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# REVISITED EXPORT-LED GROWTH HYPOTHESIS FOR SELECTED EUROPEAN COUNTRIES: A PANEL HIDDEN COINTEGRATION APPROACH

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**Abstract**

This paper examines the export-led growth hypothesis in a panel of selected European countries from 1970 to 2011. For this purpose, a panel hidden cointegration test is used. Initially, cumulative negative and positive changes are constructed for each panel variable. Then the potential panel cointegration is examined. Our empirical results support that there is hidden cointegration in panel, thus we assert that there exists a long-term relationship between economic growth and exports.

***Keywords:*** Exports, Economic Growth, Panel Data, Hidden Cointegration.
***Jel Classification:*** C33, F14.

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## 1. INTRODUCTION

In the Export-Led Growth hypothesis, it has been suggested that the increase in exports is the main determinant of growth. One of the bases for this hypothesis is the approach of Keynesian theory that is associated with the mediation of a foreign trade multiplier. In an open economy with idle capacity and unemployment, just as with consumption, investment, and government spending, the export variable leads to an increase in the output as much as the multiplier. Provision of intermediate goods required for the investments and production necessitated by the growth in developing countries depends on the export capacities of these countries. Failure to export these goods, which are complementary in production due to the shortage of foreign exchange, can lead to stagnation in growth. Exports facilitate generation of foreign exchange income required for the import of capital goods and that, hence, lead to growth. Export increases will bring specialization in production of export products, and this will lead to redistribution of resources from noncommercial sectors that are not very efficient in terms of economic growth toward export sectors that use resources more efficiently (Bilgin and Sahbaz, 2009: 179-180).

Especially in economies with surplus labor, exports lead to an increase in employment and real wages. Exports contribute to the abolition of restrictions on foreign exchange usually exercised by countries implementing an import-substitution industrialization policy (Ozer and Erdogan, 2006: 96).

The increase in foreign trade caused by the increase in exports not only facilitates access to new technologies but also leads to development of new domestic technology. These technological advances have a positive effect on economic growth. With the rise in exports, economies with limited domestic demand increase their production in proportion to the level of international demand. With the increase in foreign demand for domestic goods, a need to make new investments emerges and this increases domestic investments (Yardimcioglu and Gulmez, 2013: 145-146).

Export increases competitiveness. The increased competition in entering international markets contributes to the spread of technical knowledge and the formation of an effective

price mechanism. Export reveals a variety of new opportunities within and outside of the country. It reduces labor costs. Economies with a narrow domestic market gain the opportunity to entertain economies of scale in production through exports. The increase in exports expands the import capacity, which plays an important role in increasing domestic production through various inputs and capital goods not available in these countries and, hence, it drives economic growth (Aktas, 2009: 35-36).

After World War II, many ideas have been put forward to increase the growth of countries. However, in the post-war period, positive opinions with regard to the existence of a strong and positive link between export and growth started to propagate. The fixed exchange rate scheme had been abandoned since the 1970s, and pro-export policies began to be defended. In the 1980s, the view of opening up to international markets and increasing exports had become prominent while the costs of inward-looking growth policies and the policies protecting infant industries had been criticized (Filiztekin, Yilmaz, and Izmen, 2005: 13-19).

According to Awokuse, exportation is the engine of growth. The increase in exports as a component of the total demand directly serves as a catalyst for production increase. An increase in the demand for goods exported overseas causes an increase in the amount of overall output. This, in turn, causes an increase of income and employment in the export goods sector. Again, the increase in exports positively affects economic growth because it ensures efficient allocation of resources, results in higher capacity utilization rates, leads to economies of scale, and promotes the firms to develop technologies to cope with competition in foreign markets. Exports also provide the foreign exchange input necessary for the capital and the import of intermediate goods and, thus, they increase domestic capital formation and consequently the amount of output (Awokuse, 2006: 593-594).

