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**CHANGING EXPORT STRUCTURE ACCORDING TO INCOME
ELASTICITY**

- Kaldor revisited

Desirée Nilsson

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Changing Export Structure according to Income Elasticity - Kaldor revisited

Désirée Nilsson*

Abstract

The competition for market shares has taken various routes over the years. The first factor that perhaps spring to mind is prices. Studies have also shown that advanced technology and superior quality of products are important in the competition for market shares. The purpose of this study is to explore whether changes in export and production structures in the OECD countries tend to incorporate the income sensitivity of demand for products and if a strategy of this kind is beneficial for the development of market shares. The theoretical framework is provided by Kaldor (1957, 1967 and 1970) and by the concept of non-homothetic preferences, first established by Engel (1857 and 1881). The results show that there has been an increased focus on high-income elastic products among the OECD countries. The strategy of concentrating export and production to the high income elastic products also seems to generate increases in market shares.

Keywords: export structure, income elasticity of export demand, competitiveness, market shares, Nicholas Kaldor

JEL classification: F10, F14

* Affiliation: Jönköping International Business School, Jönköping University, P.O. Box 1026, SE-55111 Jönköping, E-mail: desiree.nilsson@jibs.hj.se

1 Introduction

The world market is becoming increasingly integrated as new technology enhances the ability to exchange products and information across the world. The constant changes on the world market make it necessary for countries to be responsive to increased competition and alterations in the rules of the game. Export performance is often evaluated by observing market shares.

The competition for market shares has taken various routes. In recent times development of new technology in order to provide customers with more sophisticated products and also a larger variety of goods has been one approach to competing for market shares. Other strategies for improving competitiveness of countries incorporate changes in the structures of demand. Burenstam Linder (1961) argued that the ability to respond to changes on the world market creates additional gains from trade for the individual country. Kaldor (1981) also suggested that countries that are able to respond to changes in international demand structures and adjust production structure accordingly are likely to gain market shares. Income elasticities of demand are said to capture market sensitivity to non-price factors that are essential to consider in the competition for market shares (Fagerberg, 1988, McCombie, 1992 and Meliciani 2001). Non-price factors include features such as advanced technology and quality of a product.

Differences in the growth of demand for various products are an important explanation for structural changes in export and production. It is reasonable to assume that when firms organise their production, potential demand for their products play a key role in the structuring of production. The purpose of this study is to explore whether changes in export and production structures in the OECD countries tend to incorporate the income sensitivity of demand for products and if a strategy of this kind is beneficial for the development of market shares. The study explores the development of income elasticities for product groups and the composition of export flows for the OECD countries during the period 1980-2001.

The focus of exports on high income-elastic products and the development of value export shares may be thought of as a tautology; if income elasticity is high on average for a product, then the average country would naturally increase its export share in that product? However, the issue is more complex than so. The product income elasticities are estimated cross-sectional. Considering that tastes differ between countries, increases in incomes does not

necessarily mean that the export share of a particular high income-elastic product exported from a country will increase. It is also important to consider the capacity of the separate countries to adjust production to changes in demand. In fact, the capability of individual countries to adjust to evolving revenue opportunities in the global market may be expected to vary greatly, thereby reflecting inter-country export competitiveness.

During the 1990s OECD admitted six new members. Besides four Eastern European countries (Poland became a member in 1995, the Czech Republic and Hungary in 1996 and the Slovak Republic in 2000), Mexico joined the organisation in 1994 and South Korea in 1996. Special attention will be given to these countries in the empirical section. Export statistics on the two-digit level of the SITC classification (rev 2) have been collected for all OECD countries. Income elasticity of export demand is calculated for each product group exported from each OECD country and year in a simple export demand equation. The elasticities are then ranked and classified into three categories of products, High, Middle and Low income elastic products.

Fagerberg, Knell and Srholec (2004) identify four aspects of competition: price, technology, capacity and demand competitiveness. Traditionally, we often think of price as the most important factor in competition. Kaldor (1978) found that countries with increasing relative unit labour cost (RULC) experienced improvements in their export performance¹. Several studies have considered the effect of RULC on changes in market shares (Carlin, Glyn and van Reenen, 1999, Fagerberg, 1988, Amable and Verspagen 1995) and found that RULC is important but it cannot explain the entire variation in market shares. Advances in technology are a significant contributor to competitiveness among countries (Fagerberg, 1996). The third feature, capacity, refers to the ability of countries to adopt and exploit new technologies. The fourth factor, demand competitiveness, aims to capture the ability of countries to adjust production to changing demand structures. Landesmann and Snell (1993) study structural shifts in exports as a response to changes in world demand. Their study includes six specific OECD countries: the USA, the UK, West Germany, France, Italy, Japan and the rest of the OECD. By estimating an Almost Ideal Demand System (AIDS) Model, they find that exports from the UK have improved their position in the higher quality segment of international trade. The USA, on the other hand, experienced a decline in income elasticity

¹ The positive relation between RULC or prices and the development of market share came to be known as the “Kaldor paradox”.

of export demand. It is the other non-price factors that, for some time, have been dominating the strategies to improve competitiveness among countries (Fagerberg, 1988 and 1996, Meliciani, 2001).

Once the structure of and changes in exports have been delineated, a possible question to ask is whether some export products are more likely to generate higher growth potentials than other export products. This issue is, however, beyond the scope of this paper and will have to be left for future studies.

The outline of the study is as follows. Section 2 provides the theoretical arguments for structuring exports according to income elasticities. Section 3 delineates the methodology applied in the empirical section (section 4). Section 5 summarises and draws conclusions.

2 Theoretical framework

The theoretical underpinning of this study incorporates the existence of non-homothetic preferences in consumption. Combining it with Kaldor's (1970) suggestion that a country achieves higher growth rate by altering its industrial structure towards more income elastic goods provides the basis for changing export structure according to income elasticity.

2.1 *Non-homothetic preferences*

When Engel (1857, 1881) formulated his theories about consumer preferences in the second half of the 19th century he assumed that consumers will substitute luxury goods for necessities as the individual income increased. He also found empirical evidence of such a conjecture in household consumption studies. This line of reasoning provides a basis for a hierarchical ordering of needs that are dependent upon the level of income. As an individual's income increases, the individual assigns proportionately more of the additional income to luxury goods, which is the definition of luxury goods.

In addition to the discussion of shifts in consumption between different product groups it is also appropriate to talk about ranking of needs which can be met by various products within a product group. This issue is related to product differentiation where the different varieties of products can serve the particular needs that individual consumers have (Lancaster, 1979). Within a group of products the characteristics of products are different; some products are technologically more advanced while other products present superior quality in other aspects. Consumers update consumption within a product group when income increases by purchasing products that meet the requirements for better quality and technological sophistication. To provide an example of hierarchical preferences within a commodity group we can consider the procurement of a car. When first acquiring a car, the consumer may be satisfied with an inexpensive and unsophisticated car just to get the basic functions. If income increases, the consumer may want to upgrade the car by, for example, buying one with more advanced technology, a more powerful engine or a brand that is known for superior quality.

