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CHAPTER 1
MACROECONOMIC PROCESSES AND REGIONAL ECONOMIES MANAGEMENT

National Competitiveness as a Portfolio Assessing Past and Future Comparative and Competitive Advantages of Countries: the Case of the European Union

Robert Goedegebuure[1], Rob van Tulder[2]

Abstract

In this article the authors propose a portfolio model for identifying weak and strong industries at the national level. Apart from providing a conceptual model for describing national competitiveness, the model is used in actually looking at both the past and future competitveness of the countries of the European Union (EU). This is not only relevant because of the ambition of the EU to become the most competitive region in the world, but also because (candidate or current) Member States of the EU have their own policies for acieving national prosperity.

The portfolio model is based on the Balassa index, and extends it, by decomposing export growth, with indicators for what the authors call positional, competitive and targeting advantages. Based on the portfolio model country rankings have been calculated, and compared rankings proposed by other authors. Even though the ranking on future competiteveness seems to capture the various dimensions of backward looking rankings, some discrepancies call for additional research, preferably at the micro level and focuse on the international dimension of modern business.

Key words: country and industry studies; economic growth of open countries, technological change; international competitiveness; Comparative studies of countries.

1. Introduction: in search of national prosperity

The current attention to national competitiveness in western economies is not new (cf. El-Agraa, 1997; Porter and Stern, 1999; IMD, 2002; World Economic Forum, 2002; Eurostat, 2002; EU, 2001, 2002). Since the early 1980s worries about the competitiveness of European and American industries have been widespread, triggered by the increasing market shares of Japanese enterprises and enterprises from the newly industrializing countries in the Pacific rim, in industries that were traditionally dominated by western countries. In response to these worries, programs have been launched in the US and most European countries (e.g. Office of Technology Assessment (US) 1980, President's Commission on Industrial Competitiveness (US), 1985; Commission of the European Communities, 1994; Department of Trade and Industry (UK), various years; Dutch Ministry of Economic Affairs, 1996; NUTEK Sweden, 1999) in order to put a stop to the assumed deterioration of national competitiveness. Since the midst of the 1990s, many programs have become less defensive and more pro-active and future oriented. The Japanese and emerging economies threat had not really materialized – partly as the result of industrial and trade policies – whereas renewed regional dynamism through stepped-up integration especially in the European Union and North-America (NAFTA) has focused most of the attention of policy makers to inward-

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looking strategies. With the productivity gap between the United States and Europe again widening at the end of the 1990s, the issue of competitiveness has entered a new phase. The European Union is playing an active role in this debate. An official ambition of the European Union since the Lisbon March 2000 Summit is to become the world's "most competitive region" by 2010 (cf. European Union, http://europa.eu.int/comm/off/index_eu.htm).

The debate on competitiveness basically runs along two tracks: the relevance of the idea of national competitiveness and the definition of an appropriate yardstick to measure the relative competitive position of countries. The discussion on national competitiveness dates back to the 17th century Mercantilist view that trade is a zero sum game in which countries can only gain at the expense of other countries. Although subsequent theories (Smith, 1776; Ricardo, 1817) have pointed out that trade is likely to be mutually beneficial, advocates of free trade in modern times started to address the issue of *strategic trade* (Krugman & Obstfeld, 1997, pp. 275-297), which leaves some room open for the infant industry argument first proposed by List and Hamilton in the first half of the 19th century, now rejuvenated to include welfare effects of innovation in the creation of economies of scope next to economies of scale. Since the mid-1980s, especially American authors have declared national competitiveness of vital importance to the economic well being of countries (Zysman and Tyson, 1983; El-Agraa, 1997; Oughton, 1997; Francis *et al.*, 1989; Thurow, 1999). Perhaps Porter (1991) with his book the *Competitive Advantage of Nations* (1990) has come closest to matching the influence of Adam Smith's "Wealth of Nations" in modern times. Krugman (1994; 1996) proved to be the most eloquent critic of many of the allegations in the competitiveness of nations debate. Countries are incomparable to firms, he argued, while the concept of competitiveness simply cannot be applied to nations. Nations do not have a clear bottom line. They can be more or less satisfied with their performance, but they do not go bankrupt.

Francis' (1989) observation that virtually all of the debate about the competitiveness of national economies has been on measures rather than on definitions, however, still holds. Indeed, the number of reports and databases (World Economic Forum; IMD; Eurostat, various years) containing indicators of national competitiveness has increased drastically. But the sheer availability of data underscores, rather than satisfies the need for a clear definition. According to Krugman (1994), for a relatively closed economy like the US, national competitiveness – even though disputing the very relevance of the concept – boils down to productivity. Porter (1990, 1999), although reasoning along different lines, comes to exactly the same conclusion: competitiveness – measured by its above-average share in export markets – is equivalent to productivity; a nation's standard of living is determined by the productivity, which in turn is determined by its innovative capacity. For smaller and open countries, the issue of competitiveness is arguably more complex (Katzenstein 1985; Van Tulder, 1999; Van Den Bulcke and Verbeeke, 2001) because of the delicate balance between the interests of highly internationalized multinational enterprises (MNEs) and the domestic interests. The European Commission (EU, 2001; 2002) basically follows the same perspective as American authors by stressing the importance of productivity as yardstick for Europe's competitiveness in world markets.

Generally, a distinction can be made between indicators that measure whether or not a nation or its industries are competitive, and factors that determine competitiveness. Competitiveness studies tend to focus on the competitiveness climate, which is a construct of variables that describe the functioning the political system (e.g. economic policies, subsidies, collective bargaining power), the economic system (e.g. market competition, quality of the labor force, science & education) and management and information technology. These variables are to some greater or lesser extent at the discretion of policy makers, and they are assumed to contribute to national competitiveness. Empirical evidence on this assumption is scarce, and suggests that cause and effect processes are (i) industry specific, (ii) long-term rather than immediate and (iii) complex (Goedegebuure, 2000). With regard to the complexity, one should bear in mind that the value levels of the variables that measure the competitiveness climate are strongly correlated with the size of the country and the openness of the economy (which, in its turn, is correlated to the size of the economy). With regard to the correlations between the political system, country size and openness, an elegant theoretical underpinning can be found in Cameron (1978) and Rodrik (1998).

Despite controversies over concepts and yardsticks, national competitiveness considerations increasingly resonate in current industrial, innovation and trade policies which are often regrouped into *competitiveness* policies to create cohesion and allow for coordination. As in the earlier days, modern governments are still seeking ways to maximize their share of the benefits of trade, either by stimulating exports of domestic enterprises or blocking imports. At the same time, the rising influence of MNEs in the global economy, tends to reduce the policy margins of national governments, within small, open economies, but increasingly so also for the medium-sized countries in Europe (Van Den Bulcke and Verbeeke, 2001; Van Tulder, 1999).

How to go beyond the discussion on competitive and comparative advantages? How to take past competitiveness and future competitiveness into account, and are small countries better off than medium-sized countries in Europe? It is a challenging task to try to integrate the traditional concept of location bound and stable comparative advantages into a more dynamic and sophisticated approach. But, reversely, new approaches that fail to explicitly incorporate comparative advantages cannot claim to be full theories on internationalization. As an illustration of the latter, Porter (1998a, 1998b) states that although factor costs remain important in industries dependent on natural resources, in those where unskilled or semiskilled labor is the important portion of total cost, and in those where technology is simple and widely available, in many industries factor comparative advantage has long been an incomplete explanation for trade. True as this may be, the step that Porter makes towards explaining the need for a new paradigm based on the premises that national prosperity is created rather than inherited, seems to be a very big one. On the contrary, economists sticking very closely to the Ricardian theory (e.g. Krugman & Obstfeld, 1997; Lejour *et al.*, 1999) by making piecemeal additions to it, stay far removed from intuitively appealing contributions like the ones made by Porter and seem to deny the existence of national competitiveness.

This article aims at addressing the competitive position of European Union countries at the moment and in the foreseeable future. These questions will be dealt with in two steps. Firstly, by extending and synthesizing a number of the basic concepts and yardsticks of national competitiveness. The discussion will expand upon the commonly used Balassa Index (BI) as a measure of revealed comparative advantage (RCA) and integrate it with extensions of the concept of competitive advantage (section two). It will be argued why the BI by itself is insufficient for describing the competitive position of nations. Extending the BI with industry growth, degree of concentration and change in market share results in a portfolio model for evaluating the past and future competitive position of nations. The theoretical exercise, secondly, enables a reassessment of the empirical data of past competitiveness (section three) and allows for a new assessment of future competitiveness of countries (section four). Section five summarizes the findings, and suggests an agenda for future research.