According to Panas and Vamvoukas, the expansion of exports also increases factor efficiency. Foreign trade increases not only efficiency but also the rate of growth through its effect on technology. Exports contribute to the dissemination of technical information between countries. Foreign exchange input to countries is ensured by promotion of exports. This, in turn, assists countries in increasing the import of goods and services. Exports create

positive economies of scale with the opening to the world economy of domestic markets in developing countries. Exports increase the competitiveness of countries and positively affect the growth rates (Panas and Vamvoukas, 2002: 731).

According to Ram, the effects of exports on economic growth are even more extensive. Ram (1985) examined the relationship between exports and economic growth using the data of 73 countries between 1960 and 1977. Opening up to international markets also provides development in the administrative sense (Ram, 2003: 5-7).

From the mid-1960s, a growing number of countries adopted an export-oriented industrialization. Such a strategy within the framework of the traditional theory of free trade production in the comparatively superior country's sectors is intended to increase exports by a variety of supports and, thus, to achieve industrialization of the country. These practices have also been followed in Turkey since the 1980s (Gundal, Azgun, 2011: 4).

Finally, opening to the international markets and achieving the increase in exports increases competition in the market. It requires domestic producers to be open to technological advances. The mode of production in the country is determined in accordance with the level of international demand. The increase in foreign trade makes it easy to access new technologies. Again, it leads to development of new technologies within the country. This, in turn, increases economic growth. The increase in demand for domestic goods abroad stimulates new investments and leads to increases in rates of investment. Foreign exchange inputs provided by export revenues play an important role in ensuring the balance of payments. Further inflow of foreign exchange to the country also increases the imports of goods and services (Simsek, 2003: 43-44).

In this study, the relationship between exports and economic growth in selected European countries investigated. These countries are; Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. These countries have participated to the union, which was founded as the name of “European Economic Community” in 1957 and then changed to “European Union” in 1992.

These countries' exports have increased after the participation to union. The increase in exports have raised production, division of labor, productivity, national income and competition. The increase in exports have reduced costs (Gul ve Kamacı, 2012: 82).

On the other hand domestic production in these countries are not dependent on. The industrial sector produces with a small ratio of imported inputs. For this reason, dependency ratio of exports to imports is lower in these countries.

Rates of exports in gross domestic product are given in the Appendix, for the countries examined in this study. European countries' exports were affected adversely by the crisis, such as shown in the Appendix. The 1973 oil crisis started when the members of Organization of Arab Petroleum Exporting Countries or the OAPEC proclaimed an oil embargo. OPEC member countries decide to raise world oil prices for increasing sources that enter their countries. On the other hand the 1990 oil price spike occurred in response to the Iraqi invasion of Kuwait in 1990. The rise in prices had been a significant factor in the recession of the early 1990s. 1973 oil crisis and 1990 oil price shock influenced the exports also negatively. The effects of the 1973 crisis appeared especially in 1975. Finally, the financial crisis of 2007-2008, also known as the Global Financial Crisis affected the exports of European countries negatively, too.

The paper is organized as follows: In the following section, a literature review is presented. In section three, the econometric methodology is explained. Section four presents the data and the empirical findings, and in the last section, the conclusion is presented.

## 2. THE LITERATURE

Ismail and Harjito (2003) investigated the causality between exports and economic growth in the ASEAN countries over the period 1966–2000. They used the Johansen cointegration procedure test and the Granger causality test. Their study concluded that there was cointegration between export and economic growth in Indonesia and Singapore while the Granger causality test showed that there was feedback or bidirectional causality between exports and economic growth only in Indonesia and the Philippines.

Keong et al. (2005) tested the validity of the export-led growth hypothesis in the Malaysian economy over the period 1960–2001. They detected a cointegrated relationship between exports and economic growth in both the long and the short run. Also they found that exports Granger-cause economic growth in the period of study.