The modelling of hierarchical preferences can be incorporated into the utility function by including an ordering term. Equation 1 presents the utility of consuming good z :

$$V = \int_0^{\infty} b(z)x(z)dz \quad (1)$$

where z is a continuum of products, $b(z)$ represent the hierarchy function (Matsuyama, 2000, Föllmi and Zweimüller, 2002) in which needs are assigned different weights depending on their ranking and $x(z)$ indicates the quantity of z consumed. Products that comply with basic needs receive a higher weight than products that meet more advanced needs. This results in that the hierarchy function is decreasing in z . If products can be ranked according the different needs that they satisfy, basic needs would accordingly receive a lower rank than luxury products. The structure of the hierarchy function results in that those goods that have a higher ranking will make the marginal utility drop more slowly as more of them are consumed.

2.2 *Competitiveness and market shares*

Considering that consumption is becoming more globalised, producers in different countries can be said to have the world market at their feet. Responsiveness to changes in market demand is a driving force to improve competitiveness for countries (Fagerberg, Knell and Srholec, 2004).

In a series of contributions, Kaldor (1957, 1967 and 1970) developed a model of economic growth in which demand was given a central role. The model was set in a two-region, two-industry framework of agriculture and manufactures (Kaldor, 1967). Development of the manufacturing industry hinges on demand in the agricultural sector. The model reaches equilibrium at full employment. Any excess demand will eventually be met by an increase in quantity supplied until full employment is reached.

A central feature of the model is the ability to adopt new technologies (Kaldor, 1957). The capacity to implement new technologies is important for the accumulation of capital. Capital investments are also necessary for the improvement of efficiency in production. At the same time, incentives for making required investments in production are provided by any increases in output. Thus, increases in demand may trigger investments to make production more efficient, so that producers can provide the market with additional goods to match the change in demand.

The potential for a country to generate even higher growth rates lies in the management of autonomous demand (Kaldor 1970). The country that is more responsive to demand changes in the world market is most likely also better equipped to exploit any increasing returns to scale in production. Considering the prevalence of non-homothetic preferences, a useful strategy would be to focus on product groups which are in greater demand as consumer

income increases. In view of the fact that technological content and quality have a higher rank on the preference scale, such characteristics should be emphasised in the production development of firms.

If countries specialise in production of technology-intensive product groups, which are often in industries characterised by economies of scale, the gains from trade are likely to be further reinforced through Verdoorn's Law (Verdoorn, 1949). Verdoorn's Law states that the growth of labour productivity increases with the scale of production. Thus, the country that is more adaptive to alterations in world market demand will also have a head start on its competitors.

Referring to Hicks "super-multiplier"², Kaldor argues that the development of exports for a country determines the general growth of an economy (Kaldor, 1970). The general recommendation from Kaldor's growth model to countries in search for higher growth is to change their industry structure with a focus on products with higher income elasticity of demand and also to try to attain the highest achievable Verdoorn effect in the sectors.

² See Hicks (1950) where he relates the growth rate of an economy to the development of autonomous demand.

3. Methodology

This section outlines the method used to elaborate on the composition of exports for the OECD countries. The approach applied in this paper uses the concept of income elasticity of export demand to categorise product groups. A simple export demand function is used to estimate income elasticities for product groups on a disaggregated level for the OECD countries' exports between the years 1980 and 2001. The empirical model is explained in section 3.2. The income elasticities are categorised into three product groups, High, Middle and Low income elastic product. The classification is explained further in section 3.3. The first subsection below outlines the data used in this study.

3.1 Data

The data used in this study are from three sources: the OECD, the World Bank and Centre d'Études Prospectives et d'Informations Internationales (CEPII). The main problem with the data is missing observations. Only 23 countries are covered by the entire time period, 1980-2001. Germany is only accounted for after the reunification in 1990. Table 3.1 summarises the data used in this study.

Table 3.1 Describing the data

Variable	Description	Source
GDP	GDP at current prices, World Development Indicators 2005.	World Bank
Export	Standard International Trade Classification (SITC), revision 2, two-digit level, 69 product groups, 1980-2001, ITS database	OECD
Distance	Between capital cities, in kilometres	CEPII
<i>Countries and years available:</i>		
	Australia, Austria, Belgium, Luxembourg, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, USA	1980-2001
	Germany, Mexico	1991-2001
	Hungary	1992-2001
	Czech Republic	1993-2001
	South Korea	1994-2001
	Slovak Republic	1997-2001

3.2 The export demand function

The categorisation of product groups in this paper is based on income elasticities of export demand. The export demand function has been used extensively in empirical economic literature. It rests on basic microeconomic principles, focusing on the different factors affecting a consumer's decision to buy a product. This study applies the simplest version by only considering income and distance as explanatory variables of export flows.

The following product export demand function is used to estimate income elasticities of demand for various exporting countries, product groups, and years:

$$\ln \text{Exp}_j = \alpha + \beta \ln \text{GDP}_j + \gamma D_j + \varepsilon_j \quad (2)$$

$\ln \text{Exp}_j$ = natural log of export of a product from the exporting country to country j

$\ln \text{GDP}_j$ = natural log of GDP in the receiving country j

D_j = the distance in kilometres between exporting country and country j

α , β and γ are constants

ε_j is an error term

In equation 2, export of a product from the exporting country (any of the OECD countries) in a given year to country j is explained by that years income (GDP) in the receiving country, j , and the distance between the exporting country and the receiving country, D_j . The estimated beta parameter provides us with the exporting country's estimated income elasticity of export demand for a particular product group and year. Observations for any particular estimate of equation 2 vary by importing country, j , providing on average 66 observations. There are 30 exporting countries³ and for each of these, separate regressions based on equation 2 are performed for a maximum of 69 product groups and a maximum 22 years (1980-2001). Overall 35,089 regressions are performed.

3.3 *The categories High, Middle and Low*

The estimated income elasticities for the different product groups are used to classify the groups into three classes – High, Middle and Low income elastic products. Before proceeding with the categorisation, the income elasticities of the various product groups are ranked for each exporting country pooled over all years, and the highest and lowest two per cent of the elasticities are excluded to eliminate extreme values. Differences in income elasticities between countries, for a particular product group, reflect that products are different in their “content”. One should also keep in mind that the two-digit level of the SITC classification is fairly aggregated, so “content” variations may be hidden at this level. After the exclusion of extreme values, all elasticities, across product groups, export country and years, are ranked and divided into three groups by taking the 33rd and 67th percentiles. The income elasticity for a particular product group may appear in a different one of these three groups in different years, which allows the analysis to incorporate dynamic changes in income elasticity over time.

³ The exporting countries are the OECD countries with Belgium and Luxembourg jointly estimated since during a major part of the period they were in economic union and therefore jointly accounted for in statistical reports.