2. Extending and synthesizing national competitiveness indicators

Revealed comparative advantage

As regards indicators that measure whether or not a nation and its industries are competitive, the concept of 'revealed comparative advantage' (RCA) has become particularly influential. The aim of the RCA concept as an indicator using observable data from trade, production and consumption has been to reveal an underlying, unobservable pattern of comparative advantages (Memedovic, 1994). Memedovic evaluated the numerous efforts that have been undertaken to construct RCA, especially since, as she argues, empirical studies use many sorts of RCA without overwhelming justification for any of them. Memedovic' conclusion is that it is impossible to empirically identify a valid measure of comparative advantage. From empirical tests on a number of commonly used RCAs, she finds that the majority of the variance in individual indices, including the BI, can be explained by one common factor, and therefore, there is no support for criticisms of the non-validity of alternative RCAs. Based on this conclusion, then, there is no reason to prefer one RCA index in particular. An adjusted form of the BI on export performance (Balassa, 1965, 1977, 1989) has been chosen since it is the most regularly used measure in modern economic lit-

erature (Bowen, 1983; Balance *et al.*, 1985; Tharakan *et al.*, 1989; Memedovic, 1994; Richardson and Zhang, 1999; Hinloopen & Van Marrewijk, 2001).

Tharakan *et al.* (1989), interestingly, do not make a distinction between comparative advantages and competitive advantages, which follows from their argument that the simple account of determinants of comparative advantage used in the Heckscher-Ohlin-Samuelson (HOS) theory, *viz.* capital and labor, has been enriched in later years by factors that are not location bound like, among others, economies of scale, degree of concentration and commercial policy variables. They use the version of the BI that measures the RCA of an industry within a country as:

$$RCA_i = \frac{x_i / m_i}{X_t / M_t}, \tag{1}$$

where:
RCA_i = revealed comparative advantage of industry *i*
x_i, m_i = value of exports, imports of industry *i*; $X_t=\sum x_i$, $M_t=\sum m_i$.

Tharakan *et al.* also use, as an alternative measure of competitiveness, the profitability of industries, which has some advantages and disadvantages over the BI. In using the BI one may find comparative advantages that are due to historical factors, even though the industry is in severe financial trouble. In this sense, the BI is, in the view of Tharakan *et al.*, a backward looking indicator. Profitability, in contrast, is forward looking. On the other hand, profitability is heavily influenced by short term factors that may draw attention away from longer term competitiveness. The correlation between the two indicators was, in the studies of Tharakan *et al.* in Belgium, quite weak, but, as the authors indicate, the joint information these indicators provide has important policy implications.

Hinloopen & Van Marrewijk (1998, 2001) confirm from their experiences in calculating the BI for the Netherlands, the finding of Tharakan *et al.* that the index is stable over time. This implies, according to the authors, that comparative advantages are stable (as location bound comparative advantages should be) and that the BI provides a good yardstick for measuring comparative advantages. In contrast to Tharakan *et al.*, Hinloopen & Van Marrewijk use a version of the BI that compares the trade patterns of several countries. Since this approach reflects the concept of 'nation-competing-nation', this paper follows the approach of Hinloopen & Van Marrewijk, though with a few adjustments (Goedegebuure & Van Tulder, 1999; Goedegebuure, 2000). The first adjustment is that the group of reference countries is defined as *all other* European Union (EU) countries rather than all EU countries (that is, including the country for which the BI is calculated), which results in figures that are better to interpret especially in those cases where countries are dominant in specific sectors. The second adjustment to the formula used by Hinloopen & Van Marrewijk is that, besides Japan, the US are included as a partner country. Inclusion of the US increases the coverage of EU exports six fold, while differences in the costs of transportation from various EU countries to the US can be ignored[1]. The adjustments lead to the following formulation for the BI.

$$BI_{E\to p,i} = \frac{EXP_{E\to p,i} \Big/ \sum_{i=1}^{I} EXP_{E\to p,i}}{\sum_{r=1}^{R} EXP_{r\to p,i} \Big/ \sum_{i=1}^{I}\sum_{r=1}^{R} EXP_{r\to p,i}}, \tag{2}$$

where:
$BI_{E\to p,i}$ = the *BI* for exporting country *E* ($E \notin$ [1..R]) and industry *i,*

[1] The different versions of the BI are quite robust at the ordinal level. However, in industries where (small) countries are more or less dominant, huge discrepancies occur.

$EXP_{E\to p,i}$; $EXP_{r\to p,i}$ = exports from *E, r*, to the set of partner countries *p*, in industry *i,*

E = the exporting country for which the index is calculated; all individual member states of the EU,

r = 1..R, the set of reference countries; all EU Member states except *E,*

i = 1..I, the set of industries, as approximated by the 97 *chapters*[1] of the Combined Nomenclature used within the EU for recording international trade,

p = the set of partner countries; US and Japan.

The BI, as any index, suggests that the higher the index is, the more of a certain property the object possesses. From the results one would be tempted to deduce that some small countries (Netherlands, Denmark, Portugal) have strong comparative advantages in certain industries, while other, especially larger European countries (Germany, France, UK) seem to be less well endowed. This can be illustrated with the use of Annex 1, which lists for all EU-countries except Luxemburg, which is included in the Belgium Luxemburg Economic Union, the five strongest industries and the five largest industries in terms of exports. Annex 1 identifies several industries with BIs[2] exceeding 20 (the equivalent of a transformed BI of approximately 0,90) for Finland (ships; paper), the Netherlands (live trees and plants; edible vegetables), Portugal (cork; textile) and Spain (ores and slag; fruits and nuts), the maximum BIs found for Germany (0,60), France (0,70), and the UK (0,82) are much lower. Given the stability of the index, this outcome cannot be accidental. The BI aims to measure the extent to which a country possesses comparative advantages within specific industries, but is relatively static.

Decomposing export growth

In order to find out what causes the divergence of BIs between countries of different sizes, and to see whether or not small countries are indeed better off, extensions to the BI are proposed that aim at identifying dynamic competitive advantages apart from stable comparative advantages. There are several reasons why growth adds an important dimension to the discussion of the BI.

First of all, if country strengths mainly have the nature of stable comparative advantages rather than competitive advantages, then a relative strong autonomous component in the economic growth of countries can be expected. Shifts in countries' shares in world trade will be mainly the result of diverging growth rates between industries in which they possess strong or weak positions. If, on the other hand, shares in world trade are co-determined by competitive advantages that can be influenced by national or industry specific policies, then one should expect a pattern of change in international trade shares of countries that is the result of both diverging growth rates in strong and weak industries *and* the ability of countries to influence their shares of the international market within specific industries. To that aim the various components of export growth are to be analyzed.

Figure 1 decomposes export growth for a specific country and a specific industry into three components. If the export flow in year *t* is represented by the rectangle ABDC, and in year *t+1* as AB^*EC^*, then:

- The first source of export growth can be dubbed **positional advantage**, due to autonomous growth of the industry. If the market share remains the same at AB, then the country's exports in the industry will increase autonomously by a factor C^*A/CA (area 1).

[1] The Combined Nomenclatures includes approximately 10.000 types of goods which have eight-digit codes; these codes are divided into 97 chapters (the first two digits) ranging from 1 to 99. Chapters 77 and 98 are empty, while chapter 99 contains secret information. The latter is included in the calculations.

[2] Technical note: The outcomes of the BI are in the range from 0 to infinity, and are centered around one. A disadvantage of the index in this form is its asymmetry: strong industries can assume very high values (the BI has a maximum value of 969 for Portugal), and all weak industries are condensed in the small range between 0 and 1. The following transformation has been applied.

$$BI^* = \frac{BI - 1}{1 + BI}$$

BI* is symmetrically distributed between –1 and +1, where 0 is the dividing point between weak and strong sectors.

- The second source of export growth is **competitive advantage**, and stems from an increase in market share. This is in line with Porter's definition of competitive advantage as expressed by above-average shares of international markets, for a country in a particular industry. Even if the industry does not show any growth, a country can increase its exports by a factor B^*A/BA through obtaining a higher share of the market (area 2).
- The third source of growth is **targeting advantage**, reflecting the combined effect of industry growth and changes in market share, depicted by area 3. This effect is the most dynamic source of export growth, but is often left out of the analysis. Especially the combined effect can be regarded as yardstick for the ability of a nation to adapt its portfolio of products and industries in the direction of promising markets[1].

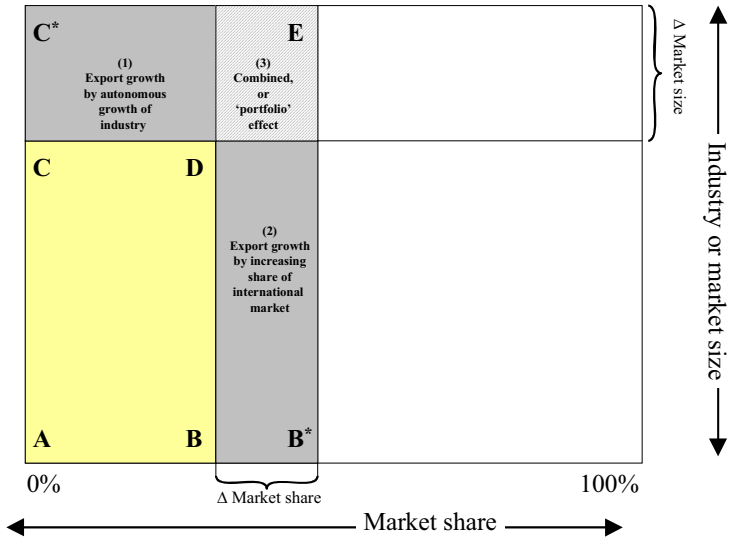

Fig. 1. Components of Export Growth

3. Reassessing Past Competitiveness on the basis of an extended Balassa Index

If it is assumed that the balance between stable, location bound or inherited comparative advantages on the one hand and dynamic, creatable competitive advantages on the other dips to the former, then the expectation is that changes in export flows are mainly due to diverging growth rates between industries. This can easily be tested from data on international trade.