Kónya (2006) investigated the Granger causality between the exports and GDP in 24 OECD countries from 1960 to 1997. He used a new panel data approach based on SUR systems and Wald tests with country-specific bootstrap critical values. The results of his empirical analyses indicate one-way causality from exports to GDP in Belgium, Denmark, Iceland, Ireland, Italy, New Zealand, Spain, and Sweden; one-way causality from GDP to exports in Austria, France, Greece, Japan, Mexico, Norway, and Portugal; two-way causality between exports and growth in Canada, Finland, and the Netherlands; and no evidence of causality in either direction in Australia, Korea, Luxembourg, Switzerland, the UK, and the USA.

Furuoka (2007) tested the validity of the export-led growth hypothesis in three BIMPEAGA countries: the Philippines, Indonesia, and Malaysia. He used times series analyses and panel data analyses. The results of his empirical analyses indicate that there has been no significant relationship between the size of national income and the amount of exportation.

Purna and Sahoo (2007) attempted to examine the export-led manufacturing and the export-led growth hypothesis for four south Asian countries—India, Pakistan, Bangladesh, and Sri Lanka-using Pedroni's panel cointegration technique for the period 1980–2002. The study found an equilibrium relationship between GDP (and non-export GDP) and exports in the long run, along with other variables supporting the export-led growth hypothesis.

Dash (2009) investigated the causal relationship between export growth and economic growth in India for the post-liberalization period (1992[Q1]–2007[Q4]). The results of this study indicate that there exists a long-term relationship between output and exports, and there is a unidirectional causal relationship running from exports to output growth.

Ray (2011) examined the relationship between export and economic growth in India using annual data over the period 1972-1973 to 2010-2011. He used the Granger causality and the Johansen cointegration test. He found that there was a long-run equilibrium relationship between the two variables. He also confirmed the presence of bidirectional causality that ran from economic growth to export and vice versa.

Mohsen and Firouzjaee (2011) investigated the Granger causality relationship between non-oil export and economic growth for 73 developing countries during the period 1970–2007. They used the panel cointegration analysis for that purpose. They found that there is bidirectional long-run causality between export and GDP growth.

Waithe et al. (2011) tested the export-led growth hypothesis for Mexico over the period 1960–2003. The evidence from their study offers support for the hypothesis in the short run, but the long-run results suggest an inverse relationship between exports and GDP.

Seabra and Galimberti (2012) studied the export-led growth hypothesis using the data of 72 countries for the period 1974–2003. For this purpose, they used a panel threshold regression. The results obtained from the empirical findings of this study give support to the export-led growth hypothesis.

Faridi (2012) investigated the contribution of exports to economic growth in Pakistan for the period 1972–2008. He employed the Johansen co-integration technique. The findings of his study show that the agricultural exports have a negative and significant effect on the economic growth. Also he found that there was bidirectional causality between agricultural exports and real GDP.

Chang et al. (2013) examined the causal relationship between exports and growth in nine provinces of South Africa for the period 1995–2011. They used the panel causality analysis that accounts for cross-section dependency and heterogeneity across regions. They found no causality in any direction between economic growth and exports for the majority of the provinces.

## 3. ECONOMETRIC METHODOLOGY

In this study, we tested the validity of export-led growth hypothesis. For empirical analyses, we used the panel hidden cointegration test introduced by Hatemi-J(2011). The hidden cointegration concept was initially developed by Granger and Yoon for time series analysis. Hatemi-J adopted Granger and Yoon(2002)'s hidden cointegration test for panel data. This test determines whether the cointegration is hidden in panel or not and, thus, separates the impact of negative and positive shocks in the variables.

He considered the following variables to be integrated the first degree:

$$y_{i,t} = y_{i,t-1} + e_{i1,t} = y_{i,0} + \sum_{j=1}^{t} e_{i1,j}$$

$$x_{i,t} = x_{i,t-1} + e_{i2,t} = x_{i,0} + \sum_{j=1}^{t} e_{i2,j}$$

These variables are denoted by recursive approach. $i = 1,2,...,m$ and denote the number of cross-section units. e is the error term that is assumed to be a white noise process. The positive shocks for each panel variable are defined as follows:

$$e_{i1,t}^{+} = Max\left(e_{i1,t},0\right) \quad , \quad e_{i2,t}^{+} = Max\left(e_{i2,t},0\right).$$