4. Empirical findings

The empirical section is divided into four subsections. The first provides an overview of the statistical results on how income elasticities of export have evolved over time for different country groups and product groups. Subsection 4.2 provides the time trends of the export share development of each of the three categories, High, Middle and Low income elastic product groups. Subsection 4.3 analyses the changes in production structure in each OECD country. Subsection 4.4 investigates if the changes in export and production structures have any effect on the developments of market shares.

Throughout the empirical section the OECD countries have been divided into three groups,

- The restructuring countries – countries which have displayed an estimated significant increase in the share of high income elastic exports and a significant decrease in the share of low income elastic exports over the period 1980-2001. The countries are: *France, Ireland, Spain, United Kingdom, Austria, Finland, Norway, Sweden, the Netherlands, Italy, Portugal, Australia, Denmark, Belgium-Luxembourg, and Turkey.*
- The new members of the OECD – the six new member countries of the organisation: *Mexico, Hungary, Poland, the Czech Republic, the Slovak Republic and South Korea.*
- The remaining countries – countries that do not comply with the conditions for either of the other two groups. The countries are: *Iceland, Germany, Japan, United States, Canada, New Zealand, Switzerland, and Greece.*

4.1 Data overview

The study of export composition also provides a picture of the production structure. Table 4.1 summarises the estimated income elasticity of demand for the three country groups. The summary statistics are over all product groups, years, and exporting countries for the particular country group and years indicated. The new member states entered the organisation during the 1990s and thus statistics for these countries are only displayed for the final period 1996-2001. Summary statistics of each member country are presented in Appendix A.

Table 4.1 shows that the restructuring and remaining countries have practically the same mean and median income elasticity of exported products in the first period. During the

following years these two groups of countries diverge to some extent. The restructuring countries reach slightly higher mean and median income elasticity by the end of the period. It is also clear that the new member countries have substantially lower income elasticities in exports than the older members of the OECD.

The new member countries also display a higher standard deviation and variance of the income elasticities compared with the other countries. It is also interesting to note that the standard deviation increases for the restructuring countries as changes progress.

Table 4.1 Summary statistics of estimated income elasticity of export demand¹

1980-1985					
Countries	min	max	mean	median	std
Restructuring countries	-1.53	1.65	0.68	0.71	0.31
New member countries	na	na	na	na	na
Remaining countries	-0.41	1.45	0.68	0.70	0.33

1996-2001					
Countries	min	max	mean	median	std
Restructuring countries	-1.67	2.05	0.79	0.84	0.34
New member countries	-1.01	1.51	0.64	0.67	0.37
Remaining countries	-0.47	1.45	0.75	0.76	0.33

¹ Over all product groups, years, and exporting countries for the particular country group and years indicated

Table 4.1 also indicates that there has been a general increase in the average income elasticity of all exported products from the older members of the OECD. Figure 4.1 displays the development of income elasticities for different industry sectors. The sectors that have shown the strongest upward trends are Chemicals, Manufactured goods, Machinery and transport, and Miscellaneous manufactures. Food has also had a notable upward trend in the development of income elasticity, though starting from a lower level.

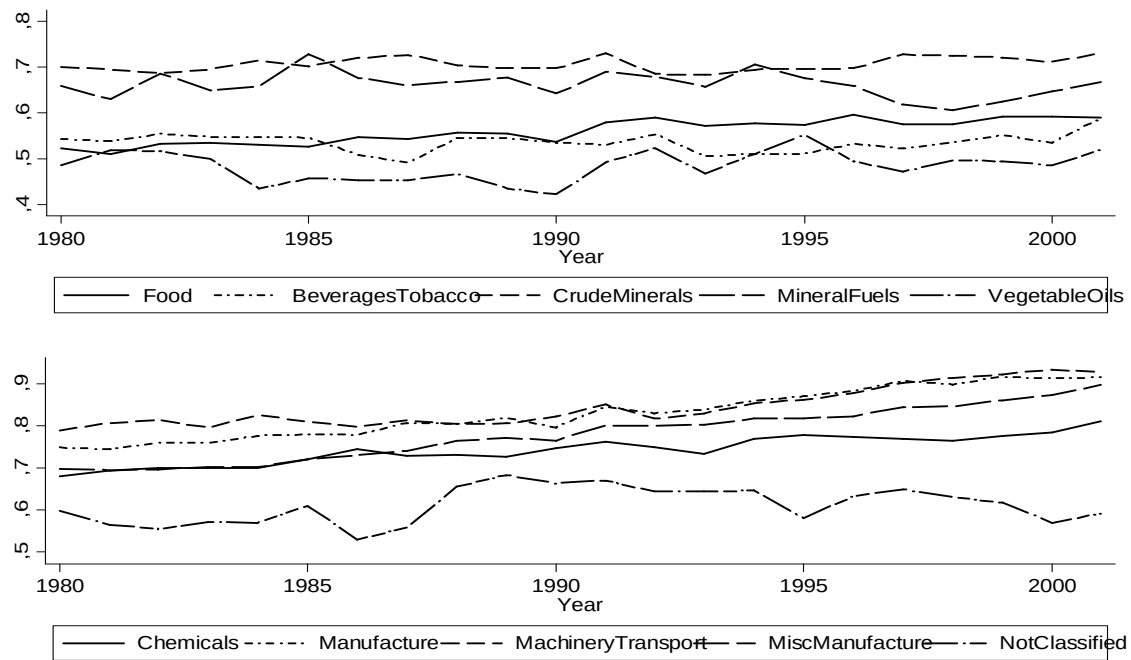


Figure 4.1 Development of income elasticities for industry sectors based on export data from the OECD countries

4.2 *Development of export shares within the income-elastic groups*

This section presents the evolution of export structures for the OECD countries in three categories, High, Middle and Low income elastic products. The classification of product groups is based on ranking the elasticities for all exporting countries (the OECD countries) product groups and years in the study. When categorising the product groups into high, middle and low income elastic products, the 33rd and 67th percentiles are used as border elasticities between Low and Middle and between Middle and High respectively. The border elasticities were estimated at 0.60 for the 33rd percentile and 0.89 for the 67th percentile.

The division of products into groups aims to present developments of exports clearly, even if it somewhat limits the amount of available information used in the data material. It may also raise questions of robustness; if the product groups had been specified differently, the results would also have been different. Appendix B shows the relation between export share development and income elasticity without the grouping. All countries, with the exception of Poland and New Zealand, show a positive relation between income elasticity and the development of export shares between the years 1980 and 2001. The share of export value based on products in one of the three income-elasticity groups will henceforth be denoted as the IEG export shares for that income-elasticity group.

More than two thirds of the OECD countries have increased the share of export value based on exports of high income-elastic products during 1980-2001. Tables 4.3, 4.4 and 4.5 show the share development over time for each of the three categories among the restructuring countries, the new member countries and the remaining countries, respectively.