To this aim export flows from EU countries to other EU countries have been extracted from the COMEXT database (Eurostat, 1995-1999), for the 1995-1999 period. International market shares relate to total demand within Europe, satisfied by either EU countries or third countries. The four-year period is long enough to identify shifts between industries and in countries' market shares. Using earlier years would introduce the risk of including data that are less reliable and less comparable, taking into consideration the changes in the system of data collection in foreign trade statistics within the EU[2]. Table 1 summarizes the aggregate results for all EU countries.

[1] A similar yardstick is provided in Eurostat's competitiveness indicators database (Eurostat, various years), under the heading 'picking winners', which refers to an approach toward national industrial policy that is currently out of date.

[2] It would also relate to a different institutional environment in which the European Union had neither yet materialized in its present shape (with 15 member countries), nor had NAFTA or the World Trade Organization's regime been implemented.

Table 1

Changes in export for EU countries decomposed into positional, competitive and targeting advantages; Countries ranked in descending order of export growth 1995-1999

Reporting country	(1) Export growth 1995-1999	(2) Positional advantage	(3) Competitive advantage	(4) Targeting advantage	(5) Total = (2)+(3)+(4)
IE	91.4%	47.4%	32.9%	19.7%	100%
UK	50.5%	78.3%	13.6%	8.1%	100%
NL	48.0%	69.3%	23.7%	7.0%	100%
AU	38.9%	84.0%	13.8%	2.3%	100%
FI	36.9%	70.9%	23.5%	5.6%	100%
ES	36.8%	92.6%	7.5%	-0.1%	100%
BELU	35.5%	86.1%	11.4%	2.5%	100%
SE	35.0%	98.9%	1.8%	-0.7%	100%
FR	33.3%	113.1%	-8.6%	-4.6%	100%
PT	33.1%	95.5%	5.1%	-0.6%	100%
DE	28.5%	144.2%	-32.3%	-11.8%	100%
IT	24.1%	135.7%	-25.3%	-10.4%	100%
DK	22.6%	148.7%	-35.9%	-12.8%	100%
GR	5.3%	456.7%	-274.5%	-82.2%	100%
Correlation of the three types of advantages (colums 2 to 4) to export growth (column 1)	**-**	**-0,66**	**0,63**	**0,73**	

Overall, within the EU, the effect of changes in market shares is relatively small, since, as the European market is mainly served by EU countries, gains in market share by one country will be largely to the detriment of other EU countries. However for individual countries the role of market share changes is quite important. For the Netherlands, about one quarter of growth is realized through increases in market shares, which is, in relative terms the second best performance within the EU after Ireland. German exports, in absolute terms, have grown slightly more than Dutch exports, but the contribution of each of the three sources of growth is quite different. German exports only grew because of autonomous growth, which compensated for losses in market share (negative competitive advantages) that occurred especially in high growth markets (negative targeting advantage). It is striking to find that the correlation between export growth and *positional advantage* is strongly negative, and the correlation between export growth and both *competitive* and *targeting advantages* is strongly positive, implying that the ability to compete and the flexibility to do so in high growth industries, rather than historical positions, are crucial in achieving success in international markets. The next important question that does not follow automatically from the sheer detection of competitive and targeting advantages, is from what set of national institutions these advantages originate. In this respect it is interesting to draw a comparison between three country rankings on competitive advantage (Table 2).

- Porter and Stern (1999) assert that country innovativeness is the key to long-term competitiveness. On the basis of innovativeness they make a ranking of seventeen countries over time, including ten EU countries. The ranking of these EU countries, which is identical for the years 1995 and 1999, is presented in Table 2.
- Using factor analysis, four groups of variables (management, government, business environment and markets) have been identified that account for the majority of the

variance in the indicators used in the 1998 Global Competitiveness Report (World Economic Forum) and World Competitiveness Yearbook (IMD Lausanne). The sum of the country scores over these four factors produced the country ranking in WCY/GCR column (Goedegebuure, 2000).

- The third ranking is the "competitive advantage" ranking (column 3) that we have calculated in Table 1 for the ten EU countries that are also part of the Porter & Stern ranking[1].

In addition, the ranking based on the assessment of the future competitiveness of countries, to be discussed in Table 4 in section 4, has been added.

Table 2

Correlation matrix

Country	Innovation Porter, 1995, 1999	Competitiveness Factors WCY/GCR, 1998	Past Competitiveness Portfolio 2002	Future Competitiveness (Table 5)
Sweden	1	8	6	2
Germany	2	3	9	7
Finland	3	1	2	4
Denmark	4	4	10	5
France	5	7	7	8
Netherlands	6	2	1	3
Austria	7	6	3	10
United Kingdom	8	5	4	1
Italy	9	10	8	9
Spain	10	9	5	6
Correlation matrix				
Porter, 1995, 1999	1		-0,20	0,27
WCY/GCR, 1998		1	0,35	0,36
Portfolio, 2002			1	0,31
Future Competitiveness, 2002				1

From the correlation matrix that is added to the comparison of rankings in Table 2 it can be concluded that both Porter & Stern's ranking and the portfolio ranking correlate positively with the ranking based on WCY/GCR factors (0.45 and 0.38, respectively), but that the correlation between the portfolio ranking and that of Porter & Stern is negative. In Porter & Stern's analysis, Sweden has been among Europe's top two countries in innovativeness since the 1980s. In the 1980s and early 1990s it ranked second after Germany, and after being the top European country in the 1995-1999 period it can be expected to be overhauled by Finland and Denmark in the early 21st century. This expectation is peculiar when facing the fact that the portfolio analysis reveals that Sweden and Denmark have produced average or below average export growth rates, while none of their export growth is due to market share increases or superior targeting. The same holds true for Germany, which is, according to Porter & Stern, second after Sweden in 1999 although expected to slip in the years ahead. Germany is losing its share of the international market and especially so in high growth sectors, evidencing the fact that its leading position in innovativeness in the 1980s and 1990s was not so much a key to long-term competitiveness as it was tied to its strong position in R&D intensive industries.

[1] Note that Ireland – the no.1 in the ranking of Table 1 – has been omitted from this table.

4. Assessing Future Competitiveness on the basis of Portfolio

Concentration

It turns out that the maximum values of BIs differ considerably between countries. Smaller countries like Portugal, Denmark and the Netherlands have high maximum values when compared to larger countries like Germany, France and the UK (see Table 1). Very high maximum values suggest that countries are dominant in the specific industry. A dominant position in an industry creates a very different situation for a country, since export growth can only be achieved by means of industry growth (which to some extent may be controllable by the dominant country) rather than market share growth. The concentration is calculated as a Herfindahl index, which sums the squared market shares of all supplying countries.

$$CONC_i = \sum_{e=1}^{E} \left(share_{e,i}\right)^2, \tag{3}$$

where:

$CONC_i$ = the degree of concentration in industry i,

i = 1..I: the set of industries,

e = 1..E: the set of countries exporting to the EU; all EU-countries, Japan and the US

$share_{e,i}$ = the share of exporting country e in the international demand of EU-countries in industry i.

A property of the Herfindahl index is that its reciprocal value can be interpreted as the equivalent number of suppliers of equal size. An index of 0.50, for instance, tells in a glance that the industry is dominated by the equivalent of two suppliers of equal size. The theoretical maximum value for CONC is 1.00 and the theoretical minimum value is 1.00 divided by the number of exporting countries included in the calculation. In our calculations 16 countries[1] have been included, leading to a theoretical minimum value of 0.0625. From the data it turns out that the overall value for the EU is 0.11, implying that the 16 exporting countries do not serve the EU market in equal amounts (as can be expected given the varying country sizes) but that the EU market is served by the equivalent of approximately nine countries of equal size. However, the concentration varies across industries. From Table 3 it turns out that the median value of CONC for the 97 industries is 0.153, and the first and third quartiles are located at 0.133 and 0.182. The maximum value of CONC is 0.526, (for live trees and other plants), and the minimum value 0.105 (for fur skins and artificial fur).

Table 4

Overview of concentration across industries

25% quartile	0.133	
Median value	0.153	
75% quartile	0.182	
Highest values	0.526	Ch. 06: Live trees and other plants
	0.457	Ch. 45: (Articles of) cork
	0.393	Ch. 50: Silk
Lowest values	0.105	Ch. 43: Furskins and articles of fur
	0.113	Ch. 68: Articles of stone

Smaller countries have higher maximum Balassa indices, and a relatively large proportion of their exports occurs in relatively concentrated industries. Out of all Dutch and Portuguese exports, respectively 17% and 16% stem from industries in the 75% quartile.

[1] The 16 countries include the 15 EU countries minus Luxemburg (which is incorporated in the Belgium Luxemburg Economic Union), plus the United States and Japan.