The negative shocks of each panel variable are:

$$e_{i1,t}^{-} = Min\left(e_{i1,t},0\right), \qquad e_{i2,t}^{-} = Min\left(e_{i2,t},0\right).$$

The two potential panel cointegration between *y* and $x$ can be defined as:

$$y_{i,t}^{+} = \alpha_i^{+} + \beta_i^{+} x_{i,t}^{+} + e_{i,t}^{+} \qquad (1)$$

$$y_{i,t}^{-} = \alpha_i^{-} + \beta_i^{-} x_{i,t}^{-} + e_{i,t}^{-} \qquad (2)$$

In (1) and (2) $y_{i,t}^{+} = y_{i,0} + \sum_{j=1}^{t} e_{i1,j}^{+}$, $x_{i,t}^{+} = x_{i,0} + \sum_{j=1}^{t} e_{i2,j}^{+}$, $y_{i,t}^{-} = y_{i,0} + \sum_{j=1}^{t} e_{i1,j}^{-}$ and $x_{i,t}^{-} = x_{i,0} + \sum_{j=1}^{t} e_{i2,j}^{-}$. If $e_{i,t}^{+}$ in (1) is stationary, then the positive cumulative shocks are cointegrated in the panel. Also, if $e_{i,t}^{-}$ in (2) is stationary, then the negative cumulative shocks are cointegrated in the panel.

To test whether $e_{i,t}^{+}$ as well as $e_{i,t}^{-}$ are stationary or not, Hatemi-J (2011) suggested the augmented Dickey-Fuller (ADF) test for its simplicity. Also, he suggested that the other test available in the literature can be used for this purpose. He considered the following ADF test equation for testing cointegration in (1):

$$e_{i,t}^{+} = \rho^{+} e_{i,t-1}^{+} + \sum_{l=1}^{k} \gamma_i^{l} \Delta e_{i1,t-1}^{+} + v_{i,t}^{+} \qquad (3)$$

where $l$ denotes the optimal lag order which is determined by minimizing an information criterion. The null hypothesis of no cointegration between the positive components is as follows:

$$H_0 : \rho^{+} = 1.$$

To test the null hypothesis, he suggested the following test statistic based on the results provided by Kao (1999).

$$ADF = \frac{t_{\rho^{+}} + \sqrt{6m} \times \frac{\sigma_v}{2\sigma_{0v}}}{\sqrt{\frac{\sigma_{0v}^2}{2\sigma_v^2} + \frac{3\sigma_v^2}{10\sigma_{0v}^2}}} \qquad (4)$$

where $t_{\rho^+}$ is the $t$-statistic for the parameter $\rho^+$ in (3). The variance is $\sigma_v^2 = \sigma_{e_1^+}^2 - \frac{\sigma_{e_1^+,e_2^+}^2}{\sigma_{e_2^+}^2}$ and the long-run variance is $\sigma_{0v}^2 = \sigma_{0e_1^+}^2 - \frac{\sigma_{0e_1^+,e_2^+}^2}{\sigma_{0e_2^+}^2}$. Let $w_{it} = \begin{bmatrix} e_{i1,t}^+ \\ e_{i2,t} \end{bmatrix}$. The estimation of the variance-covariance for $w_{it}$ and the long-run variance-covariance matrix is given by Hatemi-J (2011). The cointegration between negative components is determined by a similar process.

## 4. DATA

To investigate the validity of the export-led growth hypothesis, we used the exports of goods and services with constant 2,000 US$ (EX hereafter) and GDP per capita data with constant 2,000 US$ (PGDP hereafter). The data used in the paper are sourced from the World Development Indicators (WDI) provided by the World Bank (WB). All variables are employed with their natural logarithms. We consider 15 selected European countries namely, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom for the period 1970-2011 with annual data. These countries have been selected according to the availability of data.