The growth of IEG export share in a particular income-elastic group relative to the other IEG export shares is measured by the estimate for γ_1 in the following equation:

$$\ln\left(\frac{\text{IEG export share}_{ct}}{1 - \text{IEG export share}_{ct}}\right) = \gamma_0 + \gamma_1 t + u_t, \quad c = \text{High, Middle or Low} \quad (3)$$

where the *IEG export share_{ct}* is the IEG export share for the income-elastic group *c* (High, Middle or Low) at time *t*, γ_0 and γ_1 are constant parameters and the u_t is an error term. The γ_1 parameter indicates the growth of the “odds ratio” over time. When the estimate of the slope parameter, $\hat{\gamma}_1$ is presented in the tables (4.3-4.5), the parameter has been adjusted according to the formula $(e^{\hat{\gamma}_1} - 1) * 100$ (Gujarati, 2003), to represent the per cent change in the “odds ratio”

Countries are presented according to the estimated growth trend. Columns three, five and seven display the value of high, middle and low IEG export shares of each country at the beginning of the period. As can be seen across all three tables, the share development of high income-elastic products shows a positive and significant time trend for 23 of the 29 OECD countries. 19 of the 29 countries show a significant decrease in the share of low income elastic products. These two tendencies are the criteria for being considered as a restructuring country for the older OECD countries. It is interesting to note that for two of the new member countries, Czech Republic and Hungary, has generated such development.

France, Ireland, Spain and the United Kingdom represent the restructuring countries with the fastest change of export towards high income-elastic products. At the beginning of the period between 17 and 44 per cent of their export value belonged to the high income-elastic category. Restructuring countries with the slowest change towards high income-elastic

Changing export structure according to income elasticity — Kaldor revisited

products are Turkey, Belgium-Luxembourg, Denmark and Australia. Belgium-Luxembourg starts the period with the second highest share of high income elastic exported products. Sweden had an even higher share of high income-elastic products in the early 1980s and the average percentage change was nearly ten per cent. It is also noteworthy that eleven of the restructuring countries also had significant decreasing trends in the export share of middle income-elastic products.

Table 4.3 Developments in High, Middle and Low IEG export shares, 1980-2001: Restructuring countries

Countries	High		Middle		Low	
	Time trend ^a	Share 1980	Time trend ^a	Share 1980	Time trend ^a	Share 1980
France	15.67*** (12.08)	17.65	-13.66*** (-9.67)	65.48	-11.47*** (-12.75)	16.7
Ireland	12.87*** (12.92)	21.28	-9.69*** (-8.49)	47.9	-10.52*** (-6.27)	30.73
Spain	12.30*** (8.42)	44.46	-10.95*** (-7.47)	46.92	-11.46*** (-5.55)	8.62
United Kingdom	12.07*** (7.7)	30.36	-12.27*** (-7.79)	62.28	-7.71*** (-12.26)	6.29
Austria	10.77*** (13.78)	53.81	-9.85*** (-10.59)	33.39	-8.90*** (-10.46)	10.72
Finland	10.48*** (7.76)	45.84	-12.12*** (-6.62)	29.31	-10.24*** (-8.07)	24.5
Norway	10.24*** (3.61)	10.89	-8.58*** (-4.34)	56.28	-10.72*** (-4.15)	15.37
Sweden	9.69*** (7.03)	70.91	-11.27*** (-9.38)	19.27	-18.17*** (-9.39)	9.49
Netherlands	8.96*** (10.13)	41.65	-7.62*** (-6.93)	51.71	-5.76*** (-4.42)	6.58
Italy	8.90*** (5.67)	77.42	-10.68*** (-6.66)	19.59	-13.12*** (-7.56)	1.64
Portugal	8.51*** (3.03)	10.61	-1.26 (-0.87)	57.1	-5.58*** (-6.03)	31.36
Australia	8.21*** (5.88)	41.07	0.96 (0.61)	15.22	-15.29*** (-8.02)	31.72
Denmark	5.83*** (8.91)	31.96	-0.54 (-0.52)	52.73	-10.18*** (-6.42)	12.83
Belgium-Luxembourg	4.30** (2.5)	68.57	-3.84** (-2.38)	22.59	-6.80*** (-11.25)	8.12
Turkey	2.37* (2.00)	43.63	2.08 (1.3)	29.27	-4.42*** (-3.91)	23.51

*** significant at 1 %; ** significant at 5%; * significant at 10%;

^a the slope parameter, $\hat{\gamma}_1$, is adjusted according to the formula $(e^{\hat{\gamma}_1} - 1) * 100$

The summary statistics in Table 4.1 indicated that the new member countries have substantially lower income elasticity of export demand than the established OECD countries. There are two exceptions, South Korea and Mexico (as can be seen in Appendix A). Table 4.4 shows the share

development over time for each of the three categories among the new member countries. The South Korean export was already in 1994 concentrated in the high income elastic products, which is a result of conscious efforts to promote the development of new industries. Since then there have been some fluctuations but no significant trend in either direction. Mexico also shows a strong focus on high income elastic products and a steady increase over time. This is not surprising, considering its proximity to the USA and in particular the establishment of the Maquiladora factories. For Mexico, it is also evident that the signing of the NAFTA agreement in 1992 likely made a difference (see graph in Appendix C).

Table 4.4 Developments in High, Middle and Low IEG export shares: New member countries

Countries ^b	High		Middle		Low	
	Time trend ^a	Share	Time trend ^a	Share	Time trend ^a	Share
Czech Republic (1993)	47.68*** (6.21)	15.68	-19.23*** (-5.42)	52.16	- 37.14*** (-5.09)	32.11
Hungary (1992)	39.17*** (5.49)	1.81	-17.2*** (-9.01)	56.84	- 17.18*** (-5.16)	27.28
Slovak Republic (1997)	38.65* (2.47)	15.44	-23.06** (-4.35)	43.83	-14.8 (-1.54)	40.32
Mexico (1991)	19.62*** (4.85)	45.09	-18.33*** (-4.32)	51.85	-10.02 (-1.55)	2.68
Korea (1994)	3.01 (0.32)	61.23	-10.6 (-0.81)	29.75	10.71 (0.77)	8.93
Poland (1992)	-6.66 (0.34)	2.90	7.2 (1.21)	38.88	-6.24 (-1.38)	57.79

*** significant at 1 %; ** significant at 5%; * significant at 10%;

^a the slope parameter, $\hat{\gamma}_1$, is adjusted according to the formula $(e^{\hat{\gamma}_1} - 1) * 100$

^b the year in parenthesis indicate starting year

Even though the other new member countries have some catching up to do, they have had a good start. The Czech Republic, Hungary and the Slovak Republic experienced the fastest change in the IEG export share of high income-elastic products. The Czech Republic and Hungary also have a significantly decreasing IEG export share of low income-elastic export. The IEG export share of middle income-elastic products is also declining in the Czech Republic, Hungary, the Slovak Republic and Mexico. Poland differs from the other new member countries in that its export seems to be firmly linked to the middle and low income elastic products.

The remaining countries, presented in Table 4.5, display a variety of patterns. Iceland, Germany, Japan and the United States exhibit a significantly increasing time trend of high income-elastic products in their exports. The latter three also reveal a significantly decreasing trend in the IEG export share of middle income elastic export. These four countries also start off with fairly high shares of high income-elastic export. The other four countries show no significant tendencies when it comes to high income-elastic products. Canada and New Zealand show significant decreasing trends in the share of low income elastic products.

