growth.

At last, there is evidence of structural breaks in both countries between 1970 and 2010. For the Portuguese economy the variable introduced to study for the effects of the break is statistically insignificant, while for the Dutch economy the variable introduced is statistically significant, meaning that there was an increase on trade between the Netherlands and the developing economies after the last GATT round.

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VII-Appendix:

VII.1) Unit root tests for the 1st differences:

Table VII.1- Unit root tests for the 1st differences for Portugal:

Variables	ADF				Phillips-Perron			
	Constant		Constant and Trend		Constant		Constant and Trend	
	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%
LGDP	-3.757874	-2.945842	-4.580126	-3.540328	-3.784819	-2.938987	-4.081092	-3.529758
LExports	-5.253070	-2.941145	-5.196370	-3.533083	-4.042584	-2.938987	-3.933921	-3.529758
LImports	-4.804324	-2.938987	-4.730407	-3.529758	-4.745030	-2.938987	-4.666384	-3.529758

Table VII.2- Unit root tests for the 1st differences for the Netherlands:

Variables	ADF				Phillips-Perron			
	Constant		Constant and Trend		Constant		Constant and Trend	
	Test Statistic	Critical value a 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%	Test Statistic	Critical value at 5%
LGDP	-3.752286	-2.941145	-3.799196	-3.533083	-4.480027	-2.938987	-4.541867	-3.529758
LExports	-5.686941	-2.938987	-5.574307	-3.529758	-5.660230	-2.938987	-5.533134	-3.529758
LImports	-5.145458	-2.938987	-5.117677	-3.529758	-5.112436	-2.938987	-5.051110	-3.529758

VII.2) Cointegration tests results:

Figure VII.1- Results for Portugal.

Sample: 1970 2010

Included observations: 38

Series: LGDP LEXPORTS LIMPORTS

Lags interval: 1 to 2

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	1	3	3	1	1
Max-Eig	0	1	1	1	1

*Critical values based on MacKinnon-Haug-Michelis (1999)

Information Criteria by Rank and Model

Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood by Rank (rows) and Model (columns)					
0	204.2925	204.2925	210.2309	210.2309	213.5580
1	213.1404	218.4955	223.1527	224.9790	228.1471
2	218.3716	226.2797	228.5326	231.8266	233.5575
3	218.6956	231.5081	231.5081	235.3776	235.3776
Akaike Information Criteria by Rank (rows) and Model (columns)					
0	-9.804867	-9.804867	-9.959521	-9.959521	-9.976736
1	-9.954759	-10.18397	-10.32382	-10.36732	-10.42879*
2	-9.914295	-10.22525	-10.29119	-10.35930	-10.39776
3	-9.615556	-10.13200	-10.13200	-10.17777	-10.17777
Schwarz Criteria by Rank (rows) and Model (columns)					
0	-9.029168	-9.029168	-9.054539	-9.054539	-8.942471
1	-8.920494	-9.106614	-9.160277	-9.160674*	-9.135961
2	-8.621464	-8.846227	-8.869073	-8.850992	-8.846366
3	-8.064158	-8.451322	-8.451322	-8.367805	-8.367805

Figure VII.2- Results for the Netherlands.

Sample: 1970 2010
 Included observations: 38
 Series: LGDP LEXPORTS LIMPORTS
 Lags interval: 1 to 2

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	3	3	2	1	1
Max-Eig	0	1	2	1	1

*Critical values based on MacKinnon-Haug-Michelis (1999)