## 5. EMPIRICAL FINDINGS

We investigated the export-led growth hypothesis using the panel hidden cointegration approach. According to this test, initially the positive cumulative shocks and the negative cumulative shocks are determined for each variable. Then the potential panel cointegration is tested. The variables should be non-stationary for the cointegration relationship. Then the cointegration relationship between these non-stationary variables is investigated**.** Hatemi-J (2011) used the lm Pesaran and Shin (2003 panel unit root test in order to investigate unit root hypothesis. It was indicated that other unit root tests could also be used. He also used Kao (1999) cointegration test in order to investigate the cointegration relationship. We used the same tests in parallel with the study of Hatemi-J (2011). Unit root test results of the positive cumulative shocks and the negative cumulative shocks of the variables are given in Table 1.

**Table 1 :** The Results of Im, Pesaran, and Shin Panel Unit Root Tests

| *Variables* | $H_0 : I(1)$<br>$H_1 : I(0)$ | $H_0 : I(2)$<br>$H_1 : I(1)$ |
|---|---|---|
| $EX^+$ | 0.324 | 0.000 |
| $GDP^+$ | 0.226 | 0.000 |
| $EX^-$ | 0.847 | 0.000 |
| $GDP^-$ | 0.264 | 0.000 |

Note: The values in table are $p-$ values

As can be seen in Table 1, these positive and negative components of EX and GDP are non-stationary. Thus, the next natural step is to test for cointegration in order to avoid spurious results. GDP is described as a function of export, which is presented in the following model.

$$GDP_{it} = \beta_0 + \beta_1 EX_{it} + \varepsilon_{it}$$

The results of the cointegration tests are presented in Table 2.

**Table 2:** The Results of Kao Panel Cointegration Tests

| ***Variables In The Model*** | $H_0 : I(1)$<br>$H_1 : I(0)$ |
|---|---|
| $(GDP^+, EX^+)$ | -5.251 |
| | (0.000) |
| $(GDP^-, EX^-)$ | -3.959 |
| | (0.000) |
| $(GDP^+, EX^-)$ | -2.591 |
| | (0.004) |
| $(GDP^-, EX^+)$ | -3.551 |
| | (0.000) |

Note: The values in the parentheses indicate the $p$ values.

Results from Table 2 indicate that the null of no cointegration is rejected by all test statistics. Thus, the results suggest that there is a long-run relationship between export and GDP.

The effect of exports on growth is based on the relationship between foreign trade and economic growth. Intermediate and investment goods exports in particular have important effects on the economic growth. The increase in exports leads to the shift of resources to areas with comparative competitive advantages. Similarly, employment increases in sectors with increasing exports and positive economies of scale are created. In other words, the increase in exports has direct positive effects on development by means of increasing national income. Opening these sectors to foreign competition increases the efficiency (Ersungur, Noyan, and Yalman 2009: 83).

## 6. CONCLUSION

In this study, the existence of the export-led growth hypothesis has been analyzed for 15 selected European countries during the 1970–2011 period. We used the panel hidden cointegration test introduced by Hatemi-J (2011). This test investigates the presence of a hidden cointegration relationship. Initially, we established the cumulative positive and negative shocks for export and growth variables. We investigated the cointegration between cumulative positive and negative components. Empirical results show that there is a cointegration relationship between these components. Therefore, we conclude that there exists a long-term relationship between economic growth and exports.

The amount of foreign exchange rises with the increasing of exports that entering the country.

On the other hand the imports are dependent on the amount of foreign exchange in the country. Production in developed countries is not too dependent on imports. But domestic production in developing countries are dependent on imports. Therefore, mostly the foreign exchanges in developed countries are not used for import. For this reason, foreign exchange income increases national income and the growth.

One of the important aims of the integration of the European Union is to further grow the market operating between the member states through foreign trade. In this study as well, it was revealed that the export, which is one of the applications of foreign trade, has a positive effect on long-term growth. In other words, along with the process of expansion, the exports have a significant positive impact on economic growth of 15 EU countries.