Table 4.5 Developments in High, Middle and Low IEG export shares, 1980-2001: Remaining countries

Countries ^b	High		Middle		Low	
	Time trend ^a	Share 1980	Time trend ^a	Share 1980	Time trend ^a	Share 1980
Iceland	7.44* (1.88)	79.19	-4.62 (-0.79)	7.91	-0.69 (-0.5)	12.75
Germany (1991)	6.42** (3.09)	91.3	-7.74*** (-3.81)	8.01	-3.46 (-0.89)	0.62
Japan	5.18*** (3.66)	61.18	-16.01*** (-4.53)	37.21	5.47*** (4.35)	1.62
United States	4.73*** (5.13)	58.45	-3.93*** (-3.77)	35.19	-1.31 (-1.66)	1.81
Canada	1.40 (0.95)	49.42	-0.21 (-0.13)	32.39	-5.64*** (-2.77)	5.02
New Zealand	0.75 (0.72)	19.88	12.12*** (8.06)	16.93	-16.04*** (-10.46)	60.49
Switzerland	-2.26 (-1.09)	92.51	-6.99*** (-7.47)	7.18	3.88* (1.87)	0.19
Greece	-5.53 (-1.46)	14.72	1.78 (1.00)	50.02	1.90 (1.60)	35.09

*** significant at 1 %; ** significant at 5%; * significant at 10%;

^a the slope parameter, $\hat{\gamma}_1$, is adjusted according to the formula $(e^{\hat{\gamma}_1} - 1) * 100$

^b the year in parenthesis indicate starting year

4.3 Production structure

The tendencies in export shares also reflect changes in the production structure. The production structure is displayed by the kind of product groups exported from the OECD countries. Tables 4.6, 4.7 and 4.8 present the proportion of product groups in the different income-elasticity groups for various countries.

Table 4.6 shows that Italy, Sweden and Belgium-Luxembourg had their production concentrated in the middle and high income elastic classes at the beginning of the 1980s. Italy presented a stronger concentration (although less than 50 per cent) in the high income-elastic groups than Sweden and Belgium-Luxembourg. By the end of the 1990s more than 50 per cent of

exported products from the three countries belonged to the High category. France, Spain, the United Kingdom and the Netherlands upgraded production from a concentration in middle income-elastic products to high income-elastic products. Portugal and Turkey still have the greater part of exported products placed in the Low category. Australia and Finland, on the other hand, have moved their strongest concentration from Low to High. All of the restructuring countries have generally, though to a varying extent, substituted higher income elastic products for lower.

Table 4.6 Production structure in the restructuring countries, presented by the proportion of product groups assigned to each of the three categories (Numbers show the share of product groups)

	1980-1985			1996-2001		
	High	Middle	Low	High	Middle	Low
France	18	42	37	48	31	16
Ireland	23	37	37	39	39	18
Spain	24	45	29	50	26	18
United Kingdom	19	47	30	46	39	11
Austria	34	35	26	49	23	25
Finland	24	30	42	43	19	32
Norway	17	31	49	29	33	33
Sweden	35	31	29	54	21	20
Netherlands	33	45	19	48	35	10
Italy	47	32	18	60	18	15
Portugal	4	27	65	7	33	58
Australia	17	37	41	41	40	16
Denmark	19	38	37	28	39	29
Belgium-Luxembourg	36	35	22	51	32	12
Turkey	11	19	64	14	34	48

The new member countries (Table 4.7) still have their focus of production towards the middle and low income-elastic goods. The exceptions are again

South Korea and Mexico, but for two separate reasons (see the discussion in connection to table 4.4). South Korea is approaching 50 per cent of production concentrated in the high income elastic segment. Poland still has 72 per cent of its production within the low income-elastic category. The Czech Republic has an evenly distributed production structure with approximately one third of production in each section. Hungary and the Slovak Republic still have production concentrated on the low income elastic segment.

Table 4.7 Production structure in the new member countries, presented by the proportion of product groups assigned to each of the three categories (Numbers show the share of product groups)

	1996-2001		
	High	Middle	Low
Czech Republic	28	34	35
Hungary	12	36	47
Slovak Republic	23	23	50
Mexico	44	34	19
South Korea	46	22	29
Poland	2	23	72

Table 4.8 shows the production structure of the remaining countries. Germany has the highest share of production allocated to the high income-elastic segment, followed by Switzerland and the United States. All the countries, with the exception of Greece, experienced an increase in the proportion of high income-elastic production during the period. In the case of Greece, production of middle income-elastic products as well as production in the low income-elastic segment increased in concentration.

Table 4.8 Production structure in the remaining countries, presented by the proportion of product groups assigned to each of the three categories (Numbers show the share of product groups)

Countries	1980-1985			1996-2001		
	High	Middle	Low	High	Middle	Low
Iceland	11	12	76	17	15	64
Germany	na	na	na	71	20	4
Japan	42	33	23	46	24	23
United States	46	34	13	58	33	9
Canada	28	44	23	38	43	16
New Zealand	6	18	70	15	45	38
Switzerland	50	35	11	67	17	8
Greece	6	20	68	3	23	71

4.4 Market shares

The image thus far presents clear patterns of changes in countries concerning export and production structure. Firms in the OECD countries are increasingly focusing production and exports on high income elastic products. In view of the strong shifts in production and export from low income elastic products to high income elastic products, a reasonable question to ask is whether these efforts bear any effects on the competitiveness of the OECD countries. The competitiveness of each member is here measured as market shares of total OECD exports (excluding Germany and the new member countries), and Table 4.9 presents the development of those markets shares for the older OECD countries members (again excluding Germany) between 1980-1985 and 1996-2001. German exports are excluded from the analysis since its re-unification presents comparability difficulties over time, and new-member exports are excluded due to lack of reliable data from the early 1980s.

Eight restructuring countries increase their market shares: Ireland, Spain, Austria, Finland, Italy, Portugal, Belgium-Luxembourg, and Turkey. In the

Changing export structure according to income elasticity — Kaldor revisited

remaining countries, only the USA and Canada present an increase in the market share between the two periods. If in the 1996-2001 period we included all OECD countries in calculating market shares (i.e. including Germany and the new member countries) Mexico and South Korea would stand out among the new member countries with 3.17 per cent and 3.51 per cent of market share, at least four times higher than the market share of any of the other new members. This is notable since previously we have also seen considerably high and increasing IEG export share of high income-elastic products and a large concentration of production to the same group of products for these two countries.