On the contrary, only 7% of German exports belongs to concentrated industries. Evidently, small countries tend to rely more strongly on specialization in international niche markets, whereas larger countries concentrate on the larger, competitive markets. The position of small countries can be illustrated by the Dutch exports in *live trees and other plants*: not only is this industry relatively important within the Dutch export package, but it is also the industry that is internationally the most concentrated (CONC=0.526) of the 97 industries that have been distinguished.

The portfolio box

The combination of the four dimensions discussed above (revealed comparative advantage, industry growth, market share growth and concentration) can be represented by a *portfolio box* that depicts the competitive potential of national industries.

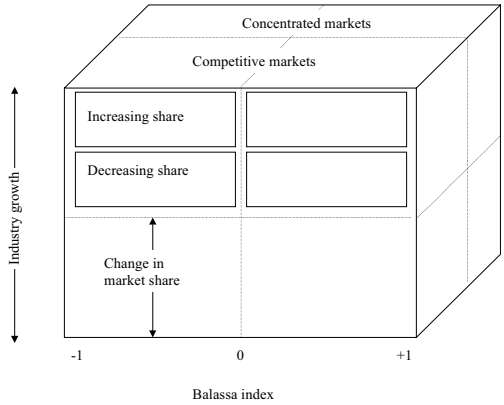

Fig. 2. The Portfolio Box

The largest and strongest export industries[1] for all the EU countries are displayed in Annex 2. The sizes of the circles reflect the size of the international market; the smaller concentric circles indicate the share of the market. The vertical axis represents the average yearly growth rate of exports. The following conclusions can be drawn:

- Dominant market positions tend to occur in niche markets, in which small countries (the Netherlands, Belgium, Finland, Portugal) have achieved substantial market shares. Important as these industries may be for the countries involved, in general they show low growth rates, and therefore a strong focus on these industries will tend to hollow out the overall international position of the country.
- An exceptional case is Ireland, where a considerable overlap exists between the strength of the international position held by the industry and the share of the industry in the export package. In other words: Ireland has strong positions in the industries that matter. Moreover, all these industries are in the high growth category.
- Germany excels in the vehicle industry, for which both the international market and the German share of the market are substantial. Germany's export growth is mainly due to the fact that it holds strong positions in these relatively rapid growing industries, which more than compensate for decreasing exports due to market share losses.
- The weakness of Greece is revealed by its absence in any substantial international markets. Its international position is shaped by a relatively strong position in small markets (salt; cotton; fats and oils) with below average growth rates.
- An exception to the stereotypical small country case is Sweden, which has a rather strong position in industries with substantial international markets (pharmaceutical

[1] In annex 2, the five industries with the largest exports and the five industries with the largest Balassa indices are included. The number of industries is less than 10 if the groups overlap.

products; vehicles), which makes Sweden less dependent on its strong position in low growth niche markets (wood; cereals).

On the basis of the dimensions of the portfolio box, a ranking of countries on future competitiveness is derived in Table 4. The ranking is based on the export flows in star industries for each country. A star industry is defined as an industry in which the country holds either

- a fairly strong position ($BI^{*}>0$) while being able to increase its share of the market, in industries for which the international market shows above average growth rates, or
- a strong position ($BI^{*}>0.20$) either in industries in which it has an increasing share of the market, or in industries with above average growth rates.

Note that the fourth dimension of the portfolio box is not used in the identification of star industries. The reasons are that countries are unlikely to further increase their market shares in industries that are dominated by one or two countries, while at the same time these industries show only moderate growth. Furthermore, high concentration is typical for specific small industries, and for small countries. Therefore, it is not a variable of interest when comparing a larger set of countries and industries – as is the aim of this article – , although it is highly relevant in studying small countries.

Table 4

Summary of the Portfolio Analysis Ranking of future competitiveness based on star industries

Ranking of future competitiveness	Country	Number of 'star industries'	Proportion of export in 'star industries'
1	Ireland	8	57%
2	United Kingdom	8	48%
3	Sweden	9	45%
4	Greece	13	43%
5	Netherlands	19	38%
6	Finland	14	36%
7	Denmark	12	35%
8	Belgium/Luxemburg	17	31%
9	Spain	32	26%
10	Portugal	16	24%
11	Germany	3	19%
12	France	14	18%
13	Italy	19	18%
14	Austria	18	16%

In order to make a comparison with the country rankings on past competitiveness discussed earlier, the proposed ranking on future competitiveness is included in Table 2. Again, the conclusion is that there are serious discrepancies between this ranking and the other three rankings, for example in the cases of Sweden and Germany. However, from the positive correlations in the last column of Table 2 it seems that the ranking on future competitiveness captures the various dimensions (´innovation´, ´competing ability´, ´targeting advantage´) of all others. Overall, countries can be classified as follows:

- countries whose either high or low competitiveness is not in doubt, and
- countries whose competitive position is significantly different across the four rankings discussed in this article.

The strong competitiveness of Finland, for instance, is beyond doubt. There would be hardly any room for discussion on Ireland either, if it were included in the list of countries ranked by Porter and Stern. Nor is there a question about the weak competitiveness of France, Italy, Austria and Spain, although our portfolio and future competitiveness rankings are a milder judge to

Spain than the Porter & Stern and WCY/GCR rankings, while the reverse is the case for France. Serious differences occur in the cases of Sweden, Germany and the UK. Evidently, Germany's strong position in innovation is not reflected in increasing market shares in promising markets. Sweden's leading position in innovation has not been evidenced by strong competitive and targeting advantages, although still a large proportion of its exports do occur in star industries. The United Kingdom, in contrast, is found to be low in innovation, but a major part of its exports relate to star industries, and moreover, the UK has an ability to increase its market share in high growth industries.

5. Summary & Conclusions

In this article an extended analytical framework has been proposed for determining the international competitive position of countries. The framework has been applied to the European Union member countries. It consists of a portfolio box that categorizes a country's industries along four dimensions: (1) revealed comparative advantage, (2) industry growth rate, (3) change in market share and (4) degree of industry concentration. It was shown that there are wide differences across European countries, which point to fundamental differences in their competitive positions. Small countries (Netherlands, Portugal, Denmark) tend to specialize in niche markets in which they are more or less dominant due to advantages that can be said to be of a comparative (stable, probably location bound) nature. Large countries (Germany) depend on their ability to compete in large industries with large international markets. Country size matters for competitiveness portfolios. By decomposing trade growth into three components that have been labelled positional, competitive and targeting advantage, it was demonstrated that success on international markets is strongly tied to the ability of countries to compete in high growth markets, rather than to being present in large (and mostly R&D intensive) international industries. This is one of the reasons that our country ranking deviates strongly from the ranking of Porter & Stern, which is largely based on the innovativeness of countries. The other reason is that country rankings are obviously based on input indicators (e.g. R&D expenditures) rather than output indicators (R&D effectiveness). This is evidenced by the fact that for innovative countries like Sweden and Germany, innovativeness has clearly not been the key to long-term competitiveness. However, to state that the puzzle of national competitiveness has not been solved is one thing. To actually solve the puzzle is quite another. In the view of the authors, the portfolio box offers a more sophisticated approach for identifying internationally successful industries than the methods that have been used so far. At the second stage, one has to go down from the macro level of analysis to the industry level or even micro level of analysis in order to determine what industry or enterprise specific factors lie at the heart of international success. Research in this respect has to be broadened to international aspects, especially in the case of small and open countries, in which the goals of the multinational enterprises that are dominant within the economy and the national government are less likely to coincide than in the case within large and relatively closed economies. In this second stage research, one should also look at the factor profitability, at either the industry or the enterprise level, since Tharakan *et al.* are right in observing that import and export flows are to some extent historically determined, while the main quest is for industries and enterprises that are competitive now and are expected to be competitive in the years ahead.

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Annex 1

Table 1

Overview of country portfolios. The five industries with the highest BIs and the five industries with the largest export flows