Afterwards, these countries examined in this study were joined the European Union. As one of the stages for becoming integrated, six EU countries have signed the Customs Union agreement. They have reduced the customs tariff between the GB and them gradually and finally lowered the tariff to zero. With the abolition of customs tariffs in an EU country, the goods that are subject to customs have entered that country at a lower price, and this has led to an increase of exports in the country of origin of those goods. In economic unions with deepening integration, the economic growth of member states is affected positively by this process. Therefore, the integration has expanded over the years by the joining of the UK, Ireland, and Denmark in 1973, Greece in 1981, Spain and Portugal in 1986, Sweden, Finland, and Austria in 1994, Central and Eastern European countries in 1993, and 10 new countries in 2004.

As was highlighted before the export, which is one of the foreign trade items of the member states, has significantly been positively affected from the expansion process. In other words, it has increased with the EU's transition into the Common Market implementation in 1993, i.e., free circulation of goods, services, people, and capital within the union without any interference. EU countries were able to expand their narrow domestic markets through exports. The increase in exports has led to an increase in production and revenue that has resulted in increased economic growth. Growth in the EU countries in general is due to exports; domestic demand is unable to change drastically.

With the free circulation of goods, services, people, and capital within the Union, labor costs have fallen, and this reduced the prices of the goods. As a result, foreign trade rates have changed in favor of the EU countries. The increase in foreign demand for domestic goods has provided fast stimulation of investments that will increase production. Hence, exports affect economic growth in the long term.

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**Appendix**

**Table A: Exports of goods and services (% of GDP) for selected European countries**

| **Countries** | **1970** | **1971** | **1972** | **1973** | **1974** | **1975** | **1976** | **1977** | **1978** | **1979** | **1980** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 28.5 | 28.1 | 28 | 28 | 30.2 | 29.2 | 29.9 | 29 | 30.2 | 32.1 | 32.92 |
| Belgium | 48.9 | 47.6 | 48 | 52.2 | 57.5 | 49.9 | 52.8 | 51.7 | 49.8 | 54.3 | 54.49 |
| Denmark | 28 | 27.8 | 27.4 | 28.7 | 31.9 | 30.2 | 29 | 29.1 | 28.1 | 29.7 | 33.21 |
| Finland | 24.2 | 22.8 | 23.9 | 23.9 | 26 | 22.4 | 23.8 | 27.2 | 28.2 | 29.9 | 31.19 |
| France | 16 | 16.5 | 16.7 | 17.6 | 20.7 | 19 | 19.5 | 20.3 | 20.6 | 21.1 | 21.4 |
| Germany | 16.4 | 15.8 | 15.8 | 16.7 | 19.8 | 18.6 | 19.6 | 19.5 | 19.2 | 19.4 | 20.22 |
| Greece | 9.68 | 10 | 11.2 | 14.3 | 17.5 | 17.4 | 17.2 | 17.2 | 16.8 | 18.6 | 23.73 |
| Ireland | 33.9 | 33.1 | 31.7 | 34.8 | 39 | 39.2 | 42.4 | 45.3 | 45.8 | 45.6 | 45.44 |
| Italy | 15.8 | 16.2 | 17 | 16.8 | 19.3 | 19.5 | 20.9 | 22.3 | 22.6 | 23.3 | 21.04 |
| Luxembourg | 91.4 | 90.7 | 85.3 | 91.9 | 106 | 95.1 | 90.7 | 89.4 | 86.2 | 93.5 | 91.07 |
| Netherlands | 44.8 | 45 | 45 | 46.8 | 53.4 | 49.1 | 50.1 | 47.2 | 45.2 | 49.7 | 52.31 |
| Portugal | 19.4 | 19.9 | 21.7 | 21.3 | 21.4 | 16.2 | 13.9 | 14.6 | 16 | 21.5 | 21.77 |
| Spain | 12.4 | 13.3 | 13.7 | 13.7 | 13.5 | 12.7 | 12.9 | 13.6 | 14.2 | 14.1 | 14.66 |
| Sweeden | 24 | 24.2 | 24.1 | 27.3 | 32.1 | 28 | 27.5 | 27.3 | 28.1 | 30.3 | 29.67 |
| United K. | 22.3 | 22.5 | 21.1 | 23.1 | 27.3 | 25.4 | 28.1 | 29.8 | 28.3 | 27.8 | 27.14 |