Table 4.9 The development of market shares for each OECD country

Restructuring countries	1980-1985	1996-2001
France	9.54	9.15
Ireland	0.86	2.05
Spain	2.09	3.44
United Kingdom	9.76	8.49
Austria	1.58	1.86
Finland	1.31	1.33
Norway	1.79	1.58
Sweden	2.82	2.51
Netherlands	6.62	5.49
Italy	7.33	7.60
Portugal	0.46	0.75
Australia	2.14	1.88
Denmark	1.54	1.54
Belgium-Luxembourg	5.36	5.73
Turkey	0.74	0.84
Remaining countries		
Iceland	0.08	0.06
Japan	14.83	13.17
USA	20.82	21.90
Canada	7.32	7.35
New Zealand	0.54	0.42
Switzerland	2.63	2.50
Greece	0.45	0.35

Considering the restructuring of exports and the changes in production structure that was presented in previous subsections, 4.2 and 4.3, do these changes have any effect on the developments of market shares? Figure 4.1 present the relation between changes over time in the High IEG export share and changes over time in market shares. There seem to be a positive effect of exports increasingly being concentrated to the high income-elastic products and the progression of market shares for the old member countries of the

OECD. The effect is, however, not statistically significant.⁴ The four countries that stand out, Ireland, Spain, Portugal and Turkey, are countries which traditionally have been referred to as economies focused on agricultural production. A similar analysis for the new members of the OECD would not be equally reliable. This is due to the few years of available statistics and the extensive economic changes that characterise these years for several of the new members.

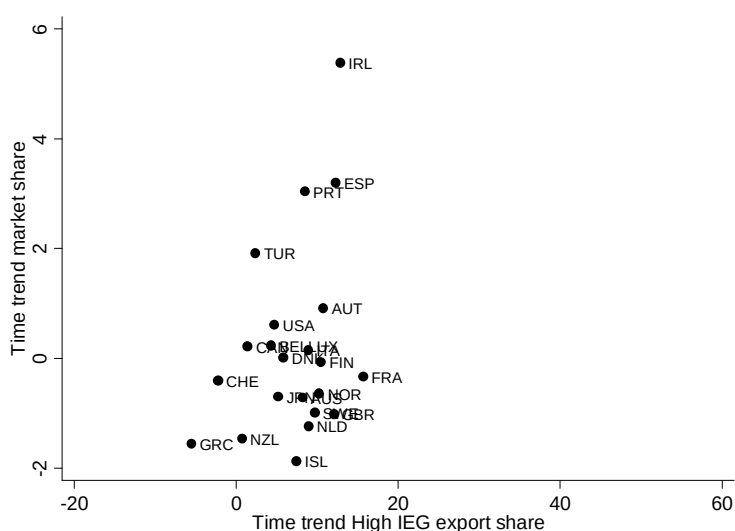


Figure 4.1 The effect of changes in High IEG export share on the development of market shares. (Market shares are calculated with only the old OECD member countries in the denominator, excluding also Germany. The time trend for market shares is estimated in the same manner as the time trend for High IEG export shares, using equation 3.)

⁴ The robust p-value on the slope coefficient from a regression of the market share time trend against the High IEG export share was estimated to be 0.133.

5 Summary and conclusions

The changing conditions of the world market underline the importance of a country's capacity to adjust. It is reasonable to assume that firms consider the potential demand for their products when they make decisions concerning production. One of the main motivations for making structural changes may originate from differences in the income elasticity of various products in the economy. This study has examined the developments of exports and production of high, middle and low income-elastic products in the OECD countries during the period of 1980-2001.

The result of the empirical investigation indicates an increased emphasis in exports and production on the high income-elastic product groups. More than two thirds of the OECD countries have increased the share of export value based on exports of high income-elastic products during 1980-2001. It is interesting to note that four of the new members of the OECD, the Czech Republic, Hungary, the Slovak Republic and Mexico, have adjusted exports towards the high income-elastic products.

The OECD countries in general have increased the share of high income-elastic goods in production. Germany, Switzerland, Italy and the United States have the largest concentration on high income-elastic production, followed by Sweden and Belgium-Luxembourg. The lowest concentration of production of high income elastic products is found among traditional agricultural economies such as Greece, Portugal and Turkey, and two of the new members of the OECD, Poland and Hungary.

It also seems that the strategy of concentrating exports to the high income-elastic products has a positive effect on the developments of export market shares over time. A crucial aspect in this way of reasoning is of course the growth of income in the world economy. It is only when income

Changing export structure according to income elasticity — Kaldor revisited

expands that an exporting country can benefit from reorienting its export flows to include an increasing share of products with high income elasticity. In this way the restructuring implies that the export will increase its share of products for which the demand increases.

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Appendix A

Table A1 Summary statistics

Countries	1980-85				1996-2001			
	min	max	mean	median	min	max	mean	median
Restructuring countries								
Australia	0.11	1.3	0.66	0.65	0.13	1.31	0.81	0.83
Austria	-0.01	1.35	0.76	0.78	-0.01	1.36	0.84	0.89
Belgium-Luxembourg	0.24	1.3	0.79	0.80	0.24	1.30	0.89	0.91
Denmark	-0.05	1.1	0.66	0.67	-0.05	1.12	0.71	0.74
Finland	-0.28	1.33	0.65	0.67	-0.28	1.34	0.75	0.82
France	0.19	1.19	0.68	0.72	0.20	1.16	0.83	0.90
Germany	-	-	-	-	0.36	1.4	1.04	1.11
Iceland	-1.53	1.65	0.26	0.31	-1.67	2.05	0.38	0.42
Ireland	-0.14	1.44	0.70	0.69	-0.18	1.45	0.84	0.83
Italy	0.19	1.24	0.83	0.88	0.17	1.23	0.91	0.99
Netherlands	0.35	1.24	0.79	0.78	0.36	1.23	0.88	0.90
Norway	-0.39	1.25	0.56	0.60	-0.37	1.32	0.68	0.75
Portugal	-0.27	1.01	0.44	0.47	-0.21	1.02	0.49	0.51
Spain	0.05	1.25	0.70	0.75	0.05	1.25	0.86	0.93
Sweden	0.04	1.33	0.75	0.78	0.10	1.39	0.9	0.97
Turkey	-0.57	1.22	0.37	0.38	-0.53	1.23	0.56	0.61
United Kingdom	0.30	1.13	0.72	0.73	0.36	1.12	0.84	0.88
United States	0.36	1.35	0.88	0.89	0.37	1.32	0.91	0.94
Total	-1.53	1.65	0.68	0.71	-1.67	2.05	0.79	0.84

¹ Over all product groups and years for the particular export country and years indicated

Table A1 Summary statistics (continued)

Countries	1980-85				1996-2001			
	min	max	mean	median	min	max	mean	median
New member countries								
Czech Republic	-	-	-	-	-0.44	1.22	0.67	0.74
Hungary	-	-	-	-	-0.21	1.12	0.57	0.61
Korea	-	-	-	-	-1.01	1.51	0.75	0.85
Mexico	-	-	-	-	0.10	1.50	0.85	0.87
Poland	-	-	-	-	-0.14	1.01	0.45	0.46
Slovak Republic	-	-	-	-	-0.69	1.28	0.53	0.58
Total					-1.01	1.51	0.64	0.67
Remaining countries								
Canada	0.30	1.45	0.77	0.75	0.32	1.44	0.83	0.84
Greece	-0.41	1.02	0.39	0.41	-0.47	0.96	0.43	0.45
Japan	-0.02	1.32	0.81	0.85	-0.03	1.34	0.82	0.89
New Zealand	0.01	1.14	0.49	0.47	0.02	1.18	0.66	0.67
Switzerland	0.04	1.44	0.89	0.90	0.09	1.45	1.02	1.07
Total	-0.41	1.45	0.68	0.70	-0.47	1.45	0.75	0.76