BI	Exp	CN	TITLE	BI_99	Export99	GR	MS	BI	Exp	CN	TITLE	BI_99	Export99	GR	MS
Austria								Denmark							
1	6	44	(ARTICLES OF) WOOD	0,87	2.294.506	5,1%	13%	1	3	02	MEAT	0,99	2.672.265	1,1%	15%
2	19	86	RAILWAY LOCOMOTIVES	0,83	641.606	6,6%	16%	2	14	16	PREPARATIONS OF MEAT, FISH	0,97	889.249	4,2%	17%
3	20	83	ARTICLES OF BASE METAL	0,80	628.924	7,1%	6%	3	11	04	DAIRY PRODUCE	0,84	1.363.986	1,0%	6%
4	68	93	ARMS AND AMMUNITION	0,75	74.966	9,4%	5%	4	56	05	PRODUCTS OF ANIMAL ORIGIN	0,81	89.599	2,0%	10%
5	41	81	OTHER BASE METALS	0,74	223.982	9,0%	13%	5	22	35	ALBUMINOUS SUBSTANCES	0,80	503.989	7,1%	9%
29	1	84	MACHINERY AND MECHANICAL APPLIANCES	0,02	10.937.198	10,0%	3%	26	1	84	MACHINERY AND MECHANI-CAL APPLIANCES	-0,07	6.205.866	10,0%	2%
23	2	85	ELECTRICAL MACHINERY	0,18	8.800.594	11,1%	4%	19	2	85	ELECTRICAL MACHINERY	0,06	4.686.691	11,1%	2%
33	3	87	VEHICLES	-0,03	6.316.069	10,0%	2%	1	3	02	MEAT	0,99	2.672.265	1,1%	15%
22	4	48	PAPER AND PAPERBOARD	0,20	2.966.837	2,8%	5%	10	4	94	FURNITURE	0,66	2.147.286	8,9%	7%
35	5	39	PLASTIC (PRODUCTS)	-0,07	2.490.250	4,8%	3%	6	5	03	FISH	0,79	2.059.261	8,9%	25%
Belgium								Spain							
1	4	71	NATURAL OR CULTURED PEARLS	0,87	12.303.635	7,1%	31%	1	56	26	ORES, SLAG AND ASH	0,98	250.724	1,7%	11%
2	38	31	FERTILIZERS	0,84	890.963	-1,6%	28%	2	4	08	EDIBLE FRUIT AND NUTS	0,98	3.070.364	3,3%	30%
3	17	57	CARPETS	0,82	1.931.207	1,2%	45%	3	19	20	PREPARATIONS OF VEGETA-BLES	0,94	1.199.096	5,4%	12%
4	59	79	ZINC	0,80	408.782	7,2%	20%	4	20	03	FISH	0,94	1.185.183	8,9%	13%
5	73	53	TEXTILE FIBRES; PAPER YARN	0,75	238.597	2,9%	22%	5	38	25	SALT; SULPHUR	0,91	573.272	3,7%	9%
29	1	87	VEHICLES	-0,04	22.996.621	10,0%	10%	67	1	87	VEHICLES	-0,32	24.001.157	10,0%	10%
41	2	84	MACHINERY AND MECHANICAL APPLIANCES	-0,28	15.351.829	10,0%	5%	65	2	84	MACHINERY AND MECHANI-CAL APPLIANCES	-0,29	9.463.476	10,0%	3%

Table 1 (continuous)

BI	Exp	CN	TITLE	BI_99	Export99	GR	MS	BI	Exp	CN	TITLE	BI_99	Export99	GR	MS
21	3	39	PLASTIC (PRODUCTS)	0,26	12.445.416	4,8%	17%	66	3	85	ELECTRICAL MACHINERY	-0,32	6.805.603	11,1%	3%
1	4	71	NATURAL OR CULTURED PEARLS	0,87	12.303.635	7,1%	31%	2	4	08	EDIBLE FRUIT AND NUTS	0,98	3.070.364	3,3%	30%
48	5	85	ELECTRICAL MACHINERY	-0,34	10.969.265	11,1%	6%	48	5	39	PLASTIC (PRODUCTS)	0,02	3.045.306	4,8%	4%
Germany								Finland							
1	2	87	VEHICLES	0,60	91.673.408	10,0%	35%	1	8	89	SHIPS	0,95	1.003.837	8,9%	22%
2	14	32	DYEING EXTRACTS	0,43	5.810.574	6,6%	31%	2	2	48	PAPER AND PAPERBOARD	0,92	8.052.996	2,8%	16%
3	95	67	PREPARED FEATHERS	0,38	26.374	1,7%	14%	3	22	43	FURSKINS AND ARTIFICIAL	0,86	208.185	-1,6%	12%
4	88	78	LEAD	0,33	101.125	4,6%	19%	4	24	79	ZINC	0,86	194.130	7,2%	13%
5	65	09	COFFEE, TEA	0,32	598.980	-0,5%	27%	5	56	10	CEREALS	0,83	30.945	-1,4%	0%
24	1	84	MACHINERY AND MECHANICAL APPLIANCES	0,07	94.052.210	10,0%	24%	21	1	85	ELECTRICAL MACHINERY	0,08	9.407.200	11,1%	3%
1	2	87	VEHICLES	0,60	91.673.408	10,0%	35%	2	2	48	PAPER AND PAPERBOARD	0,92	8.052.996	2,8%	16%
26	3	85	ELECTRICAL MACHINERY	-0,02	55.174.234	11,1%	22%	29	3	84	MACHINERY AND MECHANI-CAL APPLIANCES	-0,19	4.715.047	10,0%	1%
11	4	99	OTHER PRODUCTS	0,20	25.015.272	19,4%	84%	6	4	44	(ARTICLES OF) WOOD	0,83	2.348.153	5,1%	13%
18	5	39	PLASTIC (PRODUCTS)	0,14	21.821.981	4,8%	24%	43	5	87	VEHICLES	-0,53	1.644.244	10,0%	1%
France								Italy							
1	34	42	ARTICLES OF LEATHER	0,70	1.415.410	5,7%	24%	1	62	50	SILK	0,95	313.107	-4,3%	69%
2	96	14	VEGETABLE PLAITING MATERI-ALS	0,68	9.952	-0,3%	19%	2	45	15	FATS AND OILS	0,89	885.639	-0,2%	13%
3	4	88	AIRCRAFT	0,67	30.994.266	16,9%	42%	3	19	41	HIDES AND SKINS	0,88	2.743.333	-1,1%	39%
4	11	33	ESSENTIAL OILS	0,66	6.615.614	10,7%	34%	4	6	62	ARTICLES OF APPAREL	0,88	6.858.736	5,4%	27%
5	8	22	BEVERAGES	0,61	8.610.580	8,6%	36%	5	24	51	WOOL, FINE AND COARSE ANIMAL HAIR	0,86	2.218.661	-3,3%	46%
36	1	84	MACHINERY AND MECHANICAL APPLIANCES	0,00	42.818.101	10,0%	13%	49	1	84	MACHINERY AND MECHANI-CAL APPLIANCES	-0,08	46.136.642	10,0%	12%
84	2	87	VEHICLES	-0,58	35.051.077	10,0%	14%	73	2	87	VEHICLES	-0,50	18.905.441	10,0%	7%
33	3	85	ELECTRICAL MACHINERY	0,01	33.152.754	11,1%	14%	74	3	85	ELECTRICAL MACHINERY	-0,52	14.704.371	11,1%	6%

Table 1 (continuous)

BI	Exp	CN	TITLE	BI_99	Export99	GR	MS	BI	Exp	CN	TITLE	BI_99	Export99	GR	MS
3	4	88	AIRCRAFT	0,67	30.994.266	16,9%	42%	12	4	94	FURNITURE	0,71	9.095.955	8,9%	27%
44	5	39	PLASTIC (PRODUCTS)	-0,11	9.741.588	4,8%	13%	50	5	39	PLASTIC (PRODUCTS)	-0,09	8.100.296	4,8%	10%
Greece								Netherlands							
1	5	24	TOBACCO	0,99	471.774	10,3%	3%	1	8	06	LIVE TREES AND PLANTS	0,99	5.671.388	8,4%	76%
2	15	43	FURSKINS AND ARTIFICIAL FUR	0,98	203.351	-1,6%	13%	2	14	07	EDIBLE VEGETABLES	0,96	3.110.563	3,5%	32%
3	12	25	SALT; SULPHUR	0,98	251.605	3,7%	4%	3	27	18	COCOA (PREPARATIONS)	0,79	1.599.893	3,3%	26%
4	4	52	COTTON	0,96	490.189	0,2%	6%	4	41	12	OIL SEEDS	0,78	950.188	3,6%	34%
5	7	20	PREPARATIONS OF VEGETA-BLES	0,94	446.902	5,4%	4%	5	80	80	TIN	0,72	107.067	3,8%	47%
6	1	61	ARTICLES OF APPAREL	0,92	1.072.860	8,9%	6%	38	1	84	MACHINERY AND MECHANI-CAL APPLIANCES	0,01	36.782.320	10,0%	12%
23	2	27	MINERAL FUELS	0,26	926.745	5,9%	0%	49	2	85	ELECTRICAL MACHINERY	-0,12	15.822.982	11,1%	8%
8	3	15	FATS AND OILS	0,76	499.304	-0,2%	9%	59	3	27	MINERAL FUELS	-0,33	13.209.820	5,9%	29%
4	4	52	COTTON	0,96	490.189	0,2%	6%	68	4	87	VEHICLES	-0,42	10.646.871	10,0%	5%
1	5	24	TOBACCO	0,99	471.774	10,3%	3%	29	5	39	PLASTIC (PRODUCTS)	0,13	10.054.136	4,8%	14%
Ireland								Portugal							
1	16	35	ALBUMINOUS SUBSTANCES	0,79	448.822	7,1%	11%	1	8	45	(ARTICLES OF) CORK	1,00	739.916	10,2%	66%
2	3	29	ORGANIC CHEMICALS	0,73	11.871.501	8,1%	20%	2	7	63	TEXTILE ARTICLES	0,99	761.663	8,0%	20%
3	5	99	OTHER PRODUCTS	0,72	2.566.355	19,4%	8%	3	12	47	PULP OF WOOD	0,89	467.767	-6,5%	11%
4	4	30	PHARMACEUTICAL PRODUCTS	0,47	4.078.937	16,6%	9%	4	52	93	ARMS AND AMMUNITION	0,88	42.738	9,4%	4%
5	6	33	ESSENTIAL OILS	0,47	2.404.565	10,7%	16%	5	68	05	PRODUCTS OF ANIMAL ORIGIN	0,85	20.634	2,0%	2%
14	1	84	MACHINERY AND MECHANICAL APPLIANCES	-0,05	15.980.282	10,0%	5%	76	1	87	VEHICLES	-0,86	3.364.631	10,0%	2%
7	2	85	ELECTRICAL MACHINERY	0,30	12.475.584	11,1%	6%	37	2	85	ELECTRICAL MACHINERY	-0,06	2.979.795	11,1%	2%
2	3	29	ORGANIC CHEMICALS	0,73	11.871.501	8,1%	20%	8	3	61	ARTICLES OF APPAREL	0,71	1.805.130	8,9%	11%
4	4	30	PHARMACEUTICAL PRODUCTS	0,47	4.078.937	16,6%	9%	11	4	64	FOOTWEAR	0,65	1.539.845	6,6%	11%
3	5	99	OTHER PRODUCTS	0,72	2.566.355	19,4%	8%	45	5	84	MACHINERY AND MECHANI-CAL APPLIANCES	-0,27	1.271.564	10,0%	0%