| **Countries** | **1981** | **1982** | **1983** | **1984** | **1985** | **1986** | **1987** | **1988** | **1989** | **1990** | **1991** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 34.28 | 33 | 31.7 | 34 | 36.3 | 33.2 | 32.6 | 34.35 | 36.37 | 37.1 | 35.9 |
| Belgium | 58.78 | 63.2 | 65.7 | 70 | 67.9 | 62.3 | 60.7 | 64.59 | 69.11 | 67 | 65.5 |
| Denmark | 37.08 | 36.9 | 36.9 | 37.3 | 37.4 | 33 | 32.4 | 34.31 | 36.18 | 37.2 | 38.5 |
| Finland | 31.68 | 29.2 | 29.1 | 29.9 | 28.4 | 25.8 | 25.2 | 23.99 | 23.38 | 22.5 | 21.7 |
| France | 22.42 | 21.9 | 22.9 | 24.3 | 23.8 | 20.8 | 20 | 20.81 | 22.15 | 21.5 | 21.8 |
| Germany | 21.87 | 22.7 | 22 | 23.6 | 24.9 | 23.1 | 22.5 | 22.9 | 24.22 | 24.8 | 25.7 |
| Greece | 26.26 | 21.1 | 20.2 | 20.6 | 19.8 | 21.7 | 22.3 | 20.03 | 19.58 | 18.1 | 17.4 |
| Ireland | 44.43 | 44.1 | 48.1 | 54.6 | 55.4 | 50.3 | 53.7 | 56.95 | 60.36 | 56 | 56.9 |
| Italy | 22.58 | 22 | 21.2 | 21.9 | 22 | 19.5 | 18.7 | 18.32 | 19.3 | 19 | 17.8 |
| Luxembourg | 89.14 | 91.6 | 92.8 | 104 | 112 | 102 | 99.3 | 100.9 | 103.7 | 102 | 101 |
| Netherlands | 56.95 | 57 | 56.6 | 60.6 | 62.1 | 52.7 | 51.3 | 53.68 | 57.09 | 56.5 | 57.2 |
| Portugal | 20.63 | 21 | 24.9 | 29.6 | 29.7 | 26.4 | 27.7 | 28.05 | 29.9 | 29.6 | 26.9 |
| Spain | 16.7 | 17.4 | 19.6 | 21.8 | 21.4 | 18.7 | 18.2 | 17.74 | 17.03 | 16.1 | 16.2 |
| Sweeden | 30.4 | 32.9 | 36.2 | 36.9 | 35.7 | 33.2 | 32.8 | 32.4 | 32.17 | 30.5 | 28.2 |
| United K. | 26.68 | 26.3 | 26.5 | 28.3 | 28.8 | 25.6 | 25.3 | 22.95 | 23.64 | 24.2 | 23.5 |