Information Criteria by Rank and Model

Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood by Rank (rows) and Model (columns)					
0	295.3940	295.3940	301.7132	301.7132	307.3121
1	303.2640	309.3423	315.4955	315.4956	320.3170
2	309.3755	317.2098	322.9107	324.7283	324.9113
3	312.0197	323.3106	323.3106	326.6140	326.6140
Akaike Information Criteria by Rank (rows) and Model (columns)					
0	-14.59968	-14.59968	-14.77438	-14.77438	-14.91116
1	-14.69811	-14.96538	-15.18397	-15.13135	-15.27984*
2	-14.70397	-15.01104	-15.25846	-15.24886	-15.20586
3	-14.52735	-14.96372	-14.96372	-14.97969	-14.97969
Schwarz Criteria by Rank (rows) and Model (columns)					
0	-13.82399	-13.82399	-13.86940	-13.86940	-13.87690
1	-13.66384	-13.88803	-14.02042*	-13.92471	-13.98701
2	-13.41114	-13.63202	-13.83634	-13.74056	-13.65446
3	-12.97596	-13.28304	-13.28304	-13.16972	-13.16972

VII.3) VECM Outputs:

Figure VII.3: VECM output for Portugal.

LGDP(-1)	1.000000		
LEXPORTS(-1)	-0.471515 (0.16147) [-2.92006]		
LIMPORTS(-1)	-0.312506 (0.13374) [-2.33659]		
@TREND(70)	0.020026 (0.00815) [2.45593]		
C	-4.250871		
<hr/>			
Error Correction:	D(LGDP)	D(LEXPORTS)	D(LIMPORTS)
<hr/>			
CointEq1	-0.046802 (0.06457) [-0.72487]	0.584024 (0.14166) [4.12280]	0.159351 (0.17203) [0.92627]
D(LGDP(-1))	0.629994 (0.25115) [2.50844]	0.574449 (0.55102) [1.04251]	1.928935 (0.66919) [2.88250]
D(LGDP(-2))	-0.410315 (0.25729) [-1.59473]	-0.579834 (0.56451) [-1.02715]	-2.217362 (0.68556) [-3.23439]
D(LEXPORTS(-1))	0.115568 (0.07041) [1.64129]	0.509299 (0.15449) [3.29673]	0.194395 (0.18761) [1.03614]
D(LEXPORTS(-2))	-0.124590 (0.07262) [-1.71560]	-0.394295 (0.15933) [-2.47466]	-0.030418 (0.19350) [-0.15720]
D(LIMPORTS(-1))	-0.108443 (0.08569) [-1.26556]	-0.191858 (0.18800) [-1.02052]	-0.196174 (0.22831) [-0.85923]
D(LIMPORTS(-2))	0.137610 (0.08607) [1.59887]	0.495936 (0.18883) [2.62634]	0.508728 (0.22932) [2.21838]
C	0.019922 (0.00759) [2.62468]	0.024913 (0.01665) [1.49599]	0.035065 (0.02022) [1.73380]

Figure VII.4: VECM output for the Netherlands.

LGDP(-1)	1.000000		
LEXPORTS(-1)	-1.142677 (0.13332) [-8.57079]		
LIMPORTS(-1)	0.716452 (0.14047) [5.10036]		
C	-7.675594		
<hr/>			
Error Correction:	D(LGDP)	D(LEXPORTS)	D(LIMPORTS)
<hr/>			
CointEq1	-0.346062 (0.14464) [-2.39253]	-0.111150 (0.40431) [-0.27491]	-0.511027 (0.39569) [-1.29148]
D(LGDP(-1))	-0.375639 (0.30577) [-1.22851]	-0.797923 (0.85469) [-0.93359]	-1.353407 (0.83647) [-1.61800]
D(LGDP(-2))	-0.061392 (0.27718) [-0.22149]	-0.302088 (0.77478) [-0.38990]	0.270847 (0.75826) [0.35719]
D(LEXPORTS(-1))	-0.225360 (0.16716) [-1.34813]	-0.227692 (0.46726) [-0.48729]	-0.590516 (0.45730) [-1.29131]
D(LEXPORTS(-2))	-0.089593 (0.18058) [-0.49613]	-0.134516 (0.50477) [-0.26649]	-0.514938 (0.49402) [-1.04235]
D(LIMPORTS(-1))	0.492143 (0.17668) [2.78550]	0.547267 (0.49386) [1.10814]	1.087095 (0.48334) [2.24915]
D(LIMPORTS(-2))	0.181627 (0.21644) [0.83916]	0.241942 (0.60499) [0.39991]	0.481652 (0.59210) [0.81347]
C	0.019450 (0.00613) [3.17238]	0.057448 (0.01714) [3.35222]	0.055389 (0.01677) [3.30247]
<hr/>			