Table 1 (continuous)

BI	Exp	CN	TITLE	BI_99	Export99	GR	MS	BI	Exp	CN	TITLE	BI_99	Export99	GR	MS
Sweden								United Kingdom							
1	13	47	PULP OF WOOD	0,86	1.286.290	-6,5%	29%	1	21	97	WORKS OF ART	0,82	2.229.376	8,9%	67%
2	47	10	CEREALS	0,86	125.318	-1,4%	1%	2	4	27	MINERAL FUELS	0,79	14.186.968	5,9%	31%
3	6	44	(ARTICLES OF) WOOD	0,70	2.906.112	5,1%	15%	3	58	01	LIVE ANIMALS	0,58	469.702	1,2%	8%
4	14	82	TOOLS	0,55	829.337	7,5%	8%	4	16	49	BOOKS, NEWSPAPERS	0,56	3.011.015	4,2%	21%
5	71	65	HEADGEAR	0,49	36.979	8,0%	5%	5	48	17	SUGAR (CONFECTIONERY)	0,53	565.968	2,1%	9%
6	1	85	ELECTRICAL MACHINERY	0,40	16.795.818	11,1%	6%	12	1	84	MACHINERY AND MECHANI-CAL APPLIANCES	0,11	52.093.143	10,0%	16%
24	2	84	MACHINERY AND MECHANICAL APPLIANCES	-0,01	11.729.480	10,0%	3%	14	2	85	ELECTRICAL MACHINERY	0,08	35.300.178	11,1%	17%
12	3	87	VEHICLES	0,28	9.175.080	10,0%	4%	53	3	87	VEHICLES	-0,23	24.796.738	10,0%	10%
14	4	48	PAPER AND PAPERBOARD	0,23	6.317.825	2,8%	13%	2	4	27	MINERAL FUELS	0,79	14.186.968	5,9%	31%
15	5	30	PHARMACEUTICAL PRODUCTS	0,20	3.705.239	16,6%	7%	19	5	90	OPTICAL INSTRUMENTS	0,04	9.921.893	9,5%	16%

BI, BI_99 = Ranking (BI) of industries by 1999 Balassa index (BI_99), for each EU country
Exp, Export = Ranking (Exp) of industries by size of 1999 export flow (Export99), for each EU country
CN, titel = Chapter plus titel of Combined Nomenclature
GR= Yearly industry growth rate 1995-1999, based on all exports by EU countries
MS= Market share of country by industry, 1999 (country exports / EU exports)