¹ Over all product groups and years for the particular export country and years indicated

Appendix B Regression results

Table B1 Regression results of $Share_{pt} = a_1 + a_2 Elasticity_{pt} + a_3 t + \varepsilon_{pt}$ for each OECD country: the restructuring countries

	Austria	Finland	France	Ireland	Norway	Spain	Sweden
Elasticity	87.38 (61.24)***	68.60 (44.28)***	80.27 (34.06)***	53.03 (30.98)***	44.21 (28.79)***	81.19 (47.94)***	99.95 (63.48)***
Year	0.30 (4.02)***	0.19 (2.37)**	-0.18 (1.91)*	-0.30 (3.79)***	-0.39 (4.66)***	0.10 (1.23)	-0.09 (1.17)
Constant	-627.26 (4.22)***	-393.88 (2.45)**	343.27 (1.81)*	595.52 (3.76)***	765.97 (4.65)***	-211.64 (1.38)	147.25 (0.93)
Obs.	1407	1356	1443	1301	1381	1409	1400
R²	0.71	0.63	0.45	0.47	0.42	0.62	0.72

	United Kingdom	Australia	Belgium-Luxembourg	Denmark	Italy	Netherlands	Portugal
Elasticity	109.05 (48.22)***	55.39 (31.71)***	98.49 (75.67)***	39.98 (36.13)***	127.31 (71.91)***	73.95 (45.17)***	24.83 (18.88)***
Year	-0.38 (4.56)***	0.19 (2.89)***	0.01 (0.13)	-0.16 (4.05)***	0.23 (3.03)***	0.12 (1.59)	-0.64 (10.88)***
Constant	703.23 (4.30)***	-385.43 (2.96)***	-59.31 (0.45)	332.00 (4.13)***	-520.21 (3.43)***	-260.47 (1.74)*	1302.63 (11.07)***
Obs.	1410	1393	1423	1404	1409	1368	1373
R²	0.57	0.47	0.74	0.50	0.76	0.56	0.31

Table B1 Regression results of $Share_{pt} = a_1 + a_2 Elasticity_{pt} + a_3 t + \varepsilon_{pt}$ for each OECD country: the new members of the OECD

	Czech Republic	Hungary	Korea, Rep.	Mexico	Poland	Slovak Republic
Elasticity	33.56 (13.41)***	24.47 (12.92)***	46.56 (16.40)***	64.48 (27.91)***	-14.45 (4.78)***	11.59 (8.18)***
Year	-1.73 (5.71)***	-2.85 (16.98)***	0.24 (0.55)	-0.23 (0.93)	-0.78 (4.54)***	-0.81 (1.70)*
Constant	3465.75 (5.74)***	5714.08 (17.05)***	-463.98 (0.55)	452.98 (0.90)	1608.65 (4.70)***	1652.89 (1.72)*
Obs.	564	626	496	686	621	313
R²	0.29	0.48	0.48	0.50	0.10	0.21

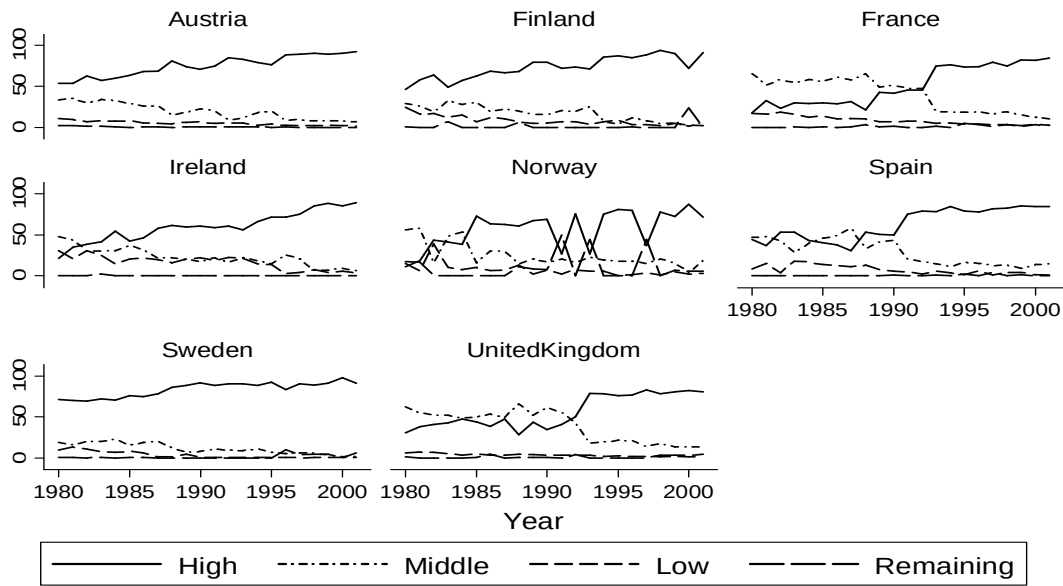
Table B1 Regression results of $Share_{pt} = a_1 + a_2 Elasticity_{pt} + a_3 t + \varepsilon_{pt}$ for each OECD country: the remaining countries

	Canada	Germany	Greece	Iceland	Japan
Elasticity	79.01 (49.65)***	153.80 (46.87)***	2.42 (2.09)**	21.53 (14.90)***	84.54 (66.50)***
Year	0.01 (0.24)	-0.08 (0.33)	0.41 (8.57)***	-0.11 (0.97)	-0.04 (0.65)
Constant	-49.33 (0.55)	79.27 (0.16)	-773.19 (8.18)***	241.49 (1.04)	59.85 (0.44)
Obs.	1377	715	1312	792	1372
R²	0.67	0.72	0.07	0.31	0.77