VII.4) Structural breaks outputs:

Figure VII.5: Structural break model output for Portugal.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 07/26/12 Time: 16:46
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.781437	0.158331	42.83078	0.0000
LEXPORTS	0.259178	0.090324	2.869414	0.0067
LIMPORTS	0.237112	0.086243	2.749346	0.0091

R-squared	0.966033	Mean dependent var	11.91578
Adjusted R-squared	0.964245	S.D. dependent var	0.352633
S.E. of regression	0.066679	Akaike info criterion	-2.507501
Sum squared resid	0.168951	Schwarz criterion	-2.382117
Log likelihood	54.40377	Hannan-Quinn criter.	-2.461843
F-statistic	540.3690	Durbin-Watson stat	0.154254
Prob(F-statistic)	0.000000		

Figure VII.6: Structural break model output with dummy variable in 1986 for Portugal.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 07/26/12 Time: 16:53
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.504334	0.519241	12.52661	0.0000
LEXPORTS	0.221487	0.103703	2.135778	0.0396
LIMPORTS	0.302685	0.123094	2.458973	0.0189
LEXPORTS*DUMMY	0.248295	0.309828	0.801397	0.4282
LIMPORTS*DUMMY	-0.246536	0.307951	-0.800569	0.4286

R-squared	0.966630	Mean dependent var	11.91578
Adjusted R-squared	0.962923	S.D. dependent var	0.352633
S.E. of regression	0.067901	Akaike info criterion	-2.427679
Sum squared resid	0.165980	Schwarz criterion	-2.218707
Log likelihood	54.76742	Hannan-Quinn criter.	-2.351583
F-statistic	260.7065	Durbin-Watson stat	0.170545
Prob(F-statistic)	0.000000		

Figure VII.7: Structural break model output with dummy variable in 1985 for Portugal.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 09/07/12 Time: 12:20
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.538659	0.522241	12.52039	0.0000
LEXPORTS	0.205177	0.110450	1.857641	0.0714
LIMPORTS	0.314973	0.126333	2.493184	0.0174
LEXPORTS*DUMMY	0.239966	0.279100	0.859784	0.3956
LIMPORTS*DUMMY	-0.237842	0.278204	-0.854922	0.3982
R-squared	0.966787	Mean dependent var		11.91578
Adjusted R-squared	0.963097	S.D. dependent var		0.352633
S.E. of regression	0.067741	Akaike info criterion		-2.432398
Sum squared resid	0.165199	Schwarz criterion		-2.223426
Log likelihood	54.86416	Hannan-Quinn criter.		-2.356302
F-statistic	261.9822	Durbin-Watson stat		0.176195
Prob(F-statistic)	0.000000			

Figure VII.8: Structural break model output with dummy variable in 1989 for Portugal.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 09/07/12 Time: 12:26
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.404915	0.439018	14.58920	0.0000
LEXPORTS	0.221149	0.102365	2.160396	0.0375
LIMPORTS	0.313342	0.121114	2.587163	0.0139
LEXPORTS*DUMMY	0.187682	0.364255	0.515249	0.6095
LIMPORTS*DUMMY	-0.188798	0.358597	-0.526491	0.6018
R-squared	0.966823	Mean dependent var		11.91578
Adjusted R-squared	0.963137	S.D. dependent var		0.352633
S.E. of regression	0.067705	Akaike info criterion		-2.433478
Sum squared resid	0.165020	Schwarz criterion		-2.224506
Log likelihood	54.88630	Hannan-Quinn criter.		-2.357382
F-statistic	262.2751	Durbin-Watson stat		0.164931
Prob(F-statistic)	0.000000			