Annex 2

Country positions

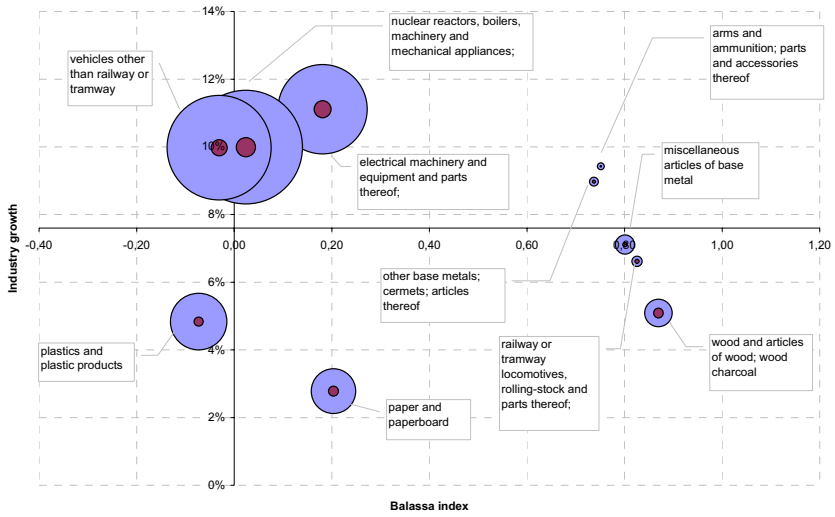

Fig. 1. Position of major industries, Austria 1999

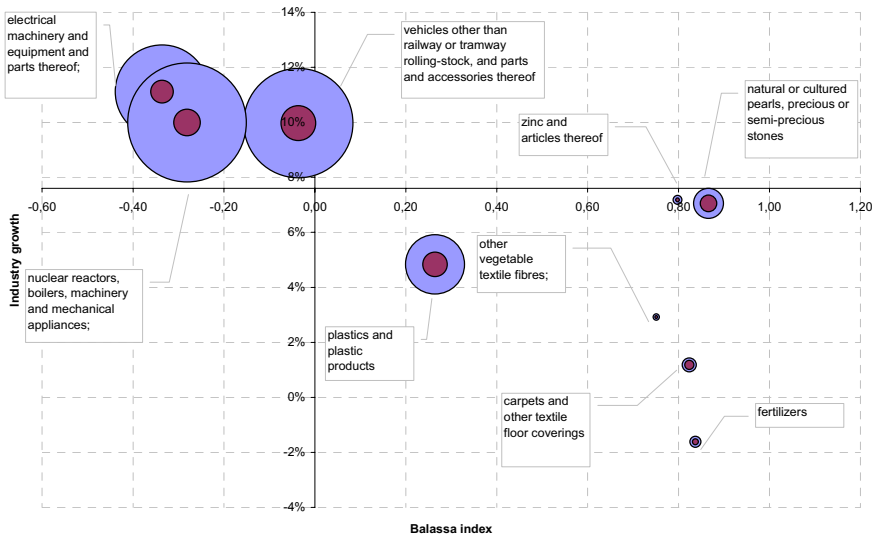

Fig. 2. Position of major industries, Belgium 1999

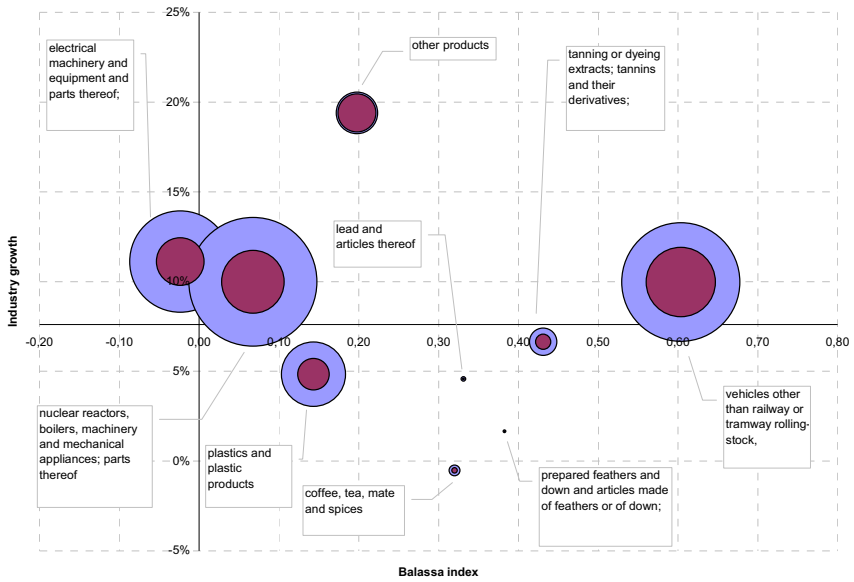

Fig. 3. Position of major industries, Denmark 1999

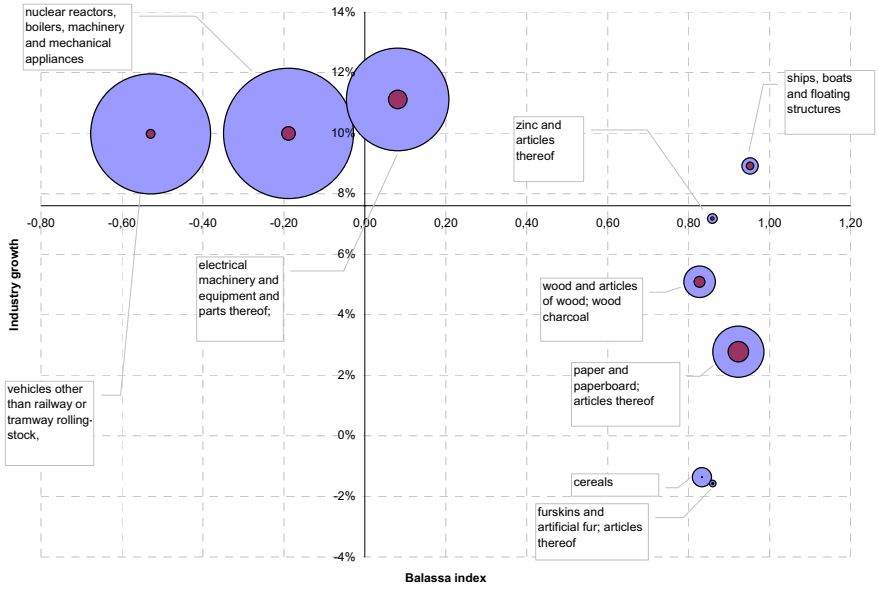

Fig. 4. Position of major industries, Finland 1999

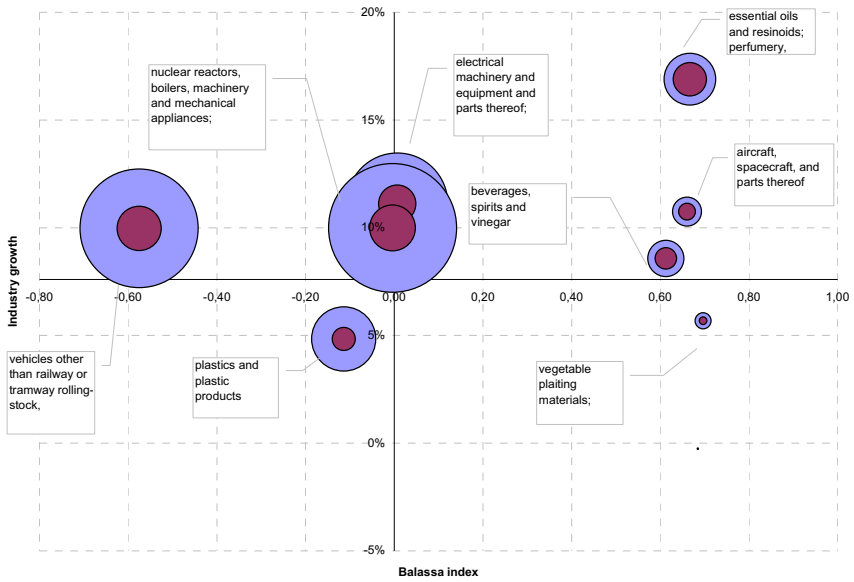

Fig. 5. Position of major industries, France 1999

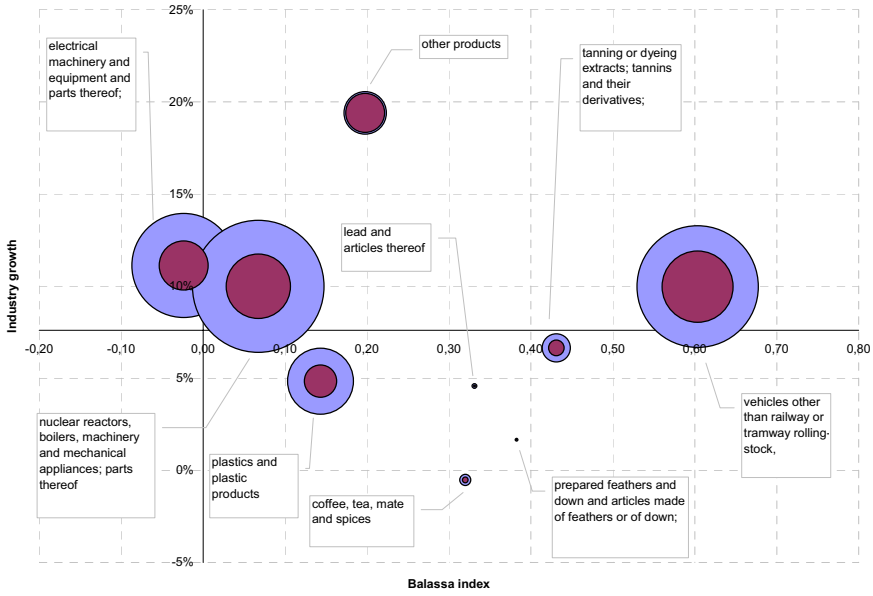

Fig. 6. Position of major industries, Germany 1999

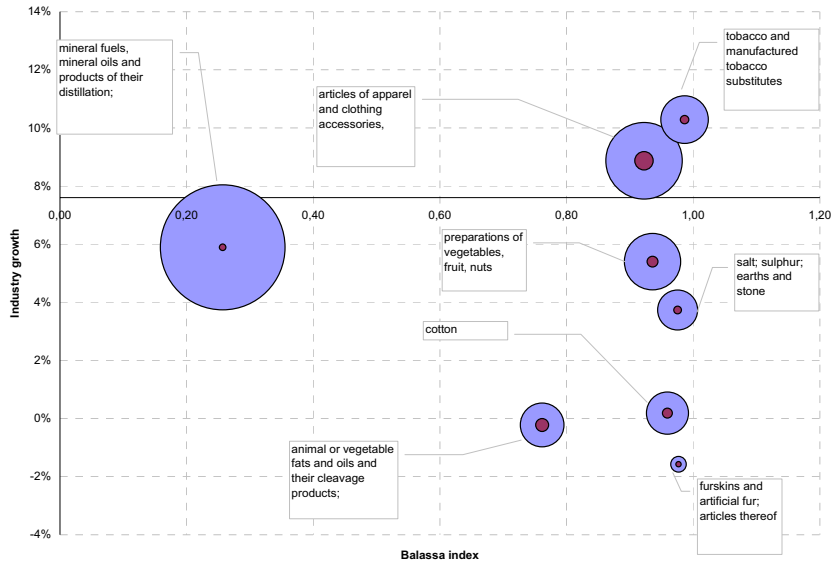

Fig. 7. Position of major industries, Greece 1999