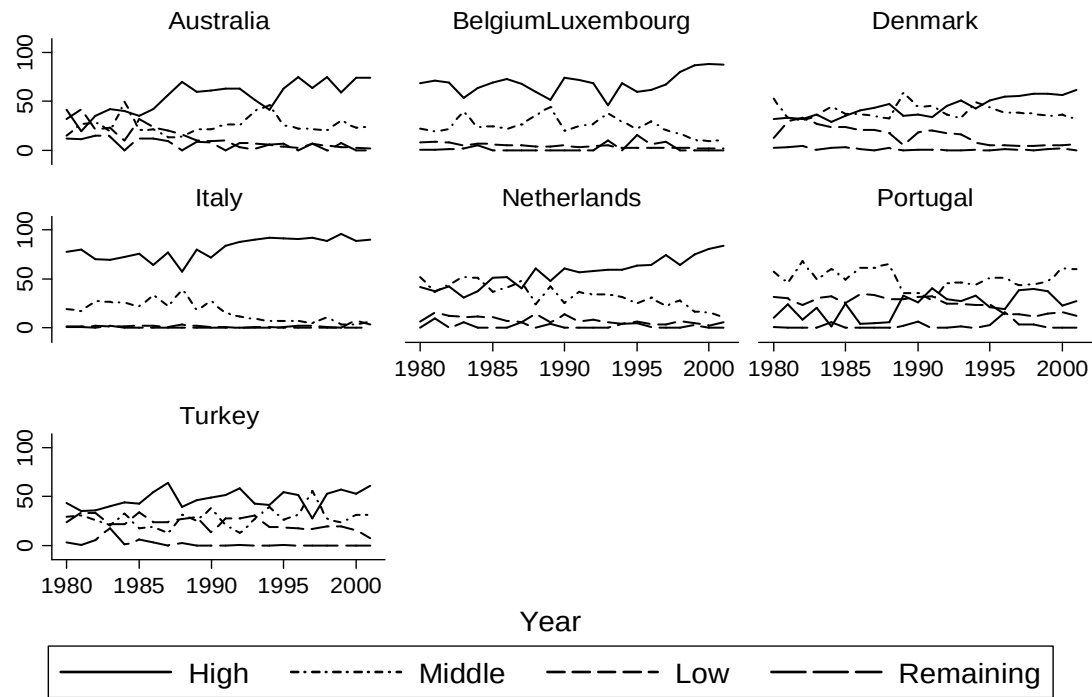
	New Zealand	Switzerland	United States	Turkey
Elasticity	-0.00 (0.00)	127.28 (51.85)***	125.43 (84.52)***	15.13 (17.16)***
Year	-0.59 (5.62)***	-0.62 (5.77)***	0.49 (6.79)***	-0.21 (5.02)***
Constant	1221.57 (5.82)***	1161.89 (5.48)***	-1028.92 (7.25)***	435.72 (5.28)***
Obs.	1353	1347	1387	1269
R²	0.04	0.66	0.77	0.24

Appendix C Shares of High, Middle and Low income-elastic products

The restructuring countries

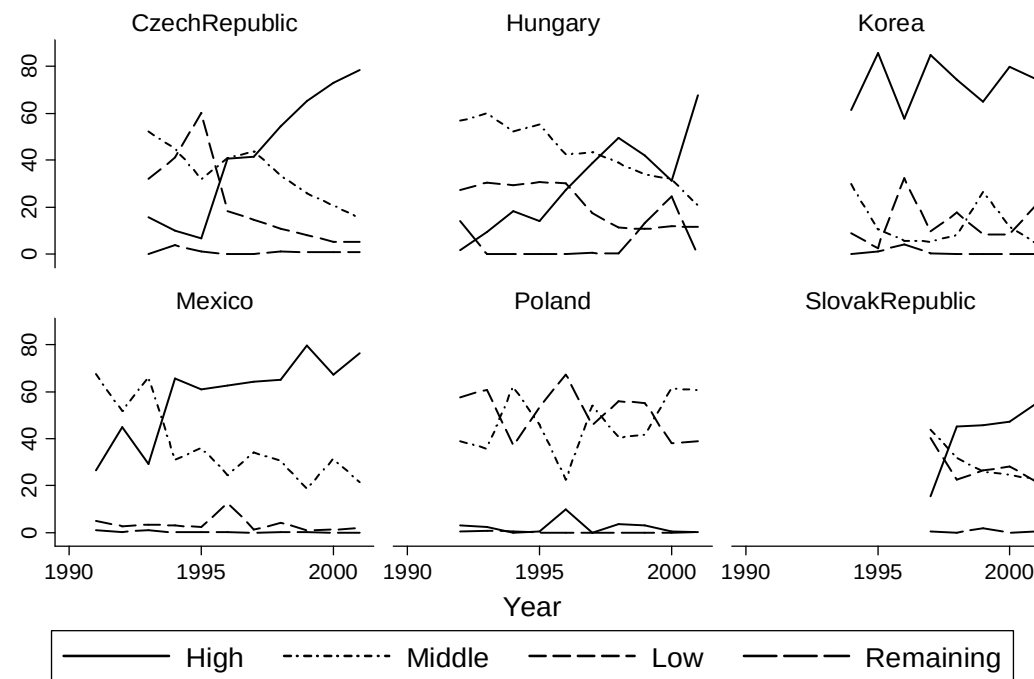


Graphs by Country



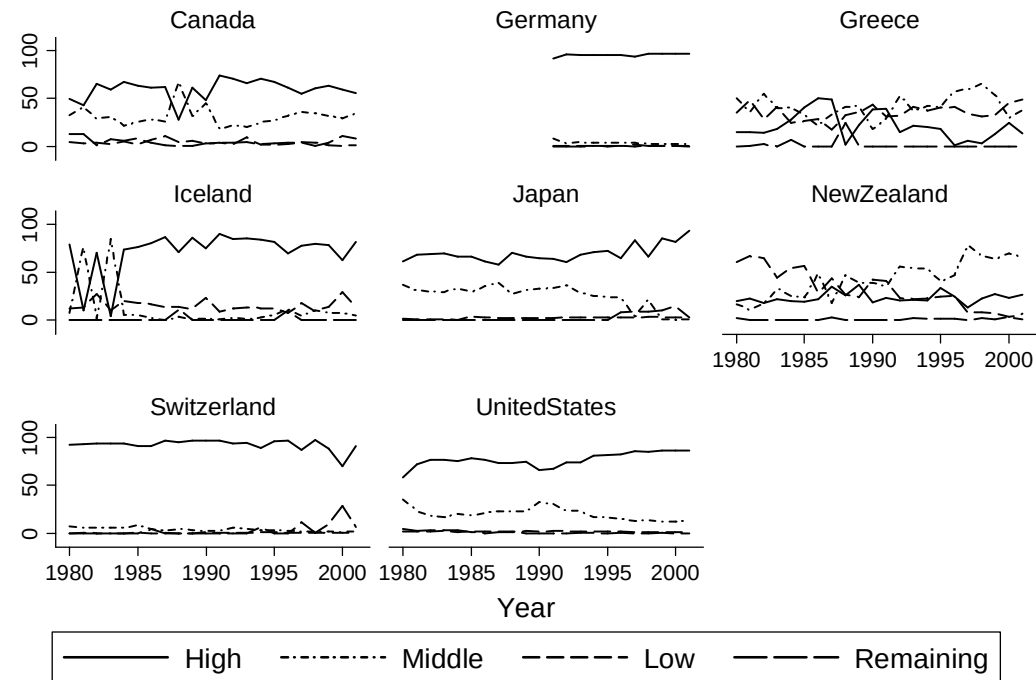
Graphs by Country

The new members of the OECD



Graphs by Country

The remaining countries



Graphs by Country