| Countries | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 34.4 | 32.7 | 33.41 | 34.8 | 35.5 | 39.2 | 40.9 | 42.05 | 46.21 | 48.08 | 48.7 |
| Belgium | 63.9 | 61 | 63.52 | 65.4 | 65.6 | 69.8 | 69.7 | 69.96 | 78.14 | 77.85 | 76.7 |
| Denmark | 37.9 | 37.4 | 37.69 | 37.5 | 37.8 | 38.7 | 38.2 | 40.66 | 46.51 | 47.19 | 47.2 |
| Finland | 26 | 31.8 | 34.8 | 36.5 | 37.2 | 38.8 | 38.6 | 38.83 | 43.58 | 41.51 | 40.5 |
| France | 21.8 | 21.2 | 22.03 | 23 | 23.4 | 25.9 | 26.5 | 26.35 | 28.81 | 28.36 | 27.5 |
| Germany | 24 | 22 | 22.83 | 23.7 | 24.8 | 27.4 | 28.6 | 29.4 | 33.38 | 34.79 | 35.7 |
| Greece | 18.3 | 17.2 | 17.74 | 17.7 | 17.6 | 19.8 | 20 | 22.54 | 25.73 | 24.87 | 21.8 |
| Ireland | 59.8 | 64.9 | 69.62 | 75.3 | 77.1 | 79.3 | 86.8 | 89.05 | 97.42 | 99.55 | 93.7 |
| Italy | 18.2 | 21.3 | 22.79 | 25.7 | 24.7 | 25.2 | 25.2 | 24.28 | 26.77 | 26.86 | 25.5 |
| Luxembourg | 100 | 101 | 104 | 106 | 111 | 121 | 128 | 134.3 | 150 | 146.6 | 141 |
| Netherlands | 55.4 | 54.6 | 56.79 | 59.4 | 59.6 | 63.3 | 62.6 | 63.04 | 70.08 | 67.28 | 64.2 |
| Portugal | 24.8 | 24 | 25.51 | 27.2 | 27.2 | 27.8 | 27.9 | 27.08 | 28.93 | 28.08 | 27.6 |
| Spain | 16.6 | 18.2 | 20.83 | 22.4 | 23.6 | 26.3 | 26.7 | 26.67 | 29.05 | 28.53 | 27.3 |
| Sweeden | 28.1 | 32.7 | 36.07 | 39.7 | 38.6 | 42.1 | 43 | 43.1 | 46.52 | 46.3 | 44.4 |
| United K. | 23.8 | 25.7 | 26.85 | 28.7 | 29.4 | 28.7 | 26.6 | 26.14 | 27.71 | 27.29 | 26.3 |

| Countries | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 48.24 | 51.5 | 53.8 | 56.4 | 58.9 | 59.3 | 50.1 | 54.1 | 57.3 |
| Belgium | 73.93 | 75.9 | 78.7 | 80.8 | 82.55 | 84.9 | 72.8 | 79.9 | 84.3 |
| Denmark | 45.3 | 45.3 | 49 | 52.1 | 52.22 | 54.7 | 47.6 | 50.4 | 53.4 |
| Finland | 38.7 | 39.9 | 41.8 | 45.5 | 45.81 | 46.8 | 37.3 | 40.3 | 40.8 |
| France | 25.91 | 26.1 | 26.4 | 27 | 26.86 | 26.9 | 23.4 | 25.5 | 26.9 |
| Germany | 35.72 | 38.5 | 41.3 | 45.5 | 47.17 | 48.2 | 42.4 | 47 | 50.2 |
| Greece | 20.71 | 23.1 | 23.2 | 23.2 | 23.79 | 24.1 | 19.3 | 22.2 | 25.1 |
| Ireland | 83.2 | 83.4 | 81.3 | 79.2 | 80.74 | 84 | 90.8 | 101 | 105 |
| Italy | 24.41 | 25.2 | 25.9 | 27.6 | 28.85 | 28.5 | 23.7 | 26.6 | 28.8 |
| Luxembourg | 137 | 152 | 156 | 170 | 175.9 | 182 | 164 | 172 | 176 |
| Netherlands | 63 | 66.4 | 69.6 | 72.8 | 74.2 | 76.3 | 68.6 | 78.2 | 83 |
| Portugal | 27.62 | 28 | 27.7 | 30.9 | 32.19 | 32.4 | 28 | 31.3 | 35.7 |
| Spain | 26.32 | 25.9 | 25.7 | 26.3 | 26.9 | 26.5 | 23.9 | 27.2 | 30.3 |
| Sweeden | 43.52 | 46 | 48.4 | 51.1 | 51.87 | 53.5 | 48 | 49.5 | 50 |
| United K. | 25.84 | 25.5 | 27 | 29.1 | 26.92 | 29.8 | 28.8 | 30.5 | 32.5 |