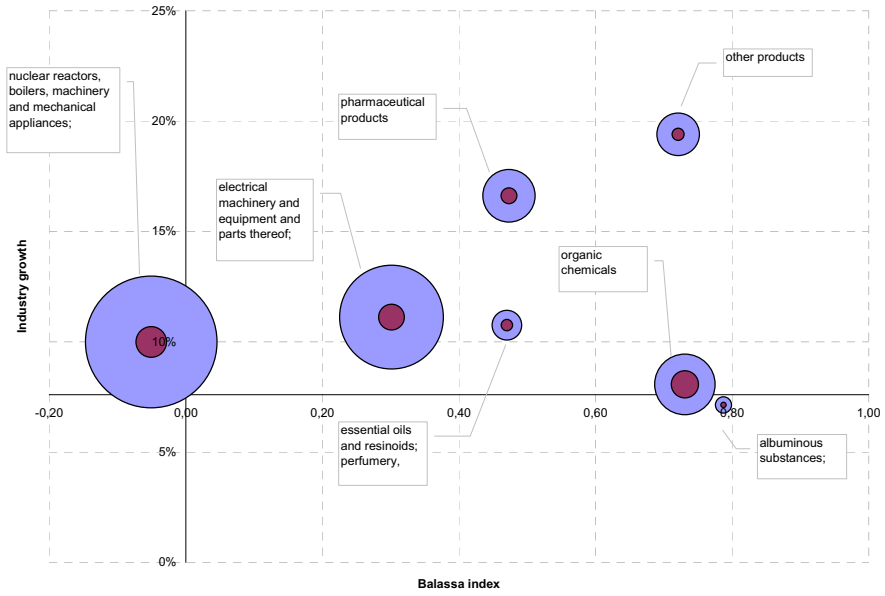

Fig. 8. Position of major industries, Ireland 1999

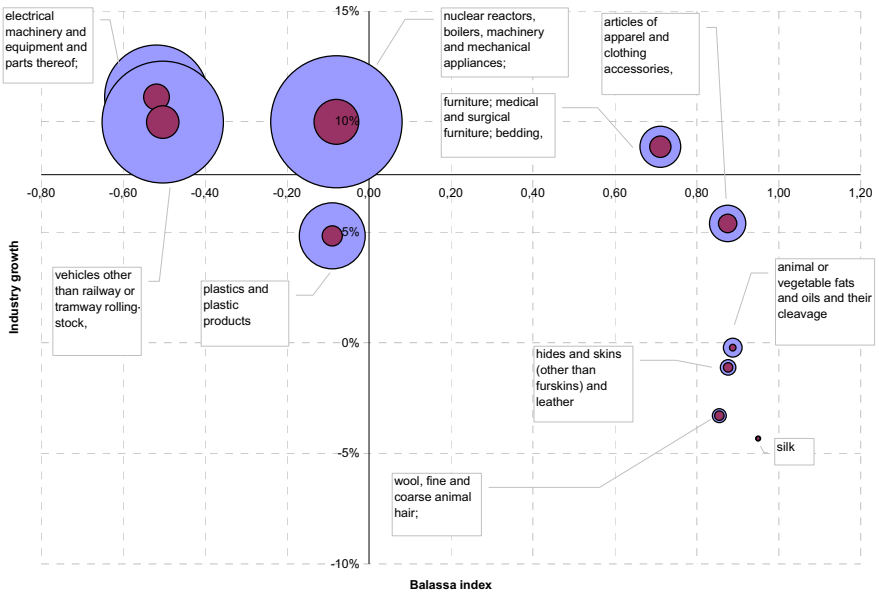

Fig. 9. Position of major industries, Italy 1999

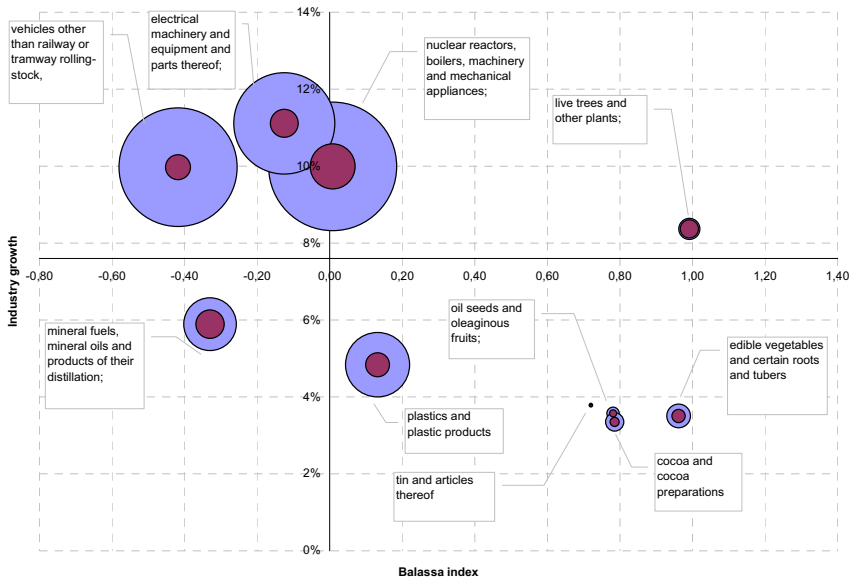

Fig. 10. Position of major industries, Netherlands 1999

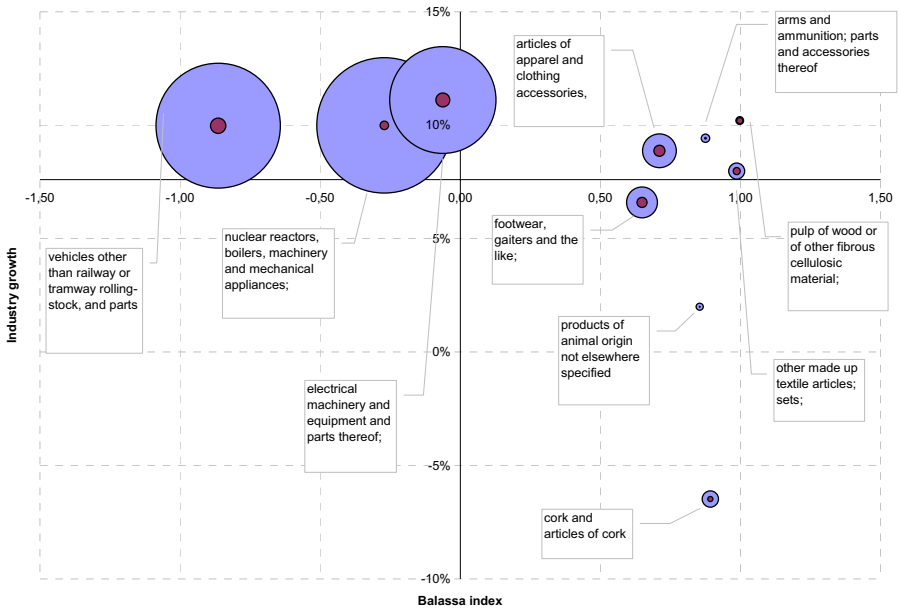

Fig. 11. Position of major industries, Portugal 1999

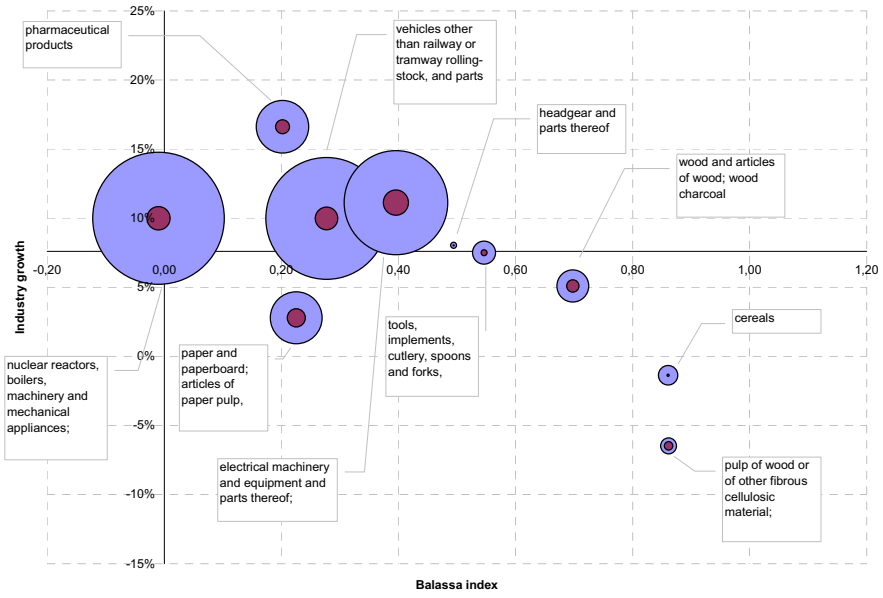

Fig. 12. Position of major industries, Sweden 1999

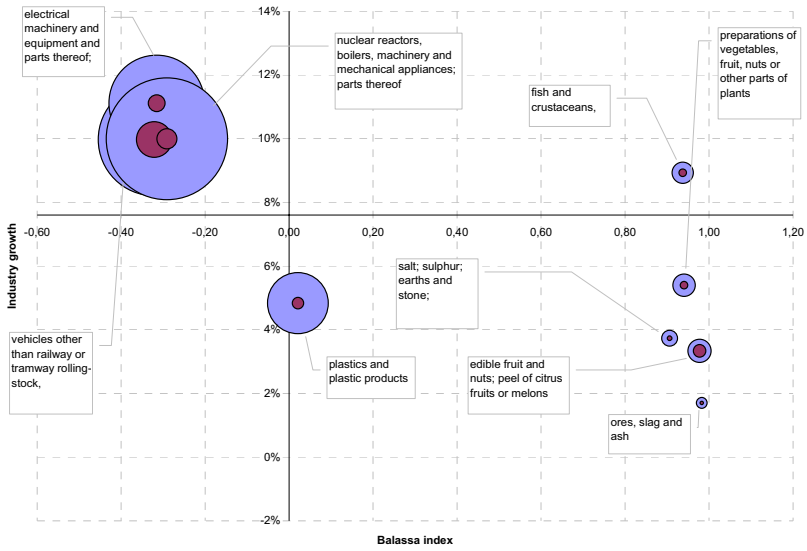

Fig. 13. Position of major industries, Spain 1999

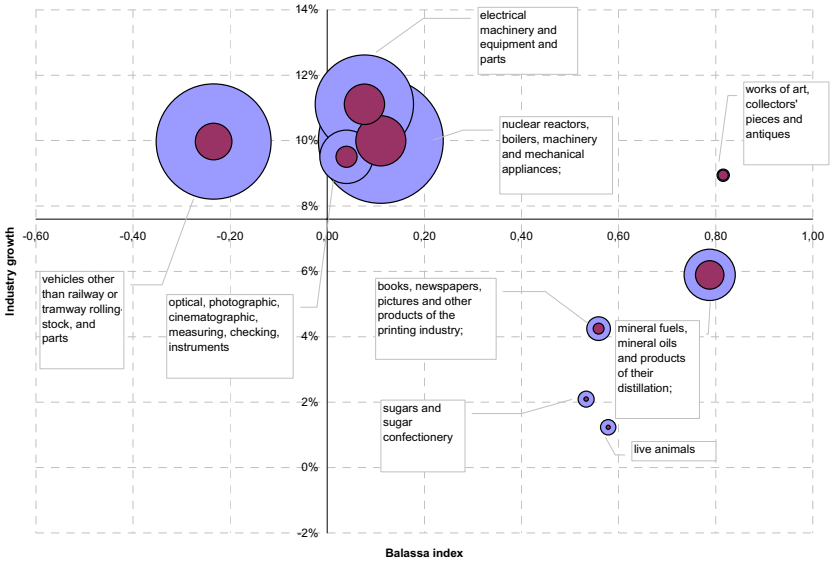

Fig. 14. Position of major industries, United Kingdom 1999