Figure VII.9: Structural break model output for the Netherlands.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 07/26/12 Time: 16:56
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.174681	0.090032	79.68998	0.0000
LEXPORTS	0.726432	0.105097	6.912016	0.0000
LIMPORTS	-0.255331	0.110803	-2.304372	0.0268
R-squared	0.995141	Mean dependent var	12.88165	
Adjusted R-squared	0.994885	S.D. dependent var	0.302841	
S.E. of regression	0.021658	Akaike info criterion	-4.756483	
Sum squared resid	0.017825	Schwarz criterion	-4.631100	
Log likelihood	100.5079	Hannan-Quinn criter.	-4.710825	
F-statistic	3891.247	Durbin-Watson stat	0.532938	
Prob(F-statistic)	0.000000			

Figure VII.10: Structural break model output with dummy variable in 1993 for the Netherlands.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 07/26/12 Time: 16:57
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.906190	0.197470	34.97340	0.0000
LEXPORTS	0.709983	0.118737	5.979484	0.0000
LIMPORTS	-0.215292	0.130677	-1.647514	0.1082
LEXPORTS*DUMMY	-0.200947	0.405885	-0.495083	0.6235
LIMPORTS*DUMMY	0.200411	0.410203	0.488565	0.6281
R-squared	0.995724	Mean dependent var	12.88165	
Adjusted R-squared	0.995249	S.D. dependent var	0.302841	
S.E. of regression	0.020875	Akaike info criterion	-4.786711	
Sum squared resid	0.015687	Schwarz criterion	-4.577739	
Log likelihood	103.1276	Hannan-Quinn criter.	-4.710615	
F-statistic	2095.705	Durbin-Watson stat	0.619135	
Prob(F-statistic)	0.000000			

Figure VII.11: Structural break model output with dummy variable in 1995 for the Netherlands.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 09/07/12 Time: 15:06
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.831719	0.201656	33.87802	0.0000
LEXPORTS	0.636398	0.118989	5.348383	0.0000
LIMPORTS	-0.134948	0.132682	-1.017076	0.3159
LEXPORTS*DUMMY	-0.753150	0.494865	-1.521931	0.1368
LIMPORTS*DUMMY	0.757243	0.499488	1.516037	0.1382
R-squared	0.995922	Mean dependent var		12.88165
Adjusted R-squared	0.995469	S.D. dependent var		0.302841
S.E. of regression	0.020385	Akaike info criterion		-4.834187
Sum squared resid	0.014960	Schwarz criterion		-4.625215
Log likelihood	104.1008	Hannan-Quinn criter.		-4.758091
F-statistic	2198.038	Durbin-Watson stat		0.784256
Prob(F-statistic)	0.000000			

Figure VII.12: Structural break model output with dummy variable in 1997 for the Netherlands.

Dependent Variable: LGDP
 Method: Least Squares
 Date: 09/09/12 Time: 14:31
 Sample: 1970 2010
 Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.584817	0.184497	35.69069	0.0000
LEXPORTS	0.502003	0.112321	4.469347	0.0001
LIMPORTS	0.021465	0.125740	0.170712	0.8654
LEXPORTS*DUMMY	-1.708205	0.516562	-3.306877	0.0021
LIMPORTS*DUMMY	1.719009	0.520934	3.299856	0.0022
R-squared	0.996849	Mean dependent var		12.88165
Adjusted R-squared	0.996498	S.D. dependent var		0.302841
S.E. of regression	0.017920	Akaike info criterion		-5.091904
Sum squared resid	0.011561	Schwarz criterion		-4.882932
Log likelihood	109.3840	Hannan-Quinn criter.		-5.015808
F-statistic	2846.846	Durbin-Watson stat		0.847885
Prob(F-statistic)	0.000